MEDIA & COMMUNICATION STUDIES | RESEARCH ARTICLE

Sustainable entrepreneurial intention and the role of altruism and the ability to innovate: A case of students in Tamaulipas

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Abstract: Sustainability, innovation, and altruism are established as key elements to achieve the expected benefits in a balanced way, meeting the present ecological, social, economic, and dynamism needs. Therefore, the objective of this research is to analyze the influence of innovation and altruism on the sustainable entrepreneurial intention of university students. The study was carried out using the theoretical foundation of the theory of planned behavior, and by using a quantitative, cross-sectioned, and non-experimental study, supported by the structural equations method based on partial least squares (PLS-SEM), making it possible to analyze the data to generate results. The study unit was aimed at students of sustainable universities in Tamaulipas, obtaining for this 160 observations. Based on the results obtained, the acceptance of the hypotheses raised was possible, so it was determined that innovation and altruism have a positive and statistically significant influence on sustainable entrepreneurial intention. However, greater promotion of the ability to innovate must be addressed by universities, so that future agents of change have stronger individual resources.

Subjects: Management Education; Innovation Management; Entrepreneurship and Small Business Management

Keywords: The ability to innovate; altruism; sustainable entrepreneurial intention; university students

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1. Introduction
The constant change in the social, environmental, and economic environment has increased uncertainty and concern for the near future, having a discouraging panorama for all society if the right measures are not taken to stop the advance of negative repercussions (Lülf & Hahn, 2014; Pachauri et al., 2014; Rodriguez, Sánchez, Zerón et al., 2021). Rugged environments and unexpected challenges have increased the need for the inclusion of proposals that can provide successful solutions, in this sense, sustainability has been expanded as one of the precursor philosophies in order to achieve a generalized balance, and it has been sought by various actors to respond to the call and join the cause (Lülf & Hahn, 2014; Manesh & Rialp-Criado, 2018; Urbaniec, 2018).

Although governments, institutions, and citizens themselves represent some of the key elements for sustainability, the business sector is one of the fields that generate the greatest contribution due to the participation and scope it has in the economy, the community, and the environment, becoming one of the main engines of change and transformation (Economía, 2021; Rodriguez, Sánchez, Zerón et al., 2021). Decision-makers in business need to have a way of thinking and orientation towards greater flexibility and resilience, allowing them to make the right changes when it’s necessary, so they can generate solutions to the challenges presented, as well as the power to overcome possible limitations (Lülf & Hahn, 2014; Ploum et al., 2018).

A sustainability-oriented venture involves an objective directed towards contributing to the solution of social and environmental problems through a successful business (Belz & Binder, 2017; Criado-Gomis et al., 2017), where those who take charge of such companies must have a sensitivity, motivation, and commitment towards achieving results, have a conviction for the development of their businesses from a balanced perspective and must have an ability to innovate in order to challenge the changes presented by developing products, services, and processes that increase people’s quality of life (Criado-Gomis et al., 2017; DiVito & Bohnsack, 2017; Gast et al., 2017).

The current COVID-19 health crisis has pushed towards the implementation of rapid modifications in business strategies, so business activities can subsist and advance. These have been modified towards a greater digitalization, testing the ability of different levels to adapt themselves, especially of business people, who must find new ways to continue contributing to society and the environment, while generating economic efficiency in an environment of greater challenges (Rodriguez et al., 2021a, 2021a; Rodriguez & Sánchez, 2021).

The intention is the previous step to the generation of actions and is considered a strong driver toward the generation of concrete practices (Ajzen, 1991). Universities have been widely recognized units over time as a generating source of future agents of change, where the philosophy and training they handle sets the tone for the development of knowledge, values, awareness, perspective, and tools that such future decision-makers may have to apply in their work field, especially in relation to the business area (Instituto Mexicano para la Mexican Institute for Competitiveness (MIC), 2014; Rodriguez et al., 2021a).

This is how, within the framework of the above considerations, this research aims to analyze the influence of innovation and altruism on the sustainable entrepreneurial intention of university students. For this, the theoretical foundation is based on the theory of planned behavior, which highlights the importance of the internal elements of the individual for the generation of an intention to act. Therefore, the scheme of this paper details firstly the theoretical and empirical assertions that shape the study variables. Subsequently, the methodology carried out is described, indicating the selected analysis method, the unit of analysis, and the data collection. After that, the results obtained are presented, which give way to the generation of a discussion and conclusions.

2. Sustainability and sustainable entrepreneurship
Sustainability is a concept that is oriented toward the harmonic generation of benefits for the community, the environment, and economic resilience, having as the main key the balance of all
its elements (Rodríguez et al., 2021a; Urbaniec, 2018). This recent way of thinking has been driven by the need to generate favorable changes in the community and its environment, which is the reason why it has become more relevant in recent times (Aguiñaga et al., 2018). The United Nations (UN) has been an important forerunner on the subject, outlining a series of objectives that guide actions, and that can be adopted by the different social sectors (Aguiñaga et al., 2018; ONU, 2018; Tur-Porcar et al., 2018).

Entrepreneurship has been identified as the main area that can make a large contribution to the objectives pursued by sustainability, this is derived from the link that its activities require towards economic development, the direct contact it has with the community (employment, activity commercial, social impact), and the environmental repercussions that their practices may or may not cause (Belz & Binder, 2017; Rodriguez et al., 2021a; Urbaniec, 2018). Therefore, entrepreneurship has formed a new way that allows positive contributions to the previously mentioned, this is called sustainable entrepreneurship.

Sustainable entrepreneurship can be seen as a multidimensional and transversal concept, where it seeks to address the economic factor through lucrative benefits, environmental preservation through a low impact of its economic activities, and social benefit by contributing to quality and well-being of the population. This orientation may require an adaptive, strategic, and innovative dynamic on the part of its activities (Criado-Gomis et al., 2017; Tur-Porcar et al., 2018; Urbaniec, 2018).

3. Sustainable entrepreneurial intention and the theory of planned behavior

The theory of planned behavior identifies a series of internal elements that influence the generation of intentions and specific behaviors and has usually been used to understand the elements that could influence the generation of pro-environmental behaviors (Yuriev et al., 2020). This theory frames behavior as a phenomenon that can be explained through two main elements: intention and control of perceived behavior (Ajzen, 1991).

On the one hand, the intention is described as the previous stage in the generation of behaviors and is represented as the will and interest in achieving an objective or result, which involves a concentration of efforts, desires, and directed attitudes (Ajzen, 1991; Rodríguez et al., 2020). In this context, an entrepreneurial intention is that force that is represented as the first step in the decision to carry out business activities, perceiving this option as an attractive and convenient element; meanwhile, a sustainable entrepreneurial intention seeks to guide and direct these business efforts towards achieving sustainability parameters (Lülfs & Hahn, 2014; Rodríguez et al., 2020; Vuorio et al., 2017).

The intention is directly influenced by two factors: attitude and subjective norm, which in turn are influenced by additional elements such as beliefs, evaluations, and motivations (Montano & Kasprzyk, 2015). On the one hand, the attitude refers to the previous evaluation that is carried out on behavior, which is based on the series of beliefs of the individual, generating positive or negative attitudes towards the action in particular; on the other hand, the subjective norm refers to the approval or disapproval of behavior of those people who form a reference to the individual (Ajzen, 1991; Montano & Kasprzyk, 2015).

In addition to the before, it is mentioned that another element of relevance in this phenomenon of intention is the control of perceived behavior, which is identified as the perception of the necessary resources that an individual has to successfully carry out an activity, and it can present a direct or indirect influence to the intention. The most common representations of this type of resource are skills (Ajzen, 1991; Montano & Kasprzyk, 2015; Rodríguez et al., 2020). Notwithstanding the foregoing, certain concerns are identified when providing an explanation related to green behaviors, mentioning the need to involve other important factors that are not included in said theory, such as the moral norms or values of the individual (Yuriev et al., 2020). In
this regard, Schwartz (1977, 1981) contributes to the explanation of the generation of behavior, mentioning that the value system that a person presents is established as a driver towards the development of behaviors, this is due to the presence of an awareness that provokes a greater understanding of the consequences of their actions.

The values of the individual can be described as the internal motivations that generate an interpretation of reality and, in this sense, one of the values that are mentioned to be closely linked to environmental behaviors is altruism (Ros et al., 1999; Schwartz, 1977); meanwhile, in the business context, it is also mentioned the importance of the presence of certain values or motivations that drive the person towards consistency in their actions, where the altruistic sense is an important part (Pérez, 2014), especially for sustainability (Arias-Arévalo et al., 2017; Gast et al., 2017; Kunttu et al., 2017; Rodríguez et al., 2020).

4. Innovation and sustainable entrepreneurial intention

As part of the theory of planned behavior, the importance of perceived behavior control is framed as an element of direct and indirect influence towards the generation of behaviors and intentions, in this sense, one of the most usual representations for the said element is the skills and resources with which the individual counts for the generation of behaviors (Ajzen, 1991). In this sense, it is mentioned that the constant change and the need that prevails in today’s world require the need for greater flexibility on the part of the decision-maker, in order to face the challenges that arise (Abidi & Koichi, 2020).

The ability to innovate is an element that allows the individual to be more receptive to changes in the environment, generating a vision of flexibility and more efficient adaptation to generate solutions to problems (Evers & Rush, 1996; Galleli et al., 2019; De Vasconcellos et al., 2019). This individual resource has been presented as an essential part of entrepreneurship and sustainability since it allows for a predisposition toward constant evolution and transformation and continuous improvement (Criado-Gomis et al., 2017; Schumpeter, 1949; Spence et al., 2011).

Current environments of different challenges aimed at greater digitization, and have driven the primary development of this skill (Rodriguez & Sánchez, 2021). Authors such as Lans et al. (2014), Pipatpropa et al. (2017), and Bamgbade et al. (2017) have identified the importance of this element in the sustainable and ecological context, while Gast et al. (2017), DiVito and Bohnsack (2017), and Ayuso and Ayuso and Navarrete-Baez (2018) establish its relevance in decision-making for sustainable business performance and the development of green businesses. This is how, based on the above, the first research hypothesis is presented:

**H1: Innovation has a positive and statistically significant influence on sustainable entrepreneurial intention.**

5. Altruism and sustainable entrepreneurial intention

Although the theory of planned behavior doesn’t consider formally the values as an element of influence in behaviors, it makes a reflective mention of the need to broaden its frame of reference to include elements such as moral responsibility from the individual for profiling in the generation of behaviors and intentions (Ajzen, 1991). Complementary, Schwartz (1977) indicates that values and motivations develop a preference towards obtaining certain results through the actions; in this case, altruism is said that promotes an orientation toward caring for the environment and a concern for social welfare, aspects of great relevance for sustainability (Kunttu et al., 2017; Ros et al., 1999; Schwartz, 1977).

Schwartz (1992) makes classification and description for universal values, within these, he names as values of self-transcendence those who selflessly seek benefit and improvement towards others, representing themselves by social justice, protection of the environment and the
nature, and equity, among others; on the other hand, Kunttu et al. (2017) name altruism to values as generosity, empathy, and care for nature. For this research, we use the term altruism.

Altruism generates activation of the moral obligations of the individual, influencing their pro-social and pro-environmental behaviors, that is, it is the activation to protect others and the environment, generating strong intentions to commit and promote related practices (Rezaei et al., 2019; Schwartz, 1977). Additionally, previous research results suggest an important link between altruism and sustainable performance in business, authors such as Thelken and Jong (2020), Tur-Porcar et al. (2018), Kunttu et al. (2017), and Saleem et al. (2018) conclude that the intentions of sustainable entrepreneurship are activated by values, specifically altruistic values; for his part, Kraus et al. (2018) maintain that this value guides the will to carry out activities in favor of sustainability. Therefore, based on the above considerations, the second hypothesis of the study is formulated as follows:

**H2: Altruism has a positive and statistically significant influence on sustainable entrepreneurial intention.**

6. Methodology
This research is carried out through a quantitative, non-experimental, and transversal approach, and its nature is causal to identify the influence of innovation and altruism on sustainable entrepreneurial intention, thus allowing the generation of the necessary information to carry out the verification of the raised hypotheses.

The method used is that of structural equations based on partial least squares (PLS-SEM). This technique is considered pertinent since it allows the generation of adequate estimates of the data in case of possible normality limitations, as well as allowing the use of small samples (160 observations in this case). It also generates adequacy to test and validate exploratory models and for the confirmation of the theory and allows carrying out multiple regressions to evaluate the relationship between constructs (Galván & Esquinca, 2019; Hair et al., 2017). In addition to the above, the two-stage method is used to evaluate the dependent variable, since its representation is established by the social objective and by the entrepreneurial intention under the same perspective. The software used for data processing is Smart PLS 3.3.3.

For a general description of the stages developed for the analysis, we followed what it’s suggested by Hair et al. (2019), Duarte and Amaro (2018), and Galván (2019) in their different studies:

1. First, as we mentioned before, we used the PLS-SEM method to identify the different relations between the variables of the study. This method is used in research related to sustainable behavior (Roxas et al., 2017; Shang et al., 2019; Tasleem et al., 2019).
2. Second, the analysis uses bootstrapping with 5,000 iterations to get the statistical significance and error.
3. Third, a descriptive data analysis is done to create a respondent’s profile.
4. Then, the evaluation of the measurement model for the first order is carried out, this is with the use of the items of all constructs in a reflective mode. This stage was divided into three parts: a) exploratory analysis of the variables to identify the distribution of the data and to determine its normality; b) exploratory factor analysis (EFA) to know the convenience of the items to the construction of the variables; and c) confirmatory factor analysis (CFA) to identify the convergent validity, the internal consistency reliability, and the discriminant validity of variables to establish the satisfactory representativeness of each construct.
5. Next, the evaluation of the measurement model of Sustainable Entrepreneurial Intention (dependent variable) is done, this is in second order in a formative mode with the constructs
of Sustainable Entrepreneurship Objective and Entrepreneurial Intention. For this step, the
two-stage method is needed for the creation of the second-order variable.

(6) Finally, the evaluation of the structural model lets to identify the paths generated to
determine the explanatory power of the dependent variable through the independent ones.

On the other hand, the analysis unit is made up of students from universities with a sustainable
philosophy in the State of Tamaulipas, Mexico, since these kinds of organizations are considered
the source of future entrepreneurs because they provide the students with the knowledge and
necessary tools for the creation of business, and the orientation and values promoted towards
sustainability can become an influencing factor on business preferences (Mexican Institute for
Competitiveness (MIC), 2014; Rodriguez, Sanchez, Briseño et al., 2021b; Global Entrepreneurship
Monitor, 2018).

Tamaulipas has 136 universities (of different sizes) according to the Cultural Information System
(Sistema de Información Cultural (SIC), 2022; however, only the Autonomous University of
Tamaulipas (UAT) is widely recognized for its sustainable activities, it’s the biggest in the State,
and has a presence in all the region: in the north (Nuevo Laredo, Reynosa, Rio Bravo, Matamoros,
Valle Hermoso), center (Victoria), and south (Mante, Tampico) of the State, so this is the one that is
taken as a reference in its different locations.

The commitment of this university is toward the economy, society and welfare, and nature (three
areas of sustainability), and has an institutional and transversal program dedicated to the dissemina-
tion, communication, and scientific, technological, and sustainable research of all its actions carried
out within the university for its community, this program is called “Committee for Sustainable
Development”. This committee develops all activities related to sustainability such as brigades,
conferences, campaigns, and workshops (Universidad Autónoma de Tamaulipas (UAT), 2022).

Due to the entrepreneurial profile needed, the main careers addressed were the economic-
administrative ones: accountant, international business, business management, marketing, and
tourism. In this sense, the population for those careers is represented by 8,478 undergraduate and
graduate students around the state (Universidad Autónoma de Tamaulipas (UAT), 2021); and
according to the finite population formula (Aguilar-Barojas, 2005), the optimum size of the sample
is 279 individuals (confidence coefficient \(z\) = 1.96, population \(N\) = 8478, probability in favor
\(p\) = 0.75. probability against \(q\) = 0.25, estimation error \(e\) = 0.05); however, the response rate
was only 40\% of all questionnaires sent effectively (little more than 400 questionnaires), the rest of
the questionnaires that could not be delivered properly (around 100–120), is due to some error in
the emails or because the message was sent to spam, so the final sample is made up of 160
responses.

Despite the previous fact, it’s mentioned that the use of the maximum likelihood estimation

technique allows generating stable results with samples of up to 50 observations; however,
a number greater than 100 is suggested, especially when there are models of up to five constructs
with a minimum of three items (Hair et al., 2009). It is worth mentioning that there are no missing
data, which favors the sample size used. In the same line, Lloret-Segura et al. (2014) recommends
a minimum sample size of 150 to be considered acceptable, and a quantity of three items per
factor.

On another hand, it is mentioned that PLS works efficiently with small samples, thus considering
the rule of ten, it indicates that the minimum number of cases included must be the number of
paths in the model multiplied by ten (Hair et al., 2017). For this study, the number of paths is two,
so the minimum result is twenty observations; however, the number was increased to 160 in order
to have greater precision in the data analysis according to the standards established by Hair et al.
(2017) and Hannachi (2020).
Likewise, the sampling technique used was non-probabilistic for convenience, this is derived from the limitations of the current pandemic context and the regulations of the university, so the selection of cases depended on the criteria of the researcher (Bernal-Torres, 2010; Hernández-Sampieri et al., 2010) and the access to the individuals; nevertheless, questionnaires were sent to individuals from the north, center, and south of the state.

6.1. Data collection
The instrument used to collect data was a self-administered electronic closed questionnaire made up of four sociodemographic questions (gender, age, career, zone), and 27 items that measure the different constructs: altruism (six), innovation (seven), entrepreneurial intention (six), and sustainable entrepreneurship objective (eight). These last two (entrepreneurial intention and sustainable entrepreneurship objective) allow us to measure sustainable entrepreneurial intention. All measures, except for the sociodemographic ones, were evaluated on a five-point Likert scale rating from (1) “Totally disagree” to (5) “Totally agree”.

The validation of the instrument went through three stages: a) content validation, b) expert validation, and c) construct validation. The first one (content validation) was carried out through a literature review to identify the key items to measure the variables effectively; for the second one (expert validation), we consulted academic researchers to identify improvements to the instrument; and for the third one, we used statistical analysis for the conformation of the constructs.

The questionnaires were carried out from June to August 2021 through e-mail, we got some help from professors with the application (to send the questionnaires to the personal and institutional students’ e-mail), and the electronic format used was “Google Forms”. The face-to-face application wasn’t possible due to the virtual classes. We got 160 responses from students from the north, center, and south of the state (40% of the response rate).

6.2. Measurement of constructs
The literature review was the starting point for the creation of the measurement instrument. For this, the measures that allowed evaluating each of the research constructs were identified. As part of the operationalization of the variables, the identified elements were translated and adapted to the context of the study.

This is how, based on the above, the scale chosen for the dependent variable sustainable entrepreneurial intention is the one used by Vuorio et al. (2017) in their study, who involves the measurement of the objective of sustainable entrepreneurship and the entrepreneurial intention as the key elements for the representation of the variable. This measure is considered appropriate because it indicates, on the one hand, the goal pursued by the UN (2021) regarding sustainability, and in turn establishes the level of intention to undertake.

On the other hand, the independent variable of innovation was constituted mainly by the scale used in the studies by Craig and Johnson (2006) and Buil et al. (2016) in order to assess the level at which students consider they have such ability. Likewise, the altruism variable had its main foundation in the studies by Vuorio et al. (2017) and Kunttu et al. (2017).

7. Results

7.1. Descriptive data analysis
As part of the sociodemographic descriptive results (Table 1), it is indicated that the majority of the respondents have an average age between 17–18 years (35%) and 19–20 (55.1%), that is, they are the people who are studying for a bachelor’s degree. Likewise, even though the careers belong to the economic-administrative area, it is indicated that 57.5% are studying a career related to the management area (Business Management = 15%, MSMEs Management = 42.5%), which is convenient for the objective of the present research because they are the main futures business
decision-makers, the rest of the percentage corresponds to Accounting (28.7%), International Business (10%), and Tourism (3.3%), all of them also related to business.

On the other hand, there is greater participation (60.6%) of women, which marks a high interest in their participation in business orientation, and it’s also relevant for the analysis of sustainable entrepreneurial intention. This means that the main analysis of the phenomenon will be through the women’s perception. Finally, concerning the area of the state, the main participation comes from the center with 62.5% of responses, 25% come from the south, and 12.5% from the north.

The next sections describe the different stages that we follow for the analysis, considering that it is carried out in a first (altruism and innovation) and second-order (sustainable entrepreneurial intention), and in a reflective (altruism and innovation) and reflective-formative (sustainable entrepreneurial intention) mode.

### 7.2. Measurement model for the first order

As part of the first analysis, the evaluation of the first order is needed. For this, the items of all constructs are measured in a reflective mode, where each item represents each latent variable, and it implies that if we need to eliminate one of them, the meaning of each construct is maintained, as long as the minimum number of measures of three is preserved (Duarte & Amaro, 2018; Hair et al., 2017).

#### 7.2.1. Exploratory analysis of the variables

Within this section, the characteristics of each variable are analyzed to determine the distribution of the data and to establish its normality, which can influence the results of the analysis, especially for the confirmation of the factors and the property of their items (Hair et al., 2009, 2014). For this, we identified the missing data, the minimum, and maximum values, the mean, and the standard deviation. No missing data is presented for the sample in question, so the total data collected is used for the analysis. In relation to the mean, this ranged between 3.019–4.700, that is, the average response for all variables was between “intermediate level” and “agree”, with which an average of acceptance is presented for the established statements.

On the other hand, the minimum response value presented in each variable was 1 [Totally disagree] and the maximum was 5 [Totally agree], that is, the answers provided were generally very diverse in opinion. However, the standard deviation (SD) remained below 1, and in some

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**Table 1. Age, Career, and Gender**

| Description | Classification          | Frequency | Percentage |
|-------------|-------------------------|-----------|------------|
| Age         | 17–18                   | 56        | 35         |
|             | 19–20                   | 88        | 55.1       |
|             | 21–22                   | 11        | 6.9        |
|             | 23–24                   | 5         | 3.1        |
| Career      | Business Management     | 24        | 15         |
|             | MSMEs Management        | 68        | 42.5       |
|             | Accounting              | 46        | 28.7       |
|             | International Business  | 16        | 10         |
|             | Tourism                 | 6         | 3.75       |
| Gender      | Male                    | 63        | 39.4       |
|             | Female                  | 97        | 60.6       |

Own elaboration
cases, it was slightly above said value (1.030–1.311), that is, despite the latter, the variability of the data at the mean is low and is considered acceptable (Hair et al., 2009).

To complement the above, an analysis of the distribution of the data was carried out, where through the asymmetry and the kurtosis of each measurement it was possible to determine if there was the presence of an abnormality. The values remained below the (±) 2 recommended (Lloret-Segura et al., 2014; Muthén & Kaplan, 1992), so no normality problems are indicated.

7.2.2. Exploratory Factor Analysis (EFA)

Subsequently in the analysis, the pertinence in the construction of the variables was evaluated exploratory through their items, so the level of correlation of the measures per variable was analyzed and exploratory factor analysis (EFA) was carried out. Based on a low (0.3–0.5), medium (0.5–0.7), and high (0.7–0.9) level (Galván et al., 2019) for the correlations of the items, the values for entrepreneurial intention and sustainable entrepreneurship objective remained in the three ranges, while innovation and altruism presented low and medium levels in both cases. This is presented at 0.01 bilateral significance.

Concerning the exploratory factor analysis (EFA), it was possible to establish the relevance of the items for each variable. Likewise, the unidimensionality of the constructs based theoretically on previous sections was identified (Table 2). On the one hand, as indicated by Vuorio et al. (2017) in their study, the variable sustainable entrepreneurial intention is conformed by two constructs: sustainable entrepreneurship objective, and entrepreneurial intention. The resulting Cronbach’s Alpha is presented at 0.841, indicating a high correlation between the items. Similarly, the KMO presents satisfactory sample adequacy (0.884) with a significant Bartlett’s sphericity index (<0.05). Additionally, the measures explain 58.15% of the total variance through two factors, maintaining loads greater than 0.562 and appearing adequate (Hair et al., 2009; Lloret-Segura et al., 2014).

To obtain the above results, the elimination of MS8 is suggested, whose presence negatively affects the conformation of the factors. This is how, through the above, an empirical verification can be provided to the theoretical assumptions of the constructs of sustainable entrepreneurial intention.

On the other hand, the innovation variable presents a Cronbach’s Alpha of 0.822, indicating a high correlation between its measures (Hair et al., 2009). The sample adequacy is satisfactory (KMO = 0.794), and the Bartlett sphericity index is significant (<0.05). The items of the variable explain 54.26% of the total variance through one single factor with loads greater than 0.638, and for this, the elimination of Inn 2, Inn 6, Inn7 is suggested. Notwithstanding the foregoing, the representativeness of the construct is not affected because the recommended minimum of three is maintained (Lloret-Segura et al., 2014). Finally, the altruism variable maintains a Cronbach’s Alpha of 0.799, indicating a high correlation between its measures, meanwhile, the sample adequacy of the KMO is satisfactory (0.730), the Bartlett sphericity index is significant (<0.05), and the total variance explained is 52.15% through the items represented with loads greater than 0.553, conforming one single factor. For the latter case, it is suggested to remove Alt3, Alt5.

7.2.3. Confirmatory Factor Analysis (CFA)

Once the exploratory analysis of the data has been carried out, the confirmatory factor analysis (CFA) is needed to correct possible errors of EFA and to increase the reliability of the analysis (Table 3; Hair et al., 2014; Batista-Foguet et al., 2004). For this, the measures of convergent validity, internal consistency reliability, and discriminant validity of variables are evaluated through PLS using the 27 original items (Cenfetelli & Bassellier, 2009; Galván et al., 2019; Hair et al., 2019). First, the convergent validity allows determining the degree of contribution of the items in the representation of a construct, for this, three values are commonly used: the analysis of loads of each item, and the average variance extracted from these (AVE; Hair et al., 2019; Irfan & Hassan, 2019).
| Constructs                      | Item | Sustainable Entrepreneurial Objective | Entrepreneurial Intention | Innovation | Altruism |
|--------------------------------|------|---------------------------------------|---------------------------|------------|----------|
| Variable                       |      | Low, medium, high*                    | Low, medium, high*        | Low-medium* | Low-medium* |
| Sustainable Entrepreneurial Intention |      | MS1 0.599                             | MS2 0.754                 | MS3 0.837  | MS4 0.841 |
|                                |      | MS5 0.58                               | MS6 0.845                 | MS7 0.845  | MS8 0.845 |
| Entrepreneurial Intention      |      | I1 0.562                              | I2 0.758                  | I3 0.787   | I4 0.876  |
|                                |      | I5 0.604                              | I6 0.604                  | Inn1 0.805 | Inn3 0.638 |
|                                |      | Inn2 0.661                            | Inn4 0.807                | Inn5 0.736 | Inn6 0.895 |
|                                |      | Inn6 0.895                            |                           |            | Al1 0.793 |
|                                |      | Alt1 0.793                            |                           |            | Alt2 0.673 |

Significance at 0.01 bilateral

Own elaboration based on SPSS

Rodríguez Jasso et al., Cogent Social Sciences (2022), 8: 2095743
https://doi.org/10.1080/23311886.2022.2095743
| Variable                          | Construct                          | Items | Charges | Alpha | Rho_A | CR  | AVE  | HTMT |
|----------------------------------|------------------------------------|-------|---------|-------|-------|-----|------|------|
| Sustainable Entrepreneurship     | Sustainable Entrepreneurship       | MS1   | 0.516   |       |       |     | 0.886|      |
| Objective                        | Objective                          | MS2   | 0.728   |       |       |     | 0.899|      |
|                                  |                                    | MS3   | 0.765   |       |       |     | 0.890|      |
|                                  |                                    | MS4   | 0.797   |       |       |     | 0.890|      |
|                                  |                                    | MS5   | 0.794   |       |       |     | 0.890|      |
|                                  |                                    | MS6   | 0.619   |       |       |     | 0.890|      |
|                                  |                                    | MS7   | 0.809   |       |       |     | 0.890|      |
|                                  |                                    | MS8   | 0.615   |       |       |     | 0.890|      |
| Entrepreneurial Intention        |                                   | I2    | 0.830   |       | 0.832 | 0.804| 0.522|      |
|                                  |                                    | I3    | 0.572   |       | 0.855 | 0.804| 0.522|      |
|                                  |                                    | I5    | 0.476   |       |       |     | 0.804|      |
|                                  |                                    | I6    | 0.919   |       |       |     | 0.804|      |
| Innovation                       |                                   | Inn3  | 0.720   |       | 0.753 | 0.751| 0.513|      |
|                                  |                                   | Inn4  | 0.504   |       | 0.793 | 0.751| 0.513|      |
|                                  |                                   | Inn5  | 0.876   |       |       |     | 0.751|      |
| Altruism                         |                                   | Alt1  | 0.836   |       | 0.806 | 0.807| 0.515|      |
|                                  |                                   | Alt2  | 0.751   |       | 0.820 | 0.807| 0.515|      |
|                                  |                                   | Alt4  | 0.595   |       |       |     | 0.807|      |
|                                  |                                   | Alt6  | 0.666   |       |       |     | 0.807|      |

Own elaboration based on the Smart PLS, version 3.3.3. Bootstrapping with 5,000 iterations at 5% of the significance level.
Second, the internal consistency reliability allows determining that the items do not present duplicity in the explanation among themselves, for which the Cronbach’s Alpha and the composite reliability index (CR) are taken as a basis (Cheah et al., 2019; Hair et al., 2017, 2019). And finally, the discriminant validity determines that the variables do not duplicate their representativeness through other variables, that is, each one must be unique in its measurement, for this, two criteria are commonly used: Fornell-Larcker and HTMT (Ali & Park, 2016; Galván et al., 2019; Hair et al., 2017; Irfan & Hassam, 2019).

7.2.3.1. Convergent validity. For this evaluation, the analysis of loads of each item, and the average variance extracted from these (AVE) are assessed. To determine the adequate bivariate contribution of each item to the construct, loads of 0.70 and above are recommended. However, values between 0.40–0.70 can be accepted when the composite reliability index is not affected. On the other hand, to establish that the items of the same construct have an adequate correlation, values are suggested for the AVE from 0.50 onwards (Hair et al., 2019; Irfan & Hassan, 2019).

Based on the above, within the results, loads above 0.500 are presented for most of the measurements, except for I5, which manages a value of 0.476. However, the omission of said item would negatively affect the variance explanation percentage for entrepreneurial intention, and since it is above the 0.40 established as a minimum, it is decided to maintain it. On the other hand, the initial resulting AVE was below 0.50 for the constructs, so a second evaluation was carried out in which the items I11, I4, Inn1, Inn2, Alt3, Alt5 were identified as problematic and were eliminated. Consequently, the levels exceeded the 0.50 recommended for the AVE in all cases. Therefore, satisfactory representativeness is indicated by the items of the constructs.

7.2.3.2. Internal consistency reliability. To continue the analysis of the measures used, an evaluation is carried out to determine that the items do not present duplicity in the explanation among themselves, for which the Cronbach’s Alpha and the composite reliability index (CR) are taken as a basis. These are suggested to remain above 0.60 to be considered acceptable, or 0.70 to be considered satisfactory (Cheah et al., 2019; Hair et al., 2017, 2019). The results establish values above 0.751 for innovation, and above 0.800 for the sustainable entrepreneurship objective, entrepreneurial intention, and altruism, thus being considered as satisfactory levels in all cases.

7.2.3.3. Discriminant validity. Once the reliability and internal consistency of the constructs have been analyzed from their indicators, the evaluation of the discriminant validity is carried out to determine that the variables do not duplicate their representativeness through other variables, that is, each one must be unique in its measurement. In order to achieve the above, two criteria are used: on the one hand, the Fronell-Larcker criterion (Table 4), which establishes that the AVE of each construct must be greater than the squared correlation of one construct with another; on the other hand, the HTMT criterion that suggests values lower than 0.90 for a satisfactory evaluation (Ali & Park, 2016; Galván et al., 2019; Hair et al., 2017; Irfan & Hassam, 2019).

Regarding the above, the results establish satisfactory levels of unique representativeness by the constructs, that is, in both criteria the values are acceptable. With these measures, the reliability and validity of the items of each variable can be established at a significance level of 5%.

7.3 Measurement model for the second order

After the analysis of the first order, the evaluation of the second-order measurement model is needed for the variable of Sustainable Entrepreneurial Intention. For this, the two-stage approach is used to generate the scores for the new latent variable items at a higher level, obtaining in this way the integration of the dependent variable under a unidimensionality (Hair et al., 2018; Sarstedt et al., 2019). In this case, the variable is reflective-formative, which means that the first order is reflective and the second order is formative. The formative mode refers that each item explains a specific part of the variable, forming it collectively, and they aren’t interchangeable with each other (Duarte & Amaro, 2018; Garson, 2016; Hair et al., 2017). For the formative analysis, it’s recommended to
Table 4. Fornell-Larcker results

| Construct                      | Altruism | Innovation | Entrepreneurial Intention | Sustainable Entrepreneurship Objective |
|--------------------------------|----------|------------|---------------------------|----------------------------------------|
| Altruism                       | 0.718    |            |                           |                                        |
| Innovation                     | 0.177    | 0.716      |                           |                                        |
| Entrepreneurial Intention      | 0.138    | 0.472      | 0.722                     |                                        |
| Sustainable Entrepreneurship Objective | 0.603 | 0.155      | 0.871                     | 0.713                                  |

Own elaboration based on the Smart PLS, version 3.3.3

evaluate the multicollinearity analysis (VIF), and the relevance and statistical significance of the weights (Cenfetelli & Bassellier, 2009; Galván & Esquinca, 2019; Hair et al., 2019).

The multicollinearity implies high correlations between constructs, so (for the formative analysis) the desirable fact is the absence of this. Some acceptable values are those below 3.3 (Duarte & Amaro, 2018; García-Machado & Martinez-Ávila, 2019; Hair et al., 2017, 2019). In this case, the results show values of 1.004 for Entrepreneurial Intention and Sustainable Entrepreneurship Objective, and a non-collinearity between measures.

On the other hand, the weights indicate a unique relationship between each item with its construct in multiple regression, so, values above 0.1 are expected to indicate an acceptable relation (García-Machado & Martinez-Ávila, 2019). The results show high values for Sustainable Entrepreneurship Objective (0.897), and moderate values for Entrepreneurial Intention (0.390) at a confidence level of 95%.

7.4. Evaluation of the structural model

Once the evaluation of the measurement model was carried out, the structural model was analyzed to identify the value of the paths generated between the exogenous and endogenous variables, as well as the explanatory power of the dependent variable, for this, it’s recommended the evaluation of structural VIF, path coefficients, $R^2$, and $f^2$ (Duarte & Amaro, 2018; Galván, 2019; Hair et al., 2011).

According to the results (Table 5), the multicollinearity analysis (VIF) establishes satisfactory values to determine that each variable is unique in its explanation, by obtaining measurements below 3.3 according to what is recommended (Cheah et al., 2019; Hair et al., 2017). On the other hand, the path coefficients indicate a positive and statistically significant relationship (0.2, $t = 1.685$) between innovation and sustainable entrepreneurial intention, although according to the value obtained it can be considered as a low-level value. On the other hand, the relationship between altruism and sustainable entrepreneurial intention is also positive and statistically significant (0.481, $t = 4.912$), although in this case it can be considered as moderate.

Derived from the above, it can be mentioned that both exogenous variables have a positive and statistically significant impact on the study phenomenon, thus generating an explanatory power ($R^2$) of 0.299 (Figure 1), that is, approximately 30%, which that according to Hair et al. (2019) can be considered at a weak-moderate level. This result becomes relevant because, according to the aforementioned author, the explanation of the dependent variable is established based on the context of the study, in this case, the issue of an intention to undertake in Mexico represents a great challenge since that only 13.2% is established at the national level, a low percentage compared to other countries; additionally, sustainability is a recent focus of study and practice in the country, with the European regions making the most progress in this regard (Rodríguez et al., 2021a).

Therefore, the analysis of a sustainable entrepreneurial intention is considered to be in a context of high challenges, not to mention the negative pandemic effect caused in the business sector.
Table 5. Evaluation of the Structural model

| Variable          | VIF  | Coeficiente Path | Value t | Value p |
|-------------------|------|------------------|---------|---------|
| Innovation        | 1.021| 0.200 (−0.012−0.378) | 1.685** | 0.046   |
| Altruism          | 1.021| 0.481 (0.286−0.594)  | 4.912*  | 0.000   |

Confidence intervals based on a one-tailed test, bootstrapped with 5,000 subsamples at the 5% level of significance. Significance at 1% (*), 5% (**)

Own elaboration from the results in PLS version 3.3.3

This is how, it is established that levels of up to 0.10 for R2 become satisfactory when the subject warrants it; additionally, this explanatory power is also influenced by the number of independent variables analyzed, so that the greater the number of constructs, the greater the R2 index generated (Hair et al., 2019). Analyzing this last point, only with the two independent variables proposed (innovation and altruism), it is possible to reach approximately 30%, constituting a background of relevance for the theme and for the search for additional variables that complement the said figure.

On the other hand, it is indicated that the effect and contribution ($f^2$) by innovation is considered at a low level (0.056), while altruism is considered at a high level (0.323), that is, dispensing with the variable altruism would cause a greater reduction in the explanation of sustainable entrepreneurial intention in the specific sample, while the effect of not considering innovation would not produce such drastic changes (Hair et al., 2017). This is how, according to the previous results, the proposed study hypotheses can be answered, determining that they can be supported for acceptance (Table 6).

8. Discussion and conclusions
The constant warnings from the environment, the unexpected global events (pandemic), and the presence of uncertainty about future life are just some aspects that must be taken into consideration in order to carry out transformative actions toward better well-being. Sustainability is a strong driver that guides toward the generation of strategies with a broader picture; however, this requires the promotion of key elements that allow the flexibility and resilience necessary for the conversion of threats (Rodríguez, Sánchez, Zerón et al., 2021; Urbaniec, 2018).

The business environment has positioned itself as one of the most relevant sectors for the contribution of well-being, an aspect that is constantly seeking sustainability, so it is of paramount importance that those who carry out decision-making have the elements that allow them to generate better results. In this sense, an intention allows determining in advance the focus on
Table 6. Hypothesis testing

| Endogenous Variable         | Exogenous Variables | Path and Hypothesis                                                                 | Path coefficient | Value t   | Value p  | Supported? | $f^2$ |
|-----------------------------|---------------------|-------------------------------------------------------------------------------------|------------------|-----------|----------|------------|-------|
| Sustainable Entrepreneurial Intention ($R^2 = 0.299$) | Innovation          | H1: Innovation has a positive and statistically significant influence on sustainable entrepreneurial intention | 0.200            | 1.685**   | 0.046    | Sí         | 0.056 |
|                             | Altruism            | H2: Altruism has a positive and statistically significant influence on sustainable entrepreneurial intention | 0.481            | 4.912**   | 0.000    | Sí         | 0.323 |

The effects were evaluated through the application of a one-tailed percentage bootstrapping test with 5,000 subsamples at a significance level of 5%. Significance at 1% (*), 5% (**).

Own elaboration from the results in SmartPLS version 3.3.3

Own elaboration based on PLS version 3.3.3

the actions that individuals will carry out, so the study of this phenomenon in the business and sustainable context is highly relevant for the explanation of future behaviors and solutions (Ajzen, 1991; Kunttu et al., 2017; Vuorio et al., 2017), this is the reason that the main focus of the present study is the analysis of sustainable entrepreneurial intention, taking into account the influence of innovation and altruism present in university students (future decision-makers).

In the first instance, and based on the above, the results of this research allowed us to support the hypotheses raised, that is, innovation (H1) and altruism (H2) have a positive and statistically significant effect on sustainable entrepreneurial intention. So, these elements are considered drivers of the phenomenon within the sample in question.

Innovation is presented as a skill at the individual level that allows a predisposition towards constant evolution and transformation, where the vision of decision-makers sets the tone for the conversion of threats into opportunities, aspects of great interest for the current context. (Criado-Gomis et al., 2017; Schumpeter, 1949). Based on the results obtained, it is identified, on the one hand, that these converge with the assertions of previous research, which indicate a positive and statistically significant relationship between innovation and sustainable entrepreneurial intention (Bamgbade et al., 2017; DiVito & Boohsack, 2017; Gast et al., 2017; Pipatprapa et al., 2017).

Notwithstanding the foregoing, the relationship described is identified at a low level, inferring that despite the importance usually given to this element within sustainability, the students surveyed do not present a high level of influence on the part of the innovation when their sustainable entrepreneurial intention is analyzed. This difference with previous studies may be due, on the one hand, to the fact that most of them have evaluated the phenomenon through already consolidated undertakings, where the perspective of the respondents can be located in a more realistic and grounded environment, having the opportunity to assess in more this element and give it its importance in the business activities.

On the other hand, and according to the data from the Global Entrepreneurship Monitor (Naranjo et al., 2016), the levels of innovation in Mexico are usually low (30.8%) for those who are in an early stage of entrepreneurial (students can be located in this stage) compared to other countries, which may indicate a negative generality in the region and implying the need to address this
area of opportunity for greater business development. It is also mentioned that social and cultural norms can be positive or negative elements that can affect the innovation in Mexico, in this case, they only stimulate a 6.08% in favor (a very low rate; Quezada et al., 2019).

In relation to altruism, is described as the orientation toward caring for the environment and towards a concern for social well-being (Kunutt et al., 2017; Ros et al., 1999; Schwartz, 1977). Previous studies have strongly marked its importance in sustainability, obtaining positive and statistically significant results in its relationship with sustainable entrepreneurship (Kunutt et al., 2017; Saleem et al., 2018; Thelken & Jong, 2020; Vuorio et al., 2017), postures that tie with the results of the present investigation, establishing that this value influences at a moderate level for the sample in question. In this regard, it is inferred that the philosophy maintained by the universities may be contributing to such results, which is considered important for the greater promotion of such intentions.

Finally, the sustainable entrepreneurial intention is established as the orientation of business efforts and interest toward the generation of sustainable results (Lülf & Hahn, 2014; Rodríguez et al., 2020; Vuorio et al., 2017). In this sense, the students surveyed present a level of intention close to 30%, taking into account their level of innovation and altruism. This level, despite being considered medium-low in its explanation (Hair et al., 2019), is of great interest, since with only two variables said predictive power is obtained, that is, the sample does present intentions to start sustainable-oriented entrepreneurship despite the contextual challenges that the business sector is currently experiencing, and despite the low levels of entrepreneurship identified in Mexico (Rodríguez et al., 2021a), implying concern for what is happening in the social sphere, environmental, and economic.

This is relevant because this topic is considered in an exploratory stage in Mexico, where its study and practice are relatively recent in the country (Rodríguez et al., 2021a); therefore, this research generates a contribution to the process of explanation of the phenomenon through the variables raised. However, it is necessary to continue this study to identify elements of summative explanation that contribute to reducing the unexplained percentage of sustainable entrepreneurial intention.

On the other hand, the sustainable entrepreneurial intention is established as a hierarchical variable made up of two dimensions (entrepreneurial intention and sustainable entrepreneurship objective), integrating them in parallel to give a more comprehensive meaning to this type of entrepreneurship, whose complexity is greater than a traditional enterprise due to the different areas of focus that must be taken into account (social, environmental, economic). The findings of this research are of interest to the organizations and institutions that generate future entrepreneurs, such as universities, incubators, and government organizations in charge of business development, to promote the elements proposed to direct the enterprises towards the sustainable theme required.

Therefore, concerning the objective of the present research focused on analyzing the influence of innovation and altruism on the sustainable entrepreneurial intention of university students, we can mention the scope of this, concluding with a positive and statistically significant influence of innovation and altruism on sustainable entrepreneurial intention. According to the results, it is interesting to realize the real influence of different factors in the explanation of the intention, factors such as individual values or personal norms that the Theory of Planned Behavior doesn't include formally as a direct effect in its model, but that authors as Schwartz claim as important for a better comprehension of the phenomenon; in this sense, it is shown that the explanation of sustainable entrepreneurial intention is greater when altruism is included. This could be a good moment to think about the necessity for an evolution in the theory, especially in contexts where is required a more complex analysis as in sustainability, where is needed the activation of different internal elements that leads to action.

Subsequently, it is also relevant to identify the factors that can be limiting the perspective of future entrepreneurs in relation to the innovation element, where social and cultural norms besides the limited research and information related to innovation for its implementation in the management of companies (11.3%), can be affecting (Quezada et al., 2019). This is interesting because we could be
talking about the influence of social norms not only on the intention but also on the control of perceived behavior, and it would be presenting the need for better transmission of the importance and implementation of innovation in business. This could be analyzed in-depth in future studies.

On the other hand, and as previously mentioned, the sustainable entrepreneurial intention involves an evaluation not only of the predisposition towards opening a business, but also that this predisposition is focused on a business with certain specific characteristics (economic reward, social benefit, environmental contribution), so the models used to evaluate the intention must be adapted and include the main objective of the context of the business opportunity in question.

To carry out the analysis, a quantitative, cross-sectioned, and non-experimental study was required, in which, with the support of the PLS-SEM method, causal relationships were established. For the evaluation of the study variables, a literature review was carried out to identify the measures that best represented innovation, altruism, and sustainable entrepreneurial intention. This last element was composed of two constructs: sustainable entrepreneurship objective and entrepreneurial intention, which as a whole adequately represented the variable. Within the results, the values of reliability, validity, and representativeness of the measures (Cronbach's Alpha, composite reliability, loads, AVE) obtained satisfactory levels, while it was determined that each variable effectively explained a different element.

The results of this research form a contribution to the literature, especially in the Mexican context. Similarly, they are relevant due to the identification of driving elements towards a sustainable entrepreneurial intention, where universities must pay attention to the main stimulus of innovation in students, who will form the agents of change in society in the near future, and who will require an ability to face the challenges of the dynamic environment.

As part of the limitations of this study, the type of non-probabilistic sampling is identified, so that future research could carry out a probabilistic sampling that would allow generalizations to be made. On the other hand, elements such as the combination of different skills, the inclusion of contextual and cultural factors, and the expansion of the study region, are perspectives that could broaden the explanation of the phenomenon. Finally, due to the quantitative nature of the study, the analysis is limited to the established elements; however, qualitative or mixed research could broaden and deepen the explanation.

Funding
The authors received no direct funding for this research.

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Disclosure statement
No potential conflict of interest was reported by the author(s).

Citation information
Cite this article as: Sustainable entrepreneurial intention and the role of altruism and the ability to innovate: A case of students in Tamaulipas, Lucero de Jesús Rodriguez Jasso, Mónica Lorena Sánchez Limón, Oscar Galván Mendoza, Naveed Akhtar Qureshi & Sikander Ali Qalati, Cogent Social Sciences (2022), 8: 2095743.

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