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The antecedents of sustainability-oriented entrepreneurial intentions: An exploratory study of Angolan higher education students

João M. Lopes [a,*], Nathalia Suchek [b], Sofia Gomes [c]

[a] Miguel Torga Institute of Higher Education, NECE-UBI – Research Unit in Business Sciences, University of Beira Interior, Estrada do Sineiro, s/n, 6200-209, Covilhã, Portugal
[b] NECE-UBI – Research Unit in Business Sciences, University of Beira Interior, Estrada do Sineiro, s/n, 6200-209, Covilhã, Portugal
[c] University Portucalense, REMIT - Research on Economics, Management and Information Technologies, R. Dr. António Bernardino de Almeida 541, 4200-072, Porto, Portugal

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ABSTRACT

Currently, economic recovery is being affected by the consequences of the Covid-19 pandemic, climate shocks, logistical interruptions in the supply of goods, global inflation, and rising commodity prices due to the war in Ukraine. By proposing a new modified conceptual model of the Theory of Planned Behavior (TPB) oriented toward sustainability, this study aims to analyze, in an exploratory way, the influence of three new antecedents (propensity to take risks, perceived creativity, and proactive personality) on the dimensions of TPB and the sustainable entrepreneurial intention of Angolan students. A quantitative methodology was used by applying the Partial Least Square (PLS) method to a sample of 308 responses from Angolan students attending higher education in Angola. The results show that the TPB dimensions positively influence the sustainability-oriented entrepreneurial intentions of students in Angola. Furthermore, the dimensions of the TPB may have as antecedents and, therefore, be explained by the risk-taking propensity, the proactive personality, and the perceived creativity, positively influencing the dimensions of the TPB and stimulating the sustainable entrepreneurial intention in Angola. We demonstrate through an extended TPB model that there are antecedents of TPB that can be learned and stimulated, positively influencing entrepreneurial intention and, as such, entrepreneurial activity in Angola. Thus, these results are particularly interesting for policymakers, higher education institutions, and students. This study proposes a new conceptual model oriented towards sustainable entrepreneurship that includes the TPB dimensions and three new personality factors as antecedents. In this work, we intend to contribute to accelerating economic growth in Angola, stimulating entrepreneurial activity, and simultaneously contributing to achieving the sustainable development goals set out in the 2030 Agenda.

1. Introduction

Currently, economies are trying to recover from the effects of the Covid-19 pandemic, global inflation, logistical disruptions in the supply of goods, rising commodity prices due to the war in Ukraine, and climate shocks (Africa Economic Outlook, 2022). These current challenges emphasize that Africa's population, especially the younger ones, cannot rely solely on the government and companies as employers but must create their businesses (Herrington and Coduras, 2019). The study of entrepreneurship in Africa has for years received less attention from researchers and official bodies such as the Global Entrepreneurship Monitor. However, the economic recovery has stimulated the study of entrepreneurship on this continent (Atiase et al., 2018; Dvouletý and Orel, 2019; Ratten and Jones, 2018). There is already evidence that entrepreneurial activity has contributed to the economic stimulus of Africa (Ajani et al., 2021; Koloba, 2017; Musara, 2020).

According to data from the GEM (2021), Angola is the African country that presented, in 2020, the highest Entrepreneurial Intention rate (83%) and highest Total Early-stage Entrepreneurial Activity (49.60%), seeming, however, forgotten by researchers given the scarcity of studies on it. Angola has less favorable conditions for entrepreneurship development compared to other African countries (e.g., South Africa, Nigeria). Thus, Angola has a less developed entrepreneurial ecosystem than other countries with low income per capita (GEM, 2021; Herrington and Coduras, 2019). However, according to Pinho and Thompson (2017), culture and social norms favor the propensity to start

* Corresponding author.
E-mail addresses: joao.lopes.1987@hotmail.com (J.M. Lopes), n.suchek@ubi.pt (N. Suchek), sofiag@upt.pt (S. Gomes).

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a business in Angola. Oppositely, the heavy administrative and bureaucratic structure are inhibitors of Angolan entrepreneurship (Pinho and Thompson, 2017). Besides this, there is also compliance with the 2030 Agenda at the level of sustainable development.

Regarding compliance with the sustainable development goals, Angola is ranked 149th out of 166 countries (Sachs et al., 2020), requiring a real decade of intervention to achieve them. In this context, entrepreneurship has been valued in recent decades as a solution to achieve greater sustainability through resolving social inequalities and preserving natural resources and the environment (Muñoz and Cohen, 2018). The fusion between traditional entrepreneurship, the environment, and society has led to the emergence of a new concept of sustainable entrepreneurship (Cohen and Winn, 2007). The goals of sustainable entrepreneurship are "preserve nature, life support, and community in the pursuit of perceived opportunities to bring into existence future products, processes, and services for gain, where gain is broadly construed to include economic and non-economic gains to individuals, the economy, and society" (p.137) (Shepherd and Patzelt, 2011).

In this context, Angola's higher education students could play a very active role in economic recovery and achieving sustainable development goals by promoting sustainable entrepreneurial activities. But to what extent do Angolan higher education students have a sustainable entrepreneurial intention? What antecedents could stimulate their attitudes and behaviors to boost their sustainable entrepreneurial intentions?

There is a gap in the literature between sustainable entrepreneurial behavior and sustainable entrepreneurial intention (Yasir et al., 2022). Studies are needed to study sustainable entrepreneurship and the formation of sustainable value, taking into account purpose (perception) and real actions (reality) (Sargani et al., 2021). It would also be pertinent to identify variables that influence sustainable entrepreneurial intentions based on personal values (Yasir et al., 2022). According to Sargani et al. (2021), it is recommended that further studies be carried out on sustainable entrepreneurship in emerging economies, requiring a larger scale analysis in order to be able to generalize the results. Fatoki (2020) warns of the need to develop new studies that relate sustainability-oriented entrepreneurial intentions (SOEI), the Theory of Planned Behavior (TPB), and personality factors, including students from different universities and departments, countries, and cultures. These new studies will help to generalize the results about SOEI (Fatoki, 2020).

Starting from the traditional relationship between the TPB and entrepreneurial intention of Ajzen (1991), which assumes personal attitude, subjective norms, and perceived behavioral control as antecedents of entrepreneurial intention, this study has three exploratory objectives: (1) to analyze the relationship between TPB and entrepreneurial intention from the perspective of sustainability; (2) to demonstrate through a modified model of TPB whether risk-taking propensity, perceived creativity, and proactive personality can be antecedents of entrepreneurial intention and (3) using the results of the first two objectives, to analyze the relationship of these three antecedents, when mediated by the relationship established by TPB, with sustainable entrepreneurial intention. These exploratory objectives will allow for a complete and alternative analysis of the entrepreneurial intention of Angolan higher education students.

This study brings three main contributions. First, this study adds to recent work on SOEI, TPB, and personality factors. Previous studies have not focused on SOEI but on entrepreneurial intention in general and in different contexts (e.g., Liñán and Chen (2009), Munir et al. (2019), Ng et al. (2021). In contrast, this study highlights that the TPB dimensions positively influence the SOEI of higher education students in Angola. Second, in contrast to previous studies that tended to focus on TPB and entrepreneurial intention (e.g., Lortie and Castogiovanni (2015), Kautonen et al. (2015), Shi et al. (2020), In this study, we examined the influence of three new antecedents (propensity to take risks, perceived creativity, and proactive personality) on TPB dimensions and SOEI in Angolan students. This approach allows us to highlight that the dimensions of the TPB can have as antecedents and, and be explained, the propensity to risk, the proactive personality and the perceived creativity, positively influencing the dimensions of the TPB and stimulating the SOEI in Angola. Finally, this study proposes a new SOEI-oriented conceptual model that includes the TPB dimensions and three new personality factors as antecedents.

2. Literature review

2.1. Sustainability-oriented entrepreneurial intentions (SOEI) and Theory of Planned Behavior

Today there is a great awareness of environmental and social challenges. This is reflected, for example, in the introduction of the sustainable development goals (SDG) by Agenda 2030 (United Nations, 2015) and the rise of circular economy principles (European Commission, 2020). With this paradigm shift, it is expected that current business will change and new business models will be developed simultaneously under the foundations of economic, environmental, and social development (Elkington, 1994).

To meet sustainable development, the necessary innovations should be introduced by entrepreneurs who, while identifying and pursuing economic opportunities, improve social and environmental conditions at local and global levels (Cohen and Winn, 2007). In this case, since evaluating a sustainability opportunity is a complex process involving not only financial but also ecological and societal gains, entrepreneurial intention and its antecedents also tend to be more complex (Muñoz and Cohen, 2018). For example, Kuckertz and Wagner (2010) observed that the sustainable orientation of individuals could contribute to the understanding of entrepreneurial intentions, but this influence will be lower as the business experience increases. For SOEI, TPB dimensions are frequently analyzed as interrelated with other antecedents (Romero-Colmenares and Reyes-Rodríguez, 2022; Vuorio et al., 2018; Yasir et al., 2021).

Since entrepreneurship, which is an intentional process of opportunity identification (Krueger et al., 2000), can be understood as a planned behavior, the TPB of Ajzen (1991), based on attitudes, subjective norms, and perceived behavioral control, become a very useful and widely accepted basis for understanding entrepreneurial intention (Krueger et al., 2000; Liñán and Chen, 2009; Liñán and Fayolle, 2015) with demonstrated validity (Kautonen et al., 2015). The interest in sustainable entrepreneurial intentions is a recent research area (Liñán and Fayolle, 2015), and as in research on traditional entrepreneurial intention, TPB (Ajzen, 1991) has proven to be the predominant basis for recent studies focused on SOEI in university students in South Africa (Fatoki, 2020), Nigeria (Agu, 2021), Pakistan (Sargani et al., 2021; Yasir et al., 2022), China (Sargani et al., 2021), Vietnam (Nguyen and Phan, 2021), India (Tiwari et al., 2017), Indonesia (Prabowo et al., 2022), Colombia (Romero-Colmenares and Reyes-Rodríguez, 2022), Netherlands and Germany (Thelken and de Jong, 2020) and Liechtenstein, Austria, and Finland (Vuorio et al., 2018). This suggests that, as in the case of traditional entrepreneurial intentions, the cognitive process of perceptions to intentions are similar across different cultures, with possible differences in the importance of their antecedents (Liñán and Chen, 2009).

The Angolan context differs from other countries, especially from sub-Saharan African countries, such as Nigeria and South Africa, where entrepreneurship framework conditions are more favorable (Herrington and Coduras, 2019). Yet, Angola is a factor-driven, low-income country, and its entrepreneurial ecosystem is less developed than the average of other low-income countries (GEM, 2021; Herrington and Coduras, 2019). Besides that, Angola shows a favorable culture and social norms that positively influence the social image of entrepreneurs, favoring their propensity to start a business. On the other hand, heavy administrative and bureaucratic structure act as major burdens that restrict the

capacity to start a business in the country (Pinho and Thompson, 2017).

The following topics describe how attitudes, subjective norms, and perceived behavioral control of the TPB model can relate to SOEI.

2.1.1. Attitude and SOEI

Attitudes refer to the degree to which an individual has a favorable or unfavorable evaluation or appreciation of a given behavior (Ajzen, 1991). Their subsequent intentions will be formed depending on how favorable individuals evaluate that behavior. Applied to the context of entrepreneurship, attitudes represent the desirability of becoming an entrepreneur (Krueger et al., 2000). In this sense, it is argued that the higher an individual's attitude toward entrepreneurship, the higher the entrepreneurial intention. In the review conducted by Lortie and Castogiovanni (2015) on the use of TPB for studying entrepreneurial intentions, all the articles analyzed supported the influence of attitudes on entrepreneurial intentions, demonstrating attitudes as a fundamental predictor. Research with samples of university students commonly gives support to attitude as the most important antecedent of entrepreneurial intentions (Munir et al., 2019; Ng et al., 2021; Phong et al., 2020; Rosique-Blasco et al., 2018; Shi et al., 2020; St-Jean and Labelle, 2018).

Previous studies indicate that university students' attitudes toward sustainability-oriented entrepreneurship positively influence sustainability-oriented intentions (Agu, 2021; Fatoki, 2020; Thelken and de Jong, 2020; Vuorio et al., 2018; Yasir et al., 2021). It means that the more favorable the attitudes toward starting a business that would enhance societal and ecological goals, the greater intention to become a sustainable entrepreneur. Few were cases in which this was not a significant factor, as verified in Vietnam during the Covid-19 pandemic (Nguyen and Phan, 2021) and in Indonesia (Prabowo et al., 2022). In the latter case, when the relationship is moderated by contextual factors such as educational, infrastructural, and relational support, the influence becomes significant, with a negative effect. In this way, contextual factors decreased the effect of attitudes toward behavioural intentions. Based on previous studies regarding SOEI, we hypothesized:

H1a. Angolan higher education students' attitude toward sustainable entrepreneurship positively influences their sustainability-oriented entrepreneurial intention.

2.1.2. Perceived behavioural control and SOEI

Perceived behavioral control is a dimension in TPB that represents the perceived ease or difficulty of performing a behavior, reflecting past experiences or anticipated impediments (Ajzen, 1991). In the case of entrepreneurship research, perceived behavioral control refers to a "sense of capacity regarding the fulfillment of firm-creation behaviors", including the feeling of being able and the perception of controllability of the behavior (Linan and Chen, 2009, p. 596). Lortie and Castogiovanni (2015) verified that 90% of the articles analyzed in their review supported the positive relationship between perceived behavioral control and entrepreneurial intentions. Research with university students also supports this relationship (Munir et al., 2019; Ng et al., 2021; Rosique-Blasco et al., 2018; Shi et al., 2020).

As in the case of attitudes and SOEI relationship, literature on SOEI highlights perceived behavioral control as a significant dimension of TPB when explaining SOEI (Fatoki, 2020; Romero-Colmenares and Reyes-Rodríguez, 2022; Thelken and de Jong, 2020; Yasir et al., 2021). Although, in some cases, such as in Nigeria (Agu, 2021) and Liechtenstein, Austria, and Finland (Vuorio et al., 2018), the perception of being capable of enhancing a sustainable entrepreneurial venture does not significantly influence entrepreneurial intention. Both studies showed subjective norms, or desirability, as the main antecedent of SOEI, followed by attitudes. In this sense, Vuorio et al. (2018) argue that the perception of a person's capability, skills, and know-how regarding becoming an entrepreneur may not be as important as in the context of traditional forms of entrepreneurship. Based on previous literature is therefore expected that:

H1b. Angolan higher education students' perceived control behavior positively influences their sustainability-oriented entrepreneurial intention.

2.1.3. Subjective norms and SOEI

The subjective norms reflect a social factor related to perceived social pressure to perform or not perform the behavior (Ajzen, 1991). In the case of entrepreneurship, it reflects the perception regarding the opinion of people of reference, such as family and friends, about the decision to become an entrepreneur (Kautonen et al., 2015; Liñán and Chen, 2009). Previous research on entrepreneurial intentions shows less consistent results for the subjective norms dimension considering the TPB (Lortie and Castogiovanni, 2015; Munir et al., 2019).

Studies regarding SOEI have found evidence that the opinion of close people is important for university students (Agu, 2021; Romero-Colmenares and Reyes-Rodríguez, 2022; Tiwari et al., 2017; Yasir et al., 2021). Indeed, in some cases, it is the most influential dimension of TPB, as referred to above (Agu, 2021; Vuorio et al., 2018). In contrast, in contexts such as South Africa (Fatoki, 2020), Indonesia (Prabowo et al., 2022), and Netherlands and Germany (Thelken and de Jong, 2020), subjective norms are shown not significant, suggesting that the importance of individuals or groups' opinions on the SOEI of university students is weak. Thelken and de Jong (2020) argue that given the low exposure of the general public to sustainable entrepreneurial situations and experiences, knowledge and awareness of sustainable entrepreneurship is relatively limited, which in turn may explain the limited influence of subjective norms. Thus, we propose that:

H1c. Angolan higher education students' subjective norms positively influence their sustainability-oriented entrepreneurial intention.

2.2. Risk-taking propensity and attitude towards sustainable entrepreneurship

Studies in the field of conventional entrepreneurial intentions highlight risk-taking propensity as an important personality trait in the context of entrepreneurial intentions (Brandstätter, 2011). Direct effects of risk-taking propensity on entrepreneurial intentions are verified (Schlaegel et al., 2021), as well as risk-aversion influences entrepreneurial intentions negatively (Rosique-Blasco et al., 2018). But when dealing with SOEI, Fatoki (2020) has found no direct effects of risk-taking propensity. Despite this, Hoogendoorn et al. (2019) suggest no significant differences concerning the willingness to take risks between sustainable and regular entrepreneurs.

Indeed, personality traits typically have shown an indirect influence on entrepreneurship by influencing key attitudes and general motivation to act (Krueger et al., 2000). Thus, it would be possible to suggest that individuals with a greater propensity to take risks present more favorable attitudes toward becoming an entrepreneur. Besides that, in the case of conventional entrepreneurial intentions, some studies report no significant influence of risk-taking propensity on attitudes toward entrepreneurship (Farrukh et al., 2018; Mahmood et al., 2019). In contrast, Munir et al. (2019) found a significant positive impact of risk-taking propensity on entrepreneurial intentions in Chinese and Pakistani university students.

Besides the controversial results, some authors suggest that attitudes toward entrepreneurship mediate the relationship between risk-taking propensity and entrepreneurial intentions (Farrukh et al., 2018; Munir et al., 2019). As sustainable entrepreneurship deals with opportunities derived from environmental and social problems surrounded by uncertainty, it is hypothesized that:

H2a. Angolan higher education students' risk-taking propensity positively influences their attitude toward sustainable entrepreneurship.

H2b. Angolan higher education students' risk-taking propensity positively influences their sustainability-oriented entrepreneurial intention

when mediated by attitude toward sustainable entrepreneurship.

2.3. Perceived creativity and perceived behavioral control

Creativity can promote the enhancement of entrepreneurial intention by improving the awareness and skills related to entrepreneurship, being a personality factor often overlooked in research on entrepreneurial intentions (Shi et al., 2020). Although direct effects are found between perceived creativity and conventional entrepreneurial intentions (Laguía et al., 2019; Rodrigues et al., 2019; Rosique-Blasco et al., 2018) or SOEI (Fatoki, 2020), some scholars argue that creativity alone will not stimulate favorable intentions to start a new venture (Hu et al., 2018; Nguyen and Phan, 2021). In fact, individual creativity may help individuals to believe in their abilities and gain confidence that they could undertake the risky task of venturing into a new business (Nguyen and Phan, 2021).

In this sense, creativity is positively related to entrepreneurial self-efficacy (Rosique-Blasco et al., 2018) and perceived behavioral control (Nguyen and Phan, 2021; Tiwari et al., 2017). Also, recent studies suggest that perceived behavior control (Tiwari et al., 2017) and self-efficacy (Laguía et al., 2019; Rosique-Blasco et al., 2018) are considered mediators of the relationship between perceived creativity and entrepreneurial intentions, which means that students who perceive themselves as being creative may believe this makes them more capable of performing entrepreneurial tasks. In this way, it is hypothesized that:

H3a. Angolan higher education students' perceived creativity positively influences their perceived control behavior

H3b. Angolan higher education students' perceived creativity positively influences their sustainability-oriented entrepreneurial intention when mediated by perceived behavioral control.

2.4. Proactive personality and subjective norms

Proactive personality is a personality trait known for its positive influence on entrepreneurial intentions since proactive individuals identify opportunities and act on them (Crant, 1996; Munir et al., 2019; Phong et al., 2020; Rosique-Blasco et al., 2018). A proactive individual triggers environmental change (Bateman and Crant, 1993). A proactive personality could predict sustainability behaviors since proactive people are more likely to proactively protect the environment and take environmentally sustainable actions (Pavalache-Ilie and Cazan, 2018). Only Fatoki (2020) has studied the effects of a proactive personality on SOEI, founding a direct positive influence. The author argues that a proactive personality can positively impact entrepreneurial intention and behavior since proactive individuals are more alert to opportunities.

Besides that, the indirect effects on entrepreneurial intentions are less explored. Research on traditional entrepreneurial intentions has shown that proactive personality may indirectly influence entrepreneurial intentions through TPB dimensions (Hu et al., 2018; Mahmood et al., 2019; Rosique-Blasco et al., 2018). Previous studies have found effects of proactive personality in the subjective norms (Andrade dos Santos et al., 2021; Munir et al., 2019) and, through subjective norms, effects on entrepreneurial intentions (Munir et al., 2019). These findings suggest that proactive individuals, who tend to initiate and maintain actions that directly alter the surrounding environment (Bateman and Crant, 1993), may perceive that subjective norms regarding starting a sustainability-oriented business are favorable, which in turn can influence their SOEI. In this perspective, we propose:

H4a. Angolan higher education students' proactive personality positively influences their subjective norms.

H4b. Angolan higher education students' proactive personality positively influences their sustainability-oriented entrepreneurial intention when mediated by subjective norms.

Fig. 1 shows the structural model.

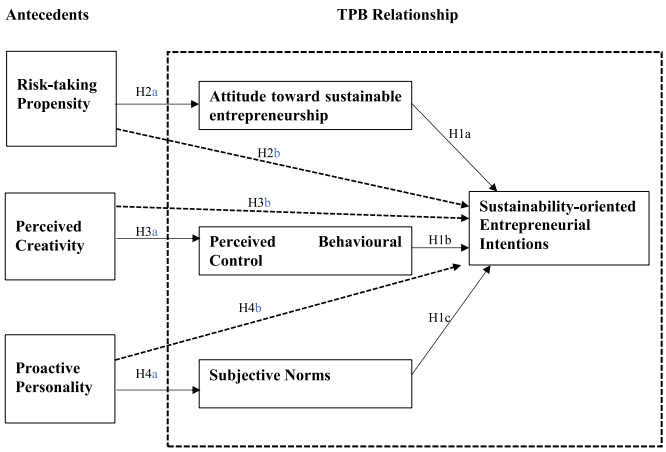

Fig. 1. Structural model
Note: Direct Effect.⟶; Indirect Effect.-----▶.

3. Methods

3.1. Data and research population

The sample for this study was collected through a questionnaire made available online, between September 2021 and May 2022. The participation condition of the research population was identified through an introductory question (yes/no): "Resides in Angola and attends higher education in Angola". If the participant answered "no", the questionnaire ended. If they answered "yes" they would proceed to the remaining sections. The questionnaire was disseminated on the authors' social networks and through Angolan students studying in Portugal, who, in turn, used their contacts on social networks and WhatsApp to disseminate the questionnaire in Angola. Thus, it is a non-probabilistic convenience sample. The population of this study was students who attend higher education and live in Angola, having obtained 308 valid responses. The sample is not representative of the Angolan population enrolled in higher education in Angola. A pre-test was conducted with 15 Angolan students to assess their understanding of the research population questions, and the purpose of the study was explained to all participants. The questionnaire was completely anonymous, and their participation was voluntary. Informed consent was also obtained from the entire research population.

Regarding the characterization of the sample (Table 1), 51% are female students, and 49% are male students. The average age is 25.42 years, with a minimum age of 18 and a maximum age of 53.87% of the research population are undergraduate and study mainly business sciences (25.3%), health (24.7%), law (10.4%), engineering and related (9.1%), and computer science (8.4%). Regarding occupation, 46.8% are students, and 53.2% are working students. There is a concentration of the research population in terms of residence in Luanda (57.8%) and Huambo (33.8%).

3.2. Data measurement

The questionnaire consists of seven groups of questions in addition to sociodemographic questions about the research population. The first group of questions is associated with attitude toward sustainable entrepreneurship and consists of six questions adapted from Vuorio et al. (2018) and Arru (2020). The second group of questions is about subjective norms with five questions, and the third group is about perceived behavior control with three questions. The questions in groups two and three were adapted from Vuorio et al. (2018) e Fatoki (2020). The fourth group is related to perceived creativity with three questions, and the fifth group is related to proactive personality with six questions. The questions in these two groups were adapted from Hu et al. (2018). The

Table 1
Description of the research population.

Variable	Valid Percent
Gender	
Man	49.0%
Woman	51.0%
Age	
Between 18–20 years	16.2%
Between 21–25 years	53.9%
More than 25 years	29.9%
Professional situation	
Student	46.8%
Student worker	53.2%
Cycle of studies in higher education	
1st Cycle	87.0%
2nd Cycle	5.8%
Other	7.1%
Study Area	
Business Sciences	25.3%
Health	24.7%
Law	10.4%
Engineering and related	9.1%
Computer Sciences	8.4%
Others	22.1%
Residence	
Luanda	57.8%
Huambo	33.8%
Other	8.4%

last group of questions is related to risk-taking propensity, with seven questions adapted from Farrukh et al. (2018). All questions were measured on a 5-point scale with "1 - strongly disagree" and "5 - strongly agree". Table 2 shows studies that have previously explored the variables under study.

3.3. Methodology

This study uses a quantitative methodology. First, a statistical analysis of the variables used in this study is carried out. Then the hypotheses of the structural model were tested using the Partial Least Square (PLS) method. The PLS method is a method suitable for this type of study since the data collected do not have a normal distribution and allows for optimizing the relationships between the items collected and the latent variables created and between latent variables, allowing to achieve the objective of this study (Ringle et al., 2020).

4. Results

4.1. Descriptive analysis

Table 3 shows the means and standard deviation of the variables presented in the structural model. The research population generally agreed with the questioned items ($M > 3$). Regarding the antecedents of sustainability-oriented entrepreneurial intention, in Risk-Taking Propensity (RTP), the question that generated the highest agreement, in average terms by the research population, was the valuation of chances ($M = 4.69$), followed by the fact of being cautious in unpredictable situations ($M = 4.39$); in perceived creativity (PC) the taste for trying new things was valued, even with the risk of failing ($M = 4.31$) and the ease of thinking of many different and useful ideas ($M = 4.31$). In Proactive Personality (PP) was the constant search for situations to improve life ($M = 4.55$) and the constant search to do things in a better way ($M = 4.54$). In the Attitude toward sustainable entrepreneurship (ATSE), the question that generated, on average, the highest level of agreement was the one regarding the positive use of natural resources ($M = 4.51$); in the Subjective Norms, they valued the influence of news media on sustainability to start a new sustainability-oriented business ($M = 3.53$) and in the Perceived Behavior Control (PBC) the certainty that they want to start a sustainability-oriented business. Finally, regarding the items measuring Sustainability-oriented Entrepreneurial Intentions (SOEI), on average, the research population valued the willingness to become sustainability-oriented entrepreneurs ($M = 3.98$).

Table 2
Paper that used the constructs.

Variables	Authors
Sustainability-oriented Entrepreneurial Intentions (SOEI)	Khan et al. (2021), Vuorio et al. (2018), Fatoki (2020)
Attitude toward sustainable entrepreneurship (ATSE)	Waris et al. (2021), Yasir et al. (2022), Sargani et al. (2021)
Perceived Behavioural Control (PCB)	Agu (2021), Fatoki (2020), Joensuu-Salo et al. (2022), Yasir et al. (2021), Romero-Colmenares and Reyes-Rodríguez (2022)
Subjective Norms (SN)	Agu (2021), Romero-Colmenares and Reyes-Rodríguez (2022), Sargani et al. (2020), Thelken and de Jong (2020), Waris et al. (2021), St-Jean and Labelle (2018)
Risk-taking Propensity (RTP)	Farrukh et al. (2018), Fatoki (2020)
Perceived Creativity (PC)	Hu et al. (2018), Fatoki (2020)
Proactive Personality (PP)	Khan et al. (2021), Fatoki (2020)

Table 3
Statistical description of the structural model variables.

Variables	Mean	Std. Deviation
Risk-Taking Propensity (RTP)		
RTP1	4.25	1.037
RTP2	4.05	1.174
RTP3	3.52	1.246
RTP4	4.69	0.651
RTP5	4.39	0.915
RTP6	3.88	1.210
RTP7	3.66	1.317
Perceived Creativity (PC)		
PC1	4.21	0.882
PC2	4.31	1.018
PC3	4.31	1.056
Proactive Personality (PP)		
PP1	4.55	0.823
PP2	4.03	1.085
PP3	3.92	1.197
PP4	4.30	1.002
PP5	4.54	0.758
PP6	4.29	0.955
Attitude toward sustainable entrepreneurship (ATSE)		
ATSE1	4.44	0.891
ATSE2	4.12	1.160
ATSE3	4.34	1.041
ATSE4	4.38	0.983
ATSE5	4.38	0.877
ATSE6	4.51	0.970
Subjective Norms (SN)		
SN1	3.42	1.434
SN2	3.50	1.524
SN3	3.51	1.558
SN4	3.53	1.454
SN5	3.32	1.500
Perceived Behavioural Control (PCB)		
PBC1	4.07	1.165
PBC2	3.92	1.240
PBC3	2.98	1.428
Sustainability-oriented Entrepreneurial Intentions (SOEI)		
SOEI1	3.98	1.258
SOEI2	3.88	1.273
SOEI3	3.97	1.278

4.2. Evaluation of reflective measurement model

The model obtained from the application of the PLS method to the structural model needs to be validated in terms of reliability, having been used for this purpose, according to Ahmad et al. (2016), Hair et al. (2019), Hair et al. (2017) and Henseler et al. (2015), Cronbach's Alpha

(Cα > 0.70), Composite Reliability (CR > 0.70) and Average Variance Extracted (AVE >0.50). The discriminant validity of the variables should also be assessed, and the Fornell-Larcker criterion was used. The results of these measures are shown in Table 4. All the results obtained are higher than the reference values, and, as such, the model is reliable and convergent. There is also discriminant validity between the latent variables, and the way they are measured according to the application of the Fornell-Larcker criterion since the square root of the AVE of each of the variables (bold on the diagonal) is higher than the correlation of each latent variable (off-diagonal).

4.3. Explanatory analysis

The coefficient of determination R^2 of the endogenous variables ATSE, SN, PCB, and SOEI and the relevance (Stone-Geisser Q^2) were also evaluated based on the cross-validated redundancy approach. As Q^2 is greater than zero (Q^2 ATSE: 0.034; Q^2 PCB: 0.110; Q^2 SN: 0.052; Q^2 SOEI: 0.411), the model obtained from applying the PLS method is relevant to explain the variables. The independent variable RTP explains 9.5% of the variance of the dependent variable ATSE ($R^2 = 0.095$), variable PP explains 8.8% of the variance of variable SN ($R^2 = 0.088$), and variable PC explains 16.7% of the variance of variable PCB ($R^2 = 0.167$). Finally, the model has a good fit (Chi-Square = 0.097; Goodness-of-Fit: 0.946; Comparative Fit Index: 0.8765; Standard Root Mean Square Residual: 0.094).

Table 5 presents the results of the hypotheses obtained by the bootstrapping analysis performed by the PLS method.

The relationship established by TPB and sustainable entrepreneurial intention is also confirmed by H1a, H1b, and H1c. The results suggest that there is a positive relationship (β = 0.308) between Risk-taking propensity (RTP) with Attitude toward Sustainable Entrepreneurship (ATSE), confirming H2a. There is also a positive relationship between Perceived Creativity (PC) with Perceived Control behavior and Proactive Personality (PP) with Subjective norms (β = 0.409 and β = 0.297, respectively), confirming H3a and H4a.

Table 6 shows the results of exploring the relationships between antecedents and sustainable entrepreneurial intention when mediated by the dimensions of the sustainability-oriented TPB.

The results suggest that there is a positive relationship between Risk-taking propensity (RTP), Perceived Creativity (PC), and Proactive Personality (PP) with Sustainability-Oriented Entrepreneurial Intentions (SOEI) when mediated by the sustainability-oriented dimensions of TPB, confirming hypotheses H2b, H3b, and H4b.

Table 5
Direct effects on dependence variables.

Effects on Endogenous Variable	Path (β)	*t* Value (Bootstrap)	Confidence Interval (2,5%; 97,5%)	Support
TPB relationship				
H1a: ATSE > SOEI	0.230	4.119*	Sig (0.124; 0.344)	Yes
H1b: PCB > SOEI	0.434	6.774*	Sig (0.299; 0.553)	Yes
H1c: SN > SOEI	0.168	2.559**	Sig (0.035; 0.295)	Yes
Antecedents				
H2a: RTP> ATSE	0.308	6.248*	Sig (0.236; 0.431)	Yes
H3a: PC > PCB	0.409	7.174*	Sig (0.292; 0.505)	Yes
H4a: PP > SN	0.297	6.061*	Sig (0.217; 0.403)	Yes

Note: *p = 0.000; **p < 0.010.

Table 6
Indirect effects on dependence variable Sustainability-Oriented Entrepreneurial Intentions.

	Path (β)	*t* Value (Bootstrap)	Confidence Interval (2,5%; 97,5%)	Support
H2b: RTP> ATSE > SOEI	0.071	3.323**	Sig (0.039; 0.101)	Yes
H3b: PC > PCB > SOEI	0.177	4.269*	Sig (0.096; 0.260)	Yes
H4b: PP > SN > SOEI	0.050	2.139*	Sig (0.011; 0.403)	Yes

Note: *p = 0.000; **p < 0.010.

5. Discussion of results and implications

5.1. Discussion of results

The proposed research hypotheses were all confirmed. Regarding the positive influence of attitudes, subjective norms, and perceived behavioral control on sustainability-oriented entrepreneurial intention in Angolan students, our results are in line with previous research that confirms that the three TPB antecedents are predictors of SOEI (Romero-Colmenares and Reyes-Rodríguez, 2022; Yasir et al., 2022), thus confirming that TPB is an adequate basis for predicting SOEI. More specifically, the analyzed sample of Angolan students shows similar results to Indian students regarding social entrepreneurial intention (Tiwari et al., 2017) and students from Pakistan and Malaysia regarding traditional entrepreneurial intention (Farrukh et al., 2018; Mahmood et al., 2019) with perceived behavior control being the dimension of TPB with the greatest influence on sustainability-oriented entrepreneurial intention, followed by attitudes towards sustainable entrepreneurship and finally subjective norms. These results provide evidence that the sense of being capable of enhancing a sustainable entrepreneurial venture is the most important TPB dimension predicting higher education students' intentions to become sustainable entrepreneurs in Angola. Favorable attitudes towards starting a business that would enhance societal and ecological goals come following, and the opinion of reference people reference, such as family and friends, about the decision to become a sustainable entrepreneur, which corresponds to subjective norms, are the less important TPB dimension.

Other studies in sub-Saharan Africa regarding SOEI showed that South African university students are mainly affected by perceived

Table 4
Evaluation of the model obtained from the application of the PLS method.

	Ca	CR	AVE	RTP	PC	PP	ATSE	SN	PCB	SOEI
Risk-taking propensity (RTP)	0.720	0.797	0.566	**0.752**						
Perceived Creativity (PC)	0.770	0.866	0.684	0.612	**0.827**					
Proactive personality (PP)	0.789	0.849	0.587	0.675	0.650	**0.766**				
Attitude toward sustainable entrepreneurship (ATSE)	0.731	0.813	0.524	0.308	0.295	0.343	**0.724**			
Subjective Norms (SN)	0.858	0.899	0.644	0.322	0.321	0.297	0.517	**0.802**		
Perceived Behavior Control (PCB)	0.776	0.870	0.692	0.374	0.409	0.428	0.369	0.591	**0.832**	
Sustainability-oriented entrepreneurial intentions (SOEI)	0.940	0.962	0.894	0.389	0.394	0.469	0.478	0.544	0.619	**0.945**

Note: AVE Square Root in bold.

behavioral control followed by attitudes. However, subjective norms do not significantly predict entrepreneurial intention (Fatoki, 2020). In contrast, subjective norms are the main predictor of SOEI in Nigeria, with perceived behavioral control showing no effects on the SOEI of university students (Agu, 2021). Given the social image of the entrepreneur in Angola (Pinho and Thompson, 2017), one could suggest that social norms could have a more impactful effect on SOEI. However, even with the difficulties in doing business verified in the Angolan context (World Bank, 2020), the perception that an individual is capable of undertaking a sustainable venture is more important. This may suggest that, as verified in a developed context study (Thelken and de Jong, 2020), knowledge regarding sustainable entrepreneurship may not have been disseminated widely, inhibiting the effect of subjective norms. Once attitudes are frequently found as the most important predictor of traditional entrepreneurial intentions in university students, the lack of sustainable development and sustainable entrepreneurship awareness is also relevant when considering the sustainability-oriented attitudes of Angolan students.

Regarding personality factors (i.e., risk-taking propensity, perceived creativity, and proactive personality), we extend the findings of Fatoki (2020) by showing that these personality factors can also indirectly influence SOEI. The results of this paper are in agreement with the literature that such personality determinants can be antecedents of attitudes towards sustainable entrepreneurship, perceived behavioral control, and subjective norms, respectively (Andrade dos Santos et al., 2021; Munir et al., 2019; Nguyen and Phan, 2021; Tiwari et al., 2017). Moreover, these determinants, mediated by the TPB dimensions, influence sustainability-oriented entrepreneurial intention. These results align with previous literature, suggesting that personal determinants indirectly affect traditional (Farrukh et al., 2018; Krueger et al., 2000; Munir et al., 2019; Nguyen and Phan, 2021) and social (Tiwari et al., 2017) entrepreneurial intention.

Especially in the case of risk-taking propensity, which showed no significant effects on students in South Africa (Fatoki, 2020), we found that in Angola, individuals with high risk-taking propensity will have more favorable attitudes regarding sustainable entrepreneurship and, through these attitudes, will influence the intentions to become an entrepreneur who deals with environmental and societal goals. Additionally, we found that creative individuals will feel more confident about starting a sustainable business. In this way, perceived behavioral control mediates the relationship between creative personality and SOEI. Finally, our results show that individuals with higher levels of proactive personality will perceive the opinion of reference people more favorably and, consequently, show a superior sustainability-oriented entrepreneurial intention.

5.2. Theoretical implications

The present study contributes to deepening the knowledge of entrepreneurial intention in Angola, which despite being one of the countries in Africa with the highest rate of entrepreneurial intention and creation of new companies, seems to have been forgotten in scientific terms. Furthermore, there are few studies on sustainable entrepreneurship in Africa, especially in Angola, considering the current Agenda 2030 that needs to be fulfilled. It also contributes to quantitatively substantiating the literature on the link between TPB and entrepreneurial intention from the sustainability perspective. On the other hand, it proposes an extension to the sustainability-oriented TPB, pointing out new determinants (risk-taking propensity, perceived creativity, and a proactive personality) that can be antecedents to the constructs of the TPB, being the first time that, in a study, these determinants are used simultaneously as antecedents.

5.3. Practical implications

Regarding practical implications, we consider that the present study's findings particularly interest policymakers, businesses, higher education institutions and students, potential entrepreneurs, and society.

The present study's findings point out that attitude toward sustainable entrepreneurship, perceived behavioral control, and subjective norms (TPB constructs) positively affect sustainable entrepreneurial intention in Angola. The TPB constructs can be developed and fostered throughout the training process of individuals. In primary, secondary, and higher education, sustainability-oriented curricular units (e.g., sustainable entrepreneurship) should be included, which provide new and positive views on entrepreneurship and sustainability (Khan et al., 2021; Vuorio et al., 2018). Alternatively, they can adjust the programs of some already existing course units. Higher education institutions can also promote new undergraduate or postgraduate courses that include sustainable entrepreneurship (Lans et al., 2014; Thelken and de Jong, 2020). They can also organize competitions to create business plans oriented towards sustainability and create partnerships with incubators to foster and increase support for business creation by higher education students (Lopes et al., 2018). Higher education institutions can organize initiatives to invite entrepreneurs with sustainable business models to share their experiences with students. To promote tacit knowledge, higher education institutions can provide internships for students in sustainable enterprises (Fatoki, 2020).

Moreover, the implementation of sustainable practices by educational institutions (e.g., encouraging the purchase of digital content instead of physical books, making available only digital content, allowing the delivery of assignments in digital format, reusing water, producing green energy, recycling waste), can develop and increase students' attitude towards sustainability. However, sustainable entrepreneurship tends to improve the conditions of the local community at the social and environmental level, as it is not limited to enjoying the benefits arising from the use of social and natural resources. Thus, it can be stated that sustainable entrepreneurship contributes to the development of society (Vuorio et al., 2018).

On the other hand, the responsibility for changing the attitudes of society at large toward sustainable behavior has been pointed toward policymakers (Owens and Driffill, 2008; Yasir et al., 2021). Thus, through long-term programs and policies, policymakers should encourage sustainable entrepreneurship (Fatoki, 2020; Khan et al., 2021). Policymakers can examine the possibility and feasibility of establishing research facilities to study and promote innovation in sustainable entrepreneurship (Yasir et al., 2022). These policies must be reflected and clear in the government program, and the government program must be defined taking into account the sustainable development goals set out in Agenda 2030. It is essential to cultivate a sustainable entrepreneurial culture.

Changing a business culture is a long process in which companies already in the market will have to transform their traditional business models into innovative and sustainable ones which meet the sustainable development goals defined in Agenda 2030. The creation of new innovative and sustainable business models will enable companies to create new services and products, as well as may enable companies to explore new markets (Sargani et al., 2021). In this way, these new businesses will have positive economic, environmental and social impacts, increasing sustainable regional and national development.

Regarding antecedents, this study includes three personality factors (risk-taking propensity, proactive personality, and perceived creativity). They positively boost their sustainable entrepreneurial intention in Angola, either directly or indirectly. These personality factors are intrinsic factors of personal values and play a relevant role in SOEI (Bolzani and Foo, 2018; Israr and Saleem, 2018). Moreover, these determinants can be learned and taught, leading to a set of relevant practical implications for new theoretical results in entrepreneurship and economic growth.

Concerning risk-taking propensity, the results suggest that rulers have policies that decrease the perception of risk by a given individual to

set up a business. Since risk-taking propensity is influenced by cultural environments (Farrukh et al., 2018), policymakers can create regulations that, up to a certain amount of debt, when opening businesses aimed at sustainability, entrepreneurs can close the company without getting into debt. Public funds would secure this amount. In order to facilitate and foster the creation of new sustainable businesses, policymakers can also study new sources of financing to be made available to potential entrepreneurs (Yasir et al., 2022). These new forms of financing may include access to subsidized credit, i.e., lower rates and interest, grace periods, and interest for new sustainable businesses. Policymakers can also create regulations that promote tax savings for businesses with sustainable entrepreneurial activities. Such new regulations could include lowering taxes on businesses, the possibility of loss deduction for more years, and the possibility of greater expense deductions.

Universities can promote differentiated entrepreneurship programs for students according to their risk-taking propensity and work on students' resilience and risk tolerance by intensifying entrepreneurial experiences and entrepreneurship education (Antoncic et al., 2018; Arpiainen and Kurczewska, 2017).

Proactive personality and perceived creativity in entrepreneurship can be learned (Morrison and Johnston, 2003; Syam et al., 2018; Verzat et al., 2017). Innovation and creativity are recognized as factors that promote sustainable development (Cheng, 2019). Thus, it is essential that at an early stage of the whole training process (from basic education to higher education) of students, subjects such as innovation, entrepreneurship, and business creation are included. Contests of ideas and brainstorming should also be promoted, as well as the creation of business incubators in universities. Universities should create conditions to support and stimulate their students' creativity, as perceived organizational support and emotional support can increase levels of creativity (Anjum et al., 2021; Laguía et al., 2019).

5.4. Limitations of the study and future lines of research

The study has some limitations. The sample size is not representative of the Angolan population that attends higher education. As such, the sample of this study is not random, and the results cannot be generalized. The data were only collected in Angola so that other studies could be carried out in other countries. The data collected did not focus on any particular course. Thus, further studies can be developed to see if there are differences in sustainable entrepreneurial intention between courses. The paper does not consider the age of the research population. However, it may be interesting to introduce this variable, as the literature suggests that age is an important determinant of entrepreneurial intention. In this way, studies that include and compare generations X, Y, and Z can be carried out. More studies are needed to analyze gender differences in SOEI. Other studies can also be conducted comparing the SOEI by continent (North America, South America, Asia, Europe, Africa, and Australia). Longitudinal studies are also recommended in order to complement the present study's results, allowing the generalization of the results. Since the present study is quantitative, it could be pertinent to conduct interviews with higher education students to deepen their knowledge of SOEI, TPB, and personality factors. The study was analyzed from the perspective of TPB, but other studies can be carried out taking into account other theories (e.g., social cognitive, social cognitive career, regret regulation, proactive personality, entrepreneurial event model). The SOEI can also be analyzed by considering the type of entrepreneurship (necessity or opportunity).

6. Conclusion

In recent years, African countries such as Angola have been experiencing above-average economic growth. However, the Covid-19 pandemic and the war in Ukraine have imposed significant challenges at the economic and social levels. In addition, there is the imposition of compliance with the sustainable development goals defined in Agenda 2030, with Angola at the bottom of the compliance ranking with these goals.

In this context, sustainable entrepreneurship has been identified as one of the solutions for green economic growth, solving problems of social inequalities and preserving natural resources and the environment. Two research questions were formulated: 1) To what extent do Angolan higher education students have sustainable entrepreneurial intentions? 2) What antecedents could stimulate their attitudes and behaviors to boost their sustainable entrepreneurial intention in Angola?

The study shows that Angola's higher education students have sustainable entrepreneurial intentions. Moreover, the constructs of TPB (attitude toward sustainable entrepreneurship, perceived behavioral control, subjective norms) positively influence the SOEI of Angola's higher education students. Regarding antecedents, it was found that the risk-taking propensity, perceived creativity, and proactive personality can positively boost sustainable entrepreneurial intention in Angola when used as antecedents of the TPB constructs, either by their direct relationship with SOEI.

With this study, through the implications, we intend to contribute to accelerating economic growth in Angola, and simultaneously, we intend to contribute to achieving sustainable development goals. Furthermore, this study helps to understand the intentions of Angolan higher education students toward sustainability-oriented entrepreneurship.

CRediT authorship contribution statement

João M. Lopes: Conceptualization, Investigation, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration. **Nathalia Suchek:** Conceptualization, Validation, Writing – original draft, Writing – review & editing. **Sofia Gomes:** Conceptualization, Methodology, Software, Validation, Formal analysis, Data curation, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors are unable or have chosen not to specify which data has been used.

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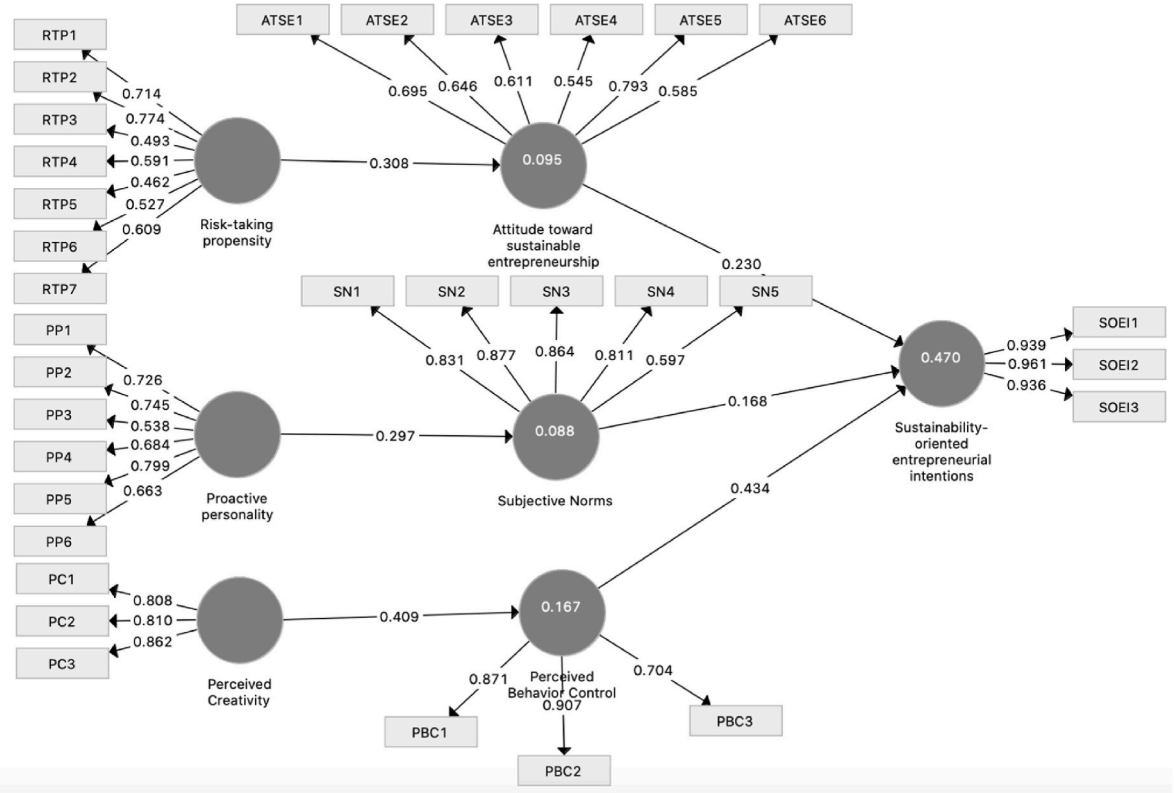
Appendix

PLS model



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