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Environmental awareness and the entrepreneurial intention in university students: Direct and mediating effects

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ABSTRACT

This study contributes to the literature about the application of responsible entrepreneurship by entrepreneurs and to their contribution to an economic and responsible growth. Quantitative research was carried out with data collection based on a questionnaire to 1337 students from Oviedo University (North of Spain) and factorial analysis and statistical regression techniques were applied to analyse the data. The results revealed that environmental awareness exerts a positive and significant effect on the entrepreneurial intention of the students and how important it is to adopt measures to avoid waste, dumping and emissions. It has also been validated that the perception of the importance of ecological consumption intervenes in the relationship between environmental awareness and entrepreneurial initiative. Finally, it can be stated that the fact of having entrepreneurial family members reinforces the entrepreneurial intention of the students.

1. Introduction

In the present context, where the aim is to encourage sustainable development through the achievement of the Sustainable Development Goals (SDGs) of The 2030 Agenda for Sustainable Development, authors such as [Fischer et al. \(2018\)](#) or [Argade et al. \(2021\)](#) uphold the role of entrepreneurship as an agent of change of such sustainable development. Specialised literature has certainly taken on the role that entrepreneurship plays in the economy as a generator of wealth and employment, ([Barba-Sánchez et al., 2022](#)). However, it is not considered to be of major importance in the achievement of SDGs, except when we focus on a very specific type of entrepreneurship, the so-called social entrepreneurship.

Nevertheless, according to [Wagner \(2012\)](#), the individuals focused on sustainable development and environmental conservation also tend to act in accordance with their values. Therefore, it is to be expected that any venture that they undertake will be sustainable ([Peng et al., 2021](#)). In this sense, [Nuringsih and Puspitowati \(2017\)](#) affirm that personal values are important predictors of the attitude, perception and behaviour of an entrepreneur, but it should be noted that not every type of value leads to an entrepreneurial behaviour ([Sahin et al., 2019](#)).

It is considered that more traditional literature overanalysed the idiosyncratic features and the demographic factors of the entrepreneur. However, many outcomes of those studies had disadvantages in terms of the initial hypotheses and the fact that they are based in a different socioeconomic reality. Generally, the body of research based on the personality of the entrepreneur focused on ex

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post analyses, that is to say, after the creation of the company (Izquierdo & Buelens, 2011). Empirical research assessed the features of personality once the entrepreneur had their company, assuming that those features had not changed since the previous stages. This hypothesis was widely criticised by subsequent studies (Autio et al., 2001), due to the fact that underlying personal values evolve according to the prevailing socioeconomic context at any particular time (Albarracín & Shavitt, 2018) or to the age of the individual (Haski-Leventhal et al., 2017).

Many studies have assessed the validity of the models based on intention and different articles have placed their emphasis on the study of the entrepreneurial intention of students using different explanatory variables (e.g. Autio et al., 2001; Barba-Sánchez et al., 2022; Krueger et al., 2000; Lüthje & Franke, 2003; Sieger et al., 2014).

Nevertheless, in the last decade intentional models have begun to be criticised due to their lack of adjustment to the changing socioeconomic reality and their static nature (Izaías & Pérez, 2020; Syed et al., 2020). With regard to the first criticism, today's society moved toward values which are more socially and environmentally responsible, as evidenced by the notable environmental activism of young adults today (Falloon et al., 2021; Pickard, 2022). Opportunities arising from technological changes, environment, innovation and even the recent health alerts may affect the intention of individuals to become entrepreneurs (Ruiz-Navarro et al., 2021). Authors such as Agu (2021) o Vuorio et al. (2018) consider it appropriate to update the traditional entrepreneurial intention models by adding some of these new entrepreneurial opportunities. For example, Romero-Colmenares and Reyes-Rodríguez (2022) have proposed a model that explains sustainable entrepreneurial intentions among university students based on the main determinants of the TPB model but they do not analyse environmental awareness. With regard to the static nature, original intentional models have not considered mediating and moderating relationships among the different variables that may exert indirect influences (Izaías & Pérez, 2020; Syed et al., 2020). Only the most recent articles have introduced moderating and mediating relationships in the classical intentional models of the entrepreneurial intention (Cui & Bell, 2022; Kiani et al., 2022; Lechuga Sancho et al., 2022; Maheshwari & Kha, 2022; Otache et al., 2021; Pérez-Pérez et al., 2021; Singh & Mehdi, 2022; Uddin et al., 2022; Uysal et al., 2022).

In order to fill in these gaps in literature, in this paper we address the analysis of the variables related to the environment aiming to assess their impact on the entrepreneurial intention of university students as young adults. For this purpose, we base ourselves on literature about the sustainable entrepreneur, who has a high sense of awareness of topics such as nature conservation, life support and community and seeks opportunities to create future products, processes and services in order to obtain environmental and economic benefits (Shepherd & Patzelt, 2011).

Few studies to date have explored environmental awareness as a pattern of young adults' engagement in entrepreneurship initiatives (Chege & Wang, 2020; Peng et al., 2021). The first contribution of this paper is to verify whether environmental awareness has influence on the entrepreneurial intention of university students. If so, the implications for the orientation of entrepreneurial education would be revealing, as the introduction of an education in environmental values should be promoted, providing empirical evidence of what Ratten and Usmanij (2021) have proposed on promoting civic engagement in entrepreneurial courses. The new generations of youngsters, who in many cases follow Do-It-Ourselves (DIO) politics (Pickard, 2022), are demanding changes both in entrepreneurial education and in the way of understanding entrepreneurship (Ratten & Usmanij, 2021).

Furthermore, according to Cho et al. (2013), individuals with a high environmental awareness have a positive attitude towards the purchase of organic products as well. However, this attitude does not always lead to an effective behaviour, giving rise to "the attitude-behavior gap" phenomenon (Wiederhold & Martinez, 2018). In this respect, the second contribution of this work is to analyse whether the habits of purchasing organic products, which denote an environmentally responsible behaviour, mediate the relationship between environmental awareness and entrepreneurial intention.

Providing proposed relationships are validated, this paper, in addition to complementing classical intentional models on entrepreneurial intention, would verificate the cultural change that have an effect on the new generations, as a results of the effort done over recent decades, by both higher education institutions and other public and private organizations, to raise awareness in society in general, and among young people in particular, of the importance that entrepreneurship has in Common Good Economy (Kuhn, 2021). This would leave behind a culture that identifies the entrepreneur as an unethical and predatory individual whose purpose was to take advantage of society for personal gain, which may originate in historical and cultural issues deep-rooted in Spanish society (Coll & Tortella, 1992).

Below there is a description of the paper, which begins with introductory aspects about responsible entrepreneurship and its potential links to environmental awareness among young people. Secondly, there is a review of the literature on environment and entrepreneurial intention. The sections that follow explain the methodology and report on data collection, analysis and findings. Finally, the concluding remarks, implications and limitations of the study are debated.

2. The environment and the entrepreneurial intention

Responsible entrepreneurship has emerged as a parallel concept to Corporate Social Responsibility (CSR), except for the fact that it is associated with small entrepreneurs instead of large companies (Chapple & Moon, 2007). It generally refers to being responsible for the effects caused by oneself to others and to assume the responsibility of helping others in business practices. The authors consider that responsible entrepreneurs are those who significantly contribute to society, while pursuing their own economic progress (Chapple & Moon, 2007).

Sustainable entrepreneurship is one of the ways of achieving responsible entrepreneurship. Among the different concerns for social

welfare, sustainable entrepreneurship is focused on finding business opportunities that also entail nature preservation, supporting diversity and a responsible consumption of natural resources by offering products, processes and services with an economic and environmental benefit (Shepherd & Patzelt, 2011).

Sustainable businesses maintain a balance in the social, environmental and economic aspects of business activities, taking into consideration intergenerational equity (Amini & Bienstock, 2014). In accordance with this definition, sustainable entrepreneurship has been defined as the implementation of a business approach in order to meet the environmental and social objectives (Schaltegger & Wagner, 2011). The field of sustainable entrepreneurship is a study which is difficult to justify from the investor perspective, so the academic field is relatively small (Hall et al., 2010).

The term 'ecopreneur' has been used in literature to define an ecopreneurial organization as a 'system-transforming, socially-committed environmental business characterized by breakthrough innovation' (Isaak, 1997, p. 81). The word 'ecopreneur' is used to represent three factors: environmental, social and economic (Dixon & Clifford, 2007). Some authors have examined how ecopreneurs can create and develop an economically viable business, while preserving the fundamental environmental and social values that had previously motivated them, and whether good business practices can actually be consistent with idealism and the best environmental practices (Dawson & Daniel, 2010).

Although sustainability may not seem practical for a new company, it might be rewarded when the sustainable practices solve market failures and/or when they are highly appreciated by society (Milinski et al., 2002).

Recent studies have demonstrated that the immense and unexploited opportunity that environmental care offers to the companies is becoming increasingly evident. Future sustainable entrepreneurs need to understand how they can incorporate environmental innovations into their business agenda in a more efficient way. Therefore, it is necessary to make an additional effort to manage the duality of implementing a business approach in order to achieve an economic and environmental result (Phillips et al., 2015).

The underlying drive towards environmental entrepreneurship is the high degree of ecological awareness of the future entrepreneur, used to create a social and environmental value rather than a personal wealth (Noruzi et al., 2010). Nicolás Martínez et al. (2019) show that most of the factors that lead to the entrepreneurial intention of non-social companies also determine the entrepreneurship of sustainable companies, although in this latter case the environmental awareness of the person determines the capacity of identifying a market opportunity related to environmental issues. Dees (2001) supports this argument by explaining that social entrepreneurs are primarily a type of entrepreneurs, therefore it implies that the factors affecting the entrepreneurial initiative of the latter have influence over the first ones, as well. Nevertheless, the dominant feature of sustainable companies is related to the environmental awareness of their promoters, which allows to identify opportunities in solving problems to satisfy a social necessity, which, in this case, is the environmental improvement (Barba-Sánchez & Atienza-Sahuquillo, 2016; Phillips et al., 2015).

Thus, the sustainable entrepreneur's initiative is subject to the main purpose of achieving a social or environmental good for a community, by detecting a neglected problem that may become a business opportunity (Nicolás Martínez et al., 2019). However, only a few studies have empirically verified whether environmental awareness can influence the entrepreneurial intention of the individual. Chege and Wang (2020) highlight that environmental factors can play a key role in the success of a sustainable entrepreneurial initiative. Moreover, Peng et al. (2021) consider that additional research is needed to know which factors have influence on responsible entrepreneurship. With regard to university students, Barba-Sánchez et al. (2022) observe that in the case of these individuals, who still have a flexible career choice, the perception of environmental opportunities can serve as a motivation to increase their initiative to create a business with an economic and environmental purpose. On the basis of these arguments, we formulate these hypotheses:

Hypothesis 1. The environmental awareness of university students exerts influence over their entrepreneurial intentions.

Nowadays, the ecological consumer is seen as someone who associates the act of purchasing or consuming products to the possibility of acting in accordance with environmental preservation (Luengo-Valderrey et al., 2022). The green consumer knows that refusing to buy harmful products to the environment helps to preserve it. Therefore, ecological consumers look for products which do not involve health or environmental risks during their production, use or final recall, consume little energy, use a few packages that, if that is not the case, have to be at least recycled and recyclable, and which do not contain ingredients from threatened habitats and species. Moreover, as a daily routine, the ecological consumer collaborates sorting their wastes and using public transport (Akehurst et al., 2012; Costa et al., 2014). The extent of the influence of the ecological consumer has increased since, in the current era of globalization and prompt dissemination of information, customers are more aware of their power and impact to support (vote in favour) or reject (boycott) companies or to criticise them for failing to maintain a balance with the environment, subjecting them to fierce advertising campaigns to harm their interests, either at an individual or collective level, through consumer organizations.

In line with the arguments that enabled the previous hypothesis, the factor that precedes ecological consumption is the personal high degree of ecological awareness. However, the perceived importance of green consumption is at a further stage in comparison with environmental awareness. For instance, the 2017 Flash Eurobarometer report (European Commission, 2017) by the European Commission reveals that 94% of the European citizens state that protecting the environment is personally important to them. Nevertheless, when questioned whether they had bought products carrying any of the ecolabels, the percentages decreased significantly (30% EU ecolabel, 29% Blue Angel symbol and 22% NF Environmental label). The descriptive analyses performed for the United States coincide with the European ones. There is an apparent high level of personal commitment to the environment but, similarly, when questioned whether they purchase organic products on a daily basis, the level rarely increases in accordance with that commitment (Izaguirre et al., 2013). This phenomenon is known as "the attitude-behavior gap" (Wiederhold & Martinez, 2018).

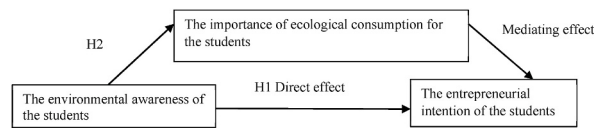


Fig. 1. Proposed model.

The gap and the proactive attitude towards the environment regarding the perceived importance of the ecological consumption are justified on the basis that green consumption not only requires a strong commitment to the environmental issues, but substantial resources from the consumer (financial resources and knowledge) and the opportunity (structural possibility) to actually participate in this form of consumption. According to [Luengo-Valderrey et al. \(2022\)](#), regarding the effects of economic cycles on green purchasing and green activism, the influence of environmental information and prices are more pronounced in times of economic crisis, as is currently the case.

In addition, customers seeking to consume in this manner must become aware of the latest environmental issues state of the art and spend time analysing the ecological labelling of the products, which is becoming more varied and sometimes causes understanding and reliability problems for the consumers. Furthermore, when purchasing organic products, the consumer feels uncertain about whether this purchase is worth it. Finally, ecological consumers must be more involved than traditional consumers when doing their shopping, as they have to sacrifice some personal conveniences because being an ecological consumer requires spending more money. For instance, frequently, they only find organic products in specialised shops far from their homes. Additionally, it is also common for them to assume cost overruns arising from the fact that organic products are more expensive ([Fuentes, 2014](#)).

An individual who is willing to consume organic products has a greater knowledge of the difficulties that it entails. From the point of view of the product, there is a technological uncertainty regarding the production process and the functionality and appearance of the green product compared to the conventional one ([Del Brío González et al., 2006](#)). Moreover, there is a commercial uncertainty arising from the environmental guarantees required by the consumer during the purchasing process ([Junquera et al., 2016](#)). Another barrier for declining to consume an organic product is its price, since the price of green products is thought to be higher than the price charged for conventional products ([Ayadi & Lapeyre, 2016](#)). The third external barrier that prevents purchasing an organic product is distribution, since the ecological purchasing decisions taken by the consumers are limited by a lack of options and the availability of green products at the main retailers ([Hornibrook et al., 2015](#)). Finally, communication is another barrier when purchasing organic products. This is evidenced by the fact that many consumers mistrust the messages of the companies about their green products ([Testa et al., 2014](#)).

People who express their desire to consume organic products have analysed these difficulties and, therefore, are at a further stage regarding environmental awareness. Likewise, when analysing the difficulties to consume organic products, new profit opportunities are identified and exploited, thus strengthening the entrepreneurial initiative of the individual and the drive for economic growth ([Dawson & Daniel, 2010](#)). The tendency to consume organic products promotes the need of obtaining new products and services in markets that are constantly changing, though sometimes there is no response from the companies in order to meet these needs, as only 32% SMEs in the EU offer green products or services, with a further 11% planning to do so in the next two years ([European Commission, 2022](#)). This leads us to believe that, since it was argued that the perception of the ecological consumption is at a further stage of environmental awareness, it can intervene in the relationship between the awareness and the entrepreneurial initiative. Therefore, we formulate the following hypothesis:

Hypothesis 2. The perception of the importance of ecological consumption intervenes in the relationship between environmental awareness and entrepreneurial initiative.

The model to be validated is represented as follows ([Fig. 1](#)):

3. Methodology

The methodology employed in this study has the following structure: a) questionnaire design; b) process followed until the reception of the questionnaires; c) main characteristics of the sample; and d) measures employed in the study and its reliability and validity.

3.1. Questionnaire design

The questionnaire design requires the inclusion of a number of guarantees that validate the instrument used and the collected items. These include an exhausted revision of the literature and the use of the experience acquired with regard to environmental management research. Likewise, efforts have been made to be accurate when explaining the variables in order to minimise ambiguity ([Davis et al., 1989](#)). The questionnaire has been subjected to a pretest phase by conducting personal interviews with three people: a student at the

University of Oviedo, Polytechnic School of Engineering; a professor at the University of Oviedo, Business Administration Department; and an entrepreneur member of *AJE Asturias*, the association of young entrepreneurs of Asturias, Spain:

The aspects analysed in the questionnaire were the following:

- a) General information about the students, such as their age, gender, the area of knowledge that they are enrolled in (the areas of knowledge are divided into five ones: Humanities, Social and Legal Sciences, Engineering, Sciences and Health Sciences), history of entrepreneurship in the family and educational level of their parents.
- b) The level of environmental awareness measured through several scales for evaluating variables, using Likert scales (1–5).
- c) The level of entrepreneurial intention of the students measured using Likert scales (1–5).

3.2. Process followed until the reception of the questionnaires

The target population of the study has been students at the University of Oviedo who were enrolled in an undergraduate degree or a master’s degree during the 2018–2019 academic year. According to the university’s website, <www.uniovi.es>, the total number of students enrolled that academic year was 14,624. Doctoral students, a total of 1,606, have not been included among the target population of study because their programmes are very different from the undergraduate degree and master’s degree programmes and there is a high percentage of international students of different ages, many of whom are writing their doctoral thesis abroad. The students enrolled in the special programmes for people over 50 offered by University of Oviedo have been neither included (a total of 642 people).

Several deliveries were made over the academic year due to the fact that several students only took modules in one semester. Field work began in October 2018 and lasted until April 2019. During that period of time, we obtained 1337 valid questionnaires.

3.3. Main characteristics of the sample

Taking the total number of valid questionnaires, 1,337, there is a 2.58% sampling error rate for 95% confidence level, $p = q = 0,5$. This error rate is low enough to be taken into consideration for a statistical study (Lind et al., 2012).

Table 1 shows the technical data of the study, universe or population, geographical and temporal area, sampling unit, sampling size, sampling error and confidence level and field work data.

In order to analyse the representativeness of the sample, Tables 2 and 3 compile the distributions of the sample and the population by gender and area of knowledge being studied.

To perform a more reliable assessment of the representativeness of the sample, two logit analyses were proposed in line with (Osterman, 1994), where the dependent variable is, in both cases, the probability of response. With respect to independent variables, dummy variables have been used. In the gender case, a dummy was used for the female gender, while the male gender was the base. In the area of knowledge case, 4 dummies were used (Humanities, Social and Legal Sciences, Engineering, Sciences) and the Health Sciences area was used as the base. In both analyses, if any dummy variable were significant, it would indicate that the probability of response of a category is significantly different from the variables used as the base. The results in Table 4 show the lack of significance in both cases. The gender and areas of knowledge dummies are not significant and, therefore, there is no bias in the sample.

In order to verify the relationship between the environmental awareness degree and the entrepreneur intention, factorial analysis and statistical regression techniques were employed using the IBM SPSS v24 software.

As all the data was collected from the same university, the University of Oviedo, there is some risk of bias in the common method. To verify that such bias does not occur, Harman’s single factor test has been performed, introducing a single factor in every item. According to Doty and Glick (1998), if every variable is explained by a single factor or if any other factor explains the major part of the variance, there is a bias related to the common method. Its importance has been demonstrated in literature (Diamantopoulos & Winklhofer, 2001). A factor analysis was performed (Table 5) to demonstrate that the bias of the common method did not represent a

Table 1
Technical data of the empirical study.

Empirical Data	
Characteristics	Survey
◆ Target universe or population	◆ Students at the University of Oviedo
◆ Geographical and temporal area	◆ Asturias/academic year 2018–2019
◆ Sampling unit	◆ Students
◆ Sampling size	◆ 1,337
◆ Sampling error/confidence level	◆ 2.58%/95%
◆ Field work data	◆ October 2018 until April 2019
◆ Respondents	◆ Undergraduate degree and master’s degree students

Source: Prepared by the authors

Table 2
Sample and population by gender.

Gender	Sample	Percentage	Population	Percentage
Female	776	58%	7,797	53.3%
Male	561	42%	6,827	46.7%
Total	1,337	100%	14,624	100%

Source: Prepared by the authors

Table 3
Sample and population by area of knowledge.

Area of knowledge	Sample	Percentage	Population	Percentage
Humanities	227	16.9%	1,720	11.76%
Social and Legal Sciences	493	36.9%	5,366	36.69%
Engineering	187	13.9%	3,430	23.45%
Sciences	165	12.3%	1,747	11.94%
Health Sciences	265	19.8%	2,361	16.14%
Total	1,337	100%	14,624	100%

Source: Prepared by the authors

Table 4
Logistic regressions for the representativeness of the sample.

Dummy Variable	Wald	Freedom Degrees	Significance
Female gender	0.073	1	0.754
Humanities	0.856	1	0.341
Social and Legal Sciences	0.004	1	0.894
Engineering	1.231	1	0.201
Sciences	0.035	1	0.645

Source: Prepared by the authors

Table 5
Factor variance.

Factors	Variance
F1	38.71%
F2	22.13%
F3	11.06%

Source: Prepared by the authors

problem in this study. Using as a criterion the inherent value greater than one, three factors were generated. Each of them respectively explains the 38.71%, 22.13% and 11.06% of the data variance. No factor is created and the first of them does not represent the major part of the variance, therefore, it can be concluded that the results will not be biased by the common method related to the data collection. However, Baumgartner et al. (2021) show analytically the deficiencies of the Harman’s single factor test for detecting common method variance and recommend use other technique. Partialling out of a marker variable analysis (Lindell & Whitney, 2001) was performed to confirm the absence of common method bias (CMB) in the present study. Level of mercury in Spain seafood served as the marker variable because not only is theoretically unrelated, but also it is tap into those sources of bias that are likely to appear within the measurement context of the substantive variables (Richardson et al., 2009). In addition, it similar in format, novel in content, and specific in definition (Lindell & Whitney, 2001). As shown in Table 6, correlations between the marker variable and substantive variables were not greater than 0.3 (Tehseen et al., 2017), except for one of the IMPACTOME items. This is indicated that there is no serious common method bias in this study. Table 6 shows too the correlations among the other variables, which give an idea of their relationships. Every item, including its full name and indicators, is explained in annex 1.

Table 6
Correlations among the items used in the paper.

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	X1	X2	X3	X4	X5	U1	U2	U3	U4	MV	DEG	GEN	FAM	
Y1	1.00																						
Y2	0.64 ^a	1.00																					
Y3	0.71 ^a	0.62 ^a	1.00																				
Y4	0.66 ^a	0.52 ^a	0.76 ^a	1.00																			
Y5	0.69 ^b	0.57 ^b	0.81 ^b	0.82 ^a	1.00																		
Y6	0.62 ^a	0.53 ^a	0.62 ^b	0.66 ^b	0.64 ^a	1.00																	
Y7	0.57 ^b	0.54 ^b	0.62 ^b	0.66 ^a	0.66 ^b	0.70 ^a	1.00																
Y8	0.62 ^b	0.56 ^b	0.62 ^b	0.64 ^b	0.63 ^b	0.71 ^a	0.76 ^a	1.00															
Y9	0.66 ^b	0.54 ^a	0.65 ^a	0.68 ^a	0.68 ^a	0.70 ^a	0.69 ^a	0.73 ^a	1.00														
X1	0.05	0.02	0.04	0.05	0.02	0.01	0.02	0.03	0.05	1.00													
X2	0.01	0.01	0.01	0.01	0.02	0.01	0.00	0.00	0.01	0.54 ^b	1.00												
X3	0.04	0.05	0.03	0.03	0.02	0.07	0.09	0.10 ^b	0.07	0.43 ^b	0.50 ^a	1.00											
X4	0.03	0.04	0.05	0.05	0.04	0.04	0.08	0.04	0.06	0.45 ^a	0.54 ^a	0.61 ^a	1.00										
X5	0.04	0.03	0.05	0.05	0.03	0.07	0.05	0.07	0.07	0.37 ^b	0.46 ^a	0.50 ^a	0.54 ^a	1.00									
U1	0.01	0.01	0.04	0.02	0.05	0.00	0.04	0.02	0.02	0.34 ^b	0.42 ^b	0.51 ^b	0.41 ^a	0.42 ^a	1.00								
U2	0.01	0.00	0.04	0.04	0.06	0.01	0.02	0.02	0.00	0.35 ^b	0.42 ^a	0.51 ^b	0.42 ^a	0.41 ^a	0.79 ^a	1.00							
U3	0.02	0.03	0.01	0.03	0.02	0.02	0.02	0.00	0.00	0.19 ^b	0.22 ^a	0.31 ^b	0.24 ^b	0.22 ^b	0.24 ^b	0.27	1.00						
U4	0.08	0.07	0.05	0.05	0.05	0.12	0.11	0.12 ^b	0.10	0.27 ^b	0.38 ^b	0.45 ^a	0.36 ^b	0.48 ^a	0.41 ^b	0.41 ^a	0.22 ^b	1.00					
MV	-0.03	0.01	-0.01	-0.01	0.00	-0.02	0.00	0.00	0.02	0.08 ^b	0.12 ^a	0.23 ^a	0.17 ^a	0.14 ^a	0.24 ^a	-0.06	0.16 ^a	0.34 ^a	1.00				
DEG	0.03	0.02	0.02	0.02	0.02	0.02	0.05	0.04	0.02	0.05	0.04	0.07	0.04	0.03	0.10	0.07	0.01	0.10 ^b	-0.02	1.00			
GEN	0.09	0.08 ^b	0.09	0.14 ^a	0.15 ^a	0.12 ^b	0.13 ^b	0.10 ^b	0.12 ^b	0.11 ^b	0.18 ^b	0.17 ^b	0.13 ^b	0.14 ^b	0.15 ^b	0.11 ^b	0.04	0.09	-0.00	0.01	1.00		
FAM	0.20 ^a	0.20 ^a	0.18 ^b	0.16 ^b	0.2 ^a	0.15 ^b	0.14 ^b	0.13 ^b	0.15 ^b	0.02	0.06	0.02	0.01	0.02	0.02	0.01	0.02	0.02	-0.00	0.02	0.02	1.00	

^a $p < 0.001$.

^b $p < 0.01$.

Source: Prepared by the authors

3.4. Scales

The variables employed in the study are shown in this section. In line with [Malhotra and Grover \(1998\)](#), in order to measure the internal consistency or the reliability of the constructs, Cronbach's Alpha has been calculated. Similarly, the factorial analysis technique has been applied to determine the validity of the scale.

3.4.1. Entrepreneurial intention of the students

To assess the entrepreneurial intention of the students, we have created a construct (ENTINT) from the initial TPB model by Ajzen ([Ajzen, 1991](#)). We have enquired about the different items in order to analyse the entrepreneurial intention.

Our construct includes some variants. The items employed were: a) My career goal is to become an entrepreneur; b) I will make every effort to create and run my own company in the future; c) I am determined to create a company in the future; d) I have been seriously considering creating a company in the future; e) I firmly intend to start a company in the future; f) The idea of becoming an entrepreneur appeals to me; g) I would start a company if I had the opportunity and the necessary resources; h) I would be thrilled to become an entrepreneur; i) Among a number of options, I would choose to be an entrepreneur. All these items have been assessed by Likert scales (1–5), where 1 meant that the item was not relevant to the student and 5 meant that it was very relevant. The high value of Cronbach's Alpha, greater than 0.7, guarantees the reliability of the construct. In order to assess the internal reliability, a factorial analysis which demonstrates that the construct is an indicator of a single variable has been conducted.

ITEMS	ENTINT
My career goal is to become an entrepreneur.	0.758
I will make every effort to create and run my own company in the future.	0.843
I am determined to create a company in the future.	0.741
I have been seriously considering creating a company in the future.	0.770
I firmly intend to start a company in the future.	0.693
The idea of becoming an entrepreneur appeals to me.	0.828
I would start a company if I had the opportunity and the necessary resources.	0.721
I would be thrilled to become an entrepreneur.	0.812
Among a number of options, I would choose to be an entrepreneur.	0.658
Cronbach's Alpha	0.818
Eigenvalue	2.958
Fraction of variance in %	70.032

3.4.2. Environmental awareness with respect to the impact of the companies

To assess the environmental awareness of the impact that the companies have on the ecosystem and how important it is to adopt measures to avoid waste, dumping and emissions (IMPACTOME), we relied on different analyses related to organic production ([Junquera et al., 2012](#); [Hornibrook et al., 2015](#)). Our construct contains items that differ from the ones addressed in these papers. The ones employed were: a) I get irritated when I think about the damage caused by pollution to our lives; b) I feel frustrated and get annoyed when I think about the pollution caused by companies; c) Plastic bags are causing pollution due to the fact that they take centuries to decompose; d) Nowadays, pollution is one of the major concerns. All these items have been assessed by Likert scales (1–5), where 1 meant that the item was not relevant to the student and 5 meant that it was very relevant. The high value of Cronbach's Alpha, greater than 0.7, guarantees the reliability of the construct. In order to assess the internal reliability, a factorial analysis which demonstrates that the construct is an indicator of a single variable has been conducted.

ITEMS	ENTINT
I get irritated when I think about the damage caused by pollution to our lives.	0.659
I feel frustrated and get annoyed when I think about the pollution caused by companies.	0.736
Plastic bags are causing pollution due to the fact that they take centuries to decompose.	0.875
Nowadays, pollution is one of the major concerns.	0.824
Cronbach's Alpha	0.795
Eigenvalue	3.002
Fraction of variance in %	68.32

3.4.3. Environmental awareness with respect to organic products

To assess the environmental awareness with respect to organic products, we have created a construct (PRODUCTOME) relying on different studies which have analysed the economic impact of consuming organic products ([Ayadi & Lapeyre, 2016](#); [Junquera et al., 2016](#); [Kang et al., 2012](#)). Our construct contains summaries of items addressed in these papers. The ones employed were: a) I only buy products if they show low levels of pollution; b) I quit buying some products for ecological reasons; c) I am interested in reading articles related to organic products; d) I always read the labels on organic products and evaluate their ingredients; e) I am willing to pay an extra 20% for organic products. All these items have been assessed by Likert scales (1–5), where 1 meant that the item was not relevant to the student and 5 meant that it was very relevant. The high value of Cronbach's Alpha, greater than 0.7, guarantees the reliability of

the construct. In order to assess the internal reliability, a factorial analysis which demonstrates that the construct is an indicator of a single variable has been conducted.

ITEMS	ENTINT
I only buy products if they show low levels of pollution.	0.819
I quit buying some products for ecological reasons.	0.825
I am interested in reading articles related to organic products.	0.775
I always read the labels on organic products and evaluate their ingredients.	0.724
I am willing to pay an extra 20% for organic products.	0.862
Cronbach's Alpha	0.80
Eigenvalue	2.802
Fraction of variance in %	63.124

Finally, as control variables, we have used some of the demographic variables most frequently used in the theory, such as gender (GEN), the degree that the students are enrolled in (DEG) and having a history of entrepreneurship in the family (FAM).

4. Results

We have used a hierarchical regression analysis in order to contrast the research hypotheses. Previously, to ensure the initial conditions, we have verified the existence of multicollinearity among the explanatory variables (IMPACTOME and PRODUCTOME factors and the control variables aforementioned). We have examined the values of the bivariate correlations and calculated the VIFs. In our study, all the correlations are far below 0.8 and all the VIFs have reached values below 2, which is the cut-off value recommended by (Neter et al., 1990). Thus, it can be concluded that multicollinearity does not represent a problem in this study.

Next, following the recommendations of (Cohen et al., 2003), the variables are introduced in the model in three steps: firstly, the control variables (Model 1); then, the variable that represents environmental awareness (IMPACTOME) (Model 2); and, finally, the factor related to the consumption of organic products (PRODUCTOME) (Model 3). The results are shown in Table 7.

Baron and Kenny state that, in order to have mediation, there are three conditions that must be complied with (Baron & Kenny, 1986). Firstly, the predictor variable, the IMPACTOME, must be related to the mediation one, the PRODUCTOME. Secondly, the mediation variable must be related to the dependent variable (ENTINT). And, finally, there must be a significant relationship between the predictor variable and the dependent variable in order for the mediation variable, once it has been introduced, to lose (in case of total mediation) or decrease (in case of partial mediation) its significance. After verifying whether there is a mediating factor, it is advisable to demonstrate whether the mediation is statistically significant through the Sobel Test (Sobel, 1982). In the following figure, the data from the regression models are shown, including the coefficients of the predictor variable in relation to the mediation variable, which were performed in an additional model.

Table 7 and Fig. 2 show that, in model 2, the IMPACTOME exerts a positive and significant effect on the entrepreneurial intention of the students (see Fig. 2). Although reduced, this effect is also significant in model 3. Therefore, hypothesis 1 becomes valid. In Fig. 2, the positive and significant effect exerted by the IMPACTOME on the perception of the importance of organic products PRODUCTOME (0.133**) has been verified, in compliance with Baron and Kenny's first condition (1986). Similarly, on the basis of the data from Table 7 and Fig. 2, the PRODUCTOME exerts a positive and significant effect on the dependent variable, in compliance with the second condition. Furthermore, it can be observed that, both in Table 7 and Fig. 2, once the mediating variable has been introduced, the influence that the IMPACTOME variable exerts on the dependent variable continues to be significant, but reduced, in compliance with the third condition. Finally, the Sobel Test (Sobel, 1982) enables us to confirm that the indirect effect of the IMPACTOME variable, through the PRODUCTOME mediating variable, is significant ($z = 3.57$; $p < 0.001$). Considering that there is still a significant direct effect, it can be affirmed that the mediation is partial.

Finally, there is a positive and significant control variable in every model proposed: the family history. Therefore, we can state that having entrepreneurial family members reinforces the entrepreneurial intention of the students. All other variables (control, gender and degree) are not significant in any of the models.

Table 7
Results of the regression analysis.

	MODEL 1	MODEL 2	MODEL 3
IMPACTOME		0.302**	0.192*
PRODUCTOME			0.247**
GEN	0.040	0.104	0.122
DEG	0.135	0.108	0.126
FAM	0.281*	0.268*	0.214*
R ²	0.186	0.179	0.398
R ² adjusted	0.177	0.168	0.393
F	22.85***	16.91***	130.90***

Dependent variable: Entrepreneurial intention (ENTINT).

*p < 0.05; **p < 0.01; ***p < 0.001.

Source: Prepared by the authors

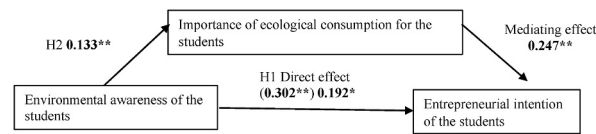


Fig. 2. Results of the regression analysis with mediation.

5. Discussion

In recent years, the concern for sustainable development has increased worldwide and the achievement of the SDGs has become the main motivation for every UN country (United Nations, 2015). Both United Nations (2015) and specialised literature (Filser et al., 2019; Saleem et al., 2018) consider that sustainable entrepreneurship is a key factor in achieving SDGs. More than 20 years ago, Milstein and Hart predicted that entrepreneurs would take into account sustainable development “as one of the biggest business opportunities in the history of commerce” (Milstein & Hart, 1999, p. 25). However, the social, environmental and economic dimensions of sustainable development are still one of the greatest challenges of the 21st century (Warchold et al., 2022). Moreover, sustainable entrepreneurship is still an emerging field of research and the knowledge about the factors that affect the behaviour of the entrepreneurs towards sustainability and their decision to formulate and exploit targeted opportunities is not sufficient (Hockerts et al., 2018; Peng et al., 2021).

In this context, this paper has empirically determined that environmental awareness, regarding the impact that companies have on the ecosystem and to what extent is important to adopt practices to avoid waste, discharges and emissions (IMPACTOME), exerts a positive and significant effect on the entrepreneurial intention of students (ENTINT), in line with the results obtained by the preceding literature (Barba-Sánchez et al., 2022; Chao & Yu, 2022; Chege & Wang, 2020; Peng et al., 2021). This contribution has satisfied the request made by Vuorio et al. (2018) regarding the application of responsible entrepreneurship by young entrepreneurs and ratifies the trend towards a responsible business culture in opposition to the pre-existing predatory culture, which promotes the full exploitation of the potential of sustainable economic growth, as predicted by Azmat and Samaratunge (2009).

However, taking into account the so-called “the attitude-behaviour gap” phenomenon tested in the field of environmental awareness (Wiederhold & Martinez, 2018), the results may lead us to take ineffective actions with regard to education in order to encourage entrepreneurship among young people. Moreover, sustainable entrepreneurship offers opportunities which are different to traditional entrepreneurial opportunities (Agu, 2021). Therefore, Vuorio et al. (2018) suggest the necessity of specific models of sustainable entrepreneurial intent. In this sense, our study incorporates a new variable: the perception of the importance of ecological consumption which, apart from influencing per se the entrepreneurial intention of young people, mediates the relationship between environmental awareness and entrepreneurial initiative, corroborating the second hypothesis. The perception of environmental opportunities can serve as a motivation to university students, who still have a flexible career choice, to increase their initiative to create a business with an economic and environmental purpose, in accordance with both their values and beliefs (Peng et al., 2021) and the Do-It-Ourselves (DIO) politics (Pickard, 2022) followed by many young people.

Finally, we can affirm that having entrepreneurial relatives reinforces the entrepreneurial intention of the students. This statement is supported by literature which considers that those people who have always had entrepreneurial examples around have more probabilities of transforming ideas into real companies (Aldrich & Cliff, 2003; Hoffmann et al., 2015).

5.1. Theoretical implications

This study contributes to the literature about the application of responsible entrepreneurship by entrepreneurs and to their contribution to an economic and responsible growth. Specifically, three key theoretical implications can be obtained from this research.

Firstly, we have contributed to the progress of literature regarding original models of entrepreneurial intention, which have been criticized in recent years because of their static nature. Most recent articles in the literature have introduced some moderating variables in the intentional models to adapt themselves to the dynamic nature of environment, such as the entrepreneurial passion (Uddin et al., 2022), the entrepreneurial self-efficacy (Maheshwari & Kha, 2022; Uysal et al., 2022), the behavioural entrepreneurial mindset (Cui & Bell, 2022), the entrepreneurial self-confidence (Otache et al., 2021), or mediating variables such as different individual characteristics (Pérez-Pérez et al., 2021), the role of openness to experience (Singh & Mehdi, 2022), the entrepreneurial behavior (Lechuga Sancho et al., 2021), the perceived person-entrepreneurship (Kiani et al., 2022) and the positive atmosphere to entrepreneurship in the university environment (Lechuga Sancho et al., 2021). However, the relationship with the environment has not been addressed in literature as a contributor to the improvement of the entrepreneurial intention and just a few articles have introduced the sustainable entrepreneurial intention concept (Romero-Colmenares & Reyes-Rodríguez, 2022), which represents a step forward in academic literature.

Secondly, this study has analysed the theoretical foundation of ‘ecopreneurship’ in which the environment is not only a potential source of opportunities, as it has been considered until now, but an emerging model of entrepreneurship in the context of sustainable development, which conditions the different steps of the business creation process and redefines the expected outcomes with the aforesaid entrepreneurship. The conceptual model of this study integrates the approach of Economy for the Common Good, typical of more collectivist cultures, with the classical western entrepreneurial philosophy, which is far more individualistic. Undoubtedly, with

the proposed relationships, it updates and revitalises the traditional models of entrepreneurial intention integrating the environmental awareness as a pattern of the young adults' commitment to entrepreneurial initiatives.

Thirdly, the current study has theoretically highlighted the factors of the environmental as influencing variables for the entrepreneurial intention in the context of young people. This study proposed a framework of sustainable entrepreneurship that shows a change in the dominant paradigm among the new generations. Therefore, educational institutions need to integrate patterns of sustainability to attract and retain potential students regarding entrepreneurship programmes.

5.2. Practical implications

The findings of our study can be important for researchers, scholars, policy makers, universities and other institutions which have among their objectives encouraging entrepreneurship as a means of obtaining a sustainable development based on the achievement of the SDGs. Young people, as social entrepreneurs, find innovative solutions to social and environmental problems and, in order to develop them, they need support by means of training, mentorship and education, as well as learning opportunities through action. In particular, some authors have begun to analyse whether there is a gap between the academic background and the needs of those who are interested in entrepreneurship education (Chell et al., 2007). The results obtained in this study suggest a cultural change in younger generations, which is based in the so-called Economy for the Common Good (Kuhn, 2021) and which should not be ignored by educational programmes that promote entrepreneurship. Cooperation, community and ecological responsibility values, inherent to other cultures such as indigenous people (Molina-Ramírez & Barba-Sánchez, 2021), are making an impression on young people, in line with the DIO philosophy defended by Pickard (2022). This study makes an appeal for an in-depth study of the consequences of this cultural change in entrepreneurship promotion programmes.

One of the tasks of the 21st century universities is to promote the social and economic development of their environment through training on the creation of companies and the development of entrepreneurship (Barba-Sánchez & Atienza-Sahuquillo, 2018). That knowledge will increase the intentions of the students to create start-up companies focused on sustainable issues. In this regard, Yang et al. (2021) defend the proactive role of knowledge institutions (including colleges and education departments) for promoting environmental responsibility. In addition to affecting the decision to start an entrepreneurial project, it improves the chances of success of an entrepreneur (Gorman et al., 1997).

Scholars have recently defended the educational methods that enhance the effectiveness of education by developing links among the students, the companies, society and the environment (see García-Morales et al., 2020; Montiel & Delgado-Ceballos, 2014). The initiatives of the sustainable entrepreneur are dependent on the main objective of achieving a social or environmental good for a community, by detecting a neglected problem that may become a business opportunity. In short, our results show a way to help develop a better focused entrepreneurial education and more striking initiatives in order to encourage entrepreneurship among young people.

5.3. Limitations and suggestions for future lines of research

With regard to the possible limitations of the study, firstly, our sample mainly comprises young adults (aged 18–22). Therefore, their answers cannot be completely taken as a generalisation of the general population, even though our intention was to show the future social trend, in line with the perception of Festa et al. (2022). Secondly, we have not included differences regarding gender, they are included as a control variable which is not significant in any of the three models. Therefore, it seems that there is no difference, although the results obtained by Haski-Leventhal et al. (2017) may have an impact on values, attitudes toward CSR and, therefore, on environmental awareness. In this regard, a future line of research should analyse whether our conclusions are maintained for both sexes equally or whether there is any significant difference in this respect.

Thirdly, due to the fact that the considered variables were based on the perceptions of the students (individual respondents), a certain degree of subjectivity was unavoidable. Although previous studies have concluded that this approach may obtain reliable and valid data (Haski-Leventhal et al., 2017; Swaim et al., 2013), future studies in this field should consider other respondents, e.g. instructors.

Fourthly, this study was conducted in Spain (Asturias), therefore, the conclusions are limited to that culture. The research has suggested that the cognitive, emotional and behavioural responses may vary among cultures (Cole et al., 2002). Future studies should explore the role of perception and behaviour in terms of the responses of young people to the entrepreneurial intention issue in a variety of cultures. Thus, the field of study must be extended to include a larger geographical scope and sample, since the environmental differences might affect the variables of the research.

This study only considered the students at the University of Oviedo. Therefore, the perceptions of the entrepreneurs about environmental awareness and the use of organic products at other universities should be examined.

Ultimately, the role of educators should leverage the existing literature about responsible entrepreneurship and the experience of successful sustainable entrepreneurs in order to create educational experiences related to the acquisition of skills in responsible entrepreneurship.

Finally, it should be noted that this study contributes to the scarce literature on sustainable entrepreneurship with an empirical research that enables the generalisation of the obtained results. For this reason, this research is expected to promote awareness of the creation of sustainable companies, stimulating the research on issues affecting sustainable entrepreneurship.

6. Conclusion

In summary, it can be concluded that the environmental proactivity of young people, understood not only as their environmental awareness, but also as the effective ecological behaviour, encourages their entrepreneurial intention in the context of a responsible entrepreneurial culture. This conclusion suggests the existence of an emerging paradigm of understanding entrepreneurship which must be considered by the different public and private institutions involved in entrepreneurship promotion and education to design their policies and programmes on this matter. However, considering the limitations of this study, further investigation is needed to ratify and, especially, to spread in other contexts the model validated here.

Data availability

Data will be made available on request.

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ANNEX 1: ITEMS

ITEMS	Abbreviation
My career goal is to become an entrepreneur.	Y1
I will make every effort to create and run my own company in the future.	Y2
I am determined to create a company in the future.	Y3
I have been seriously considering creating a company in the future.	Y4
I firmly intend to start a company in the future.	Y5
The idea of becoming an entrepreneur appeals to me.	Y6
I would start a company if I had the opportunity and the necessary resources.	Y7
I would be thrilled to become an entrepreneur.	Y8
Among a number of options, I would choose to be an entrepreneur.	Y9
ENTREPRENEURIAL INTENTION OF THE STUDENTS (factor)	ENTINT
I only buy products if they show low levels of pollution.	X1
I quit buying some products for ecological reasons.	X2
I am interested in reading articles related to organic products.	X3
I always read the labels on organic products and evaluate their ingredients.	X4
I am willing to pay an extra 20% for organic products.	X5
ENVIRONMENTAL AWARENESS WITH RESPECT TO ORGANIC PRODUCTS (factor)	PRODUCTOME
I get irritated when I think about the damage caused by pollution to our lives.	U1
I feel frustrated and get annoyed when I think about the pollution caused by companies.	U2
Plastic bags are causing pollution due to the fact that they take centuries to decompose.	U3
Nowadays, pollution is one of the major concerns.	U4
ENVIRONMENTAL AWARENESS WITH RESPECT TO THE IMPACT OF THE COMPANIES (factor)	IMPACTOME
DEGREE	DEG
GENDER	GEN
FAMILY HISTORY	FAM

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