

Megatrends as a factor of innovation and their influence on sustainability from a university perspective

Megatendencias como factor de innovación y su influencia en la sostenibilidad desde una perspectiva universitaria

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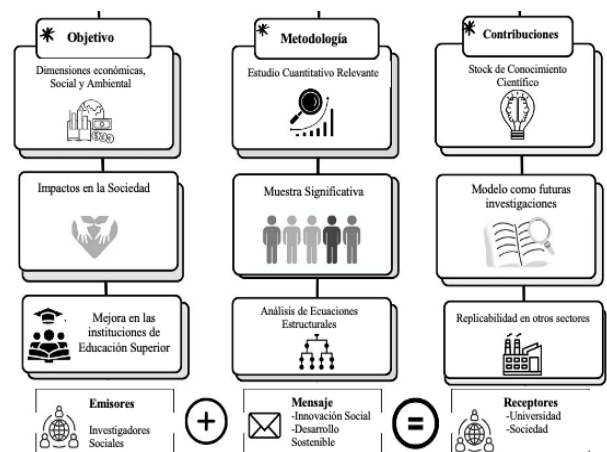
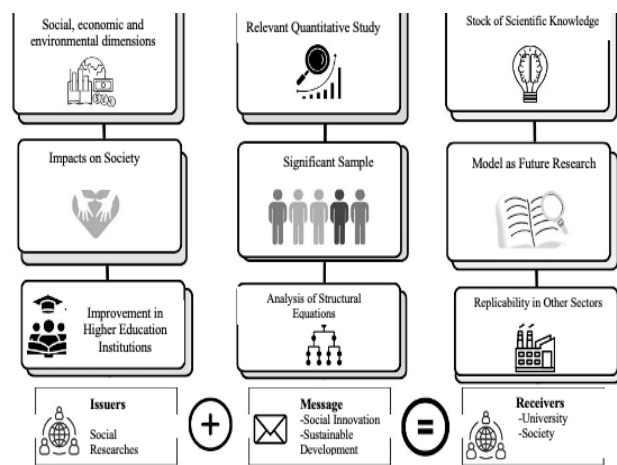
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Abstract

The objective of this research is to analyze the influence of innovation on the social, economic, and environmental dimensions that make up the sustainability of a higher education institution in Sonora from the student perspective. This turns out to be quantitative cross-sectional of a non-experimental and correlational nature, the results are analyzed the effects that innovation has on the dimensions of sustainability through a structural equation model in the Smart PLS statistical program. In addition to this, higher education students were chosen as part of the sample, since these turn out to be one of the main interest groups that are dedicated to addressing sustainability, as well as the main clients of the innovation processes that they develop within organizations, in this particular case, universities. Likewise, it was defined that the type of sampling applied was non-probabilistic for convenience. The above has the intention of contributing to the stock of scientific knowledge and reducing the knowledge gap between both variables, identifying the need to continue developing research based on it, as well as exposing empirical references for future experts interested in the same lines of research.

Resumen

La presente investigación tiene el objetivo de analizar la influencia de la innovación en las dimensiones sociales, económicas y ambientales que conforman la sostenibilidad de una institución de educación superior de Sonora desde la perspectiva estudiantil. Esta resulta ser de corte cuantitativo transversal de carácter no experimental y correlacional, los resultados se analizan los efectos que tiene la innovación sobre las dimensiones de la sostenibilidad a través de un modelo de ecuación estructural en el programa estadístico Smart PLS. Aunado a ello, se eligieron como parte de la muestra a estudiantes de educación superior, ya que estos resultan ser uno de los principales grupos de interés a los cuales se avoca en atender la sostenibilidad, así como los clientes principales de los procesos de innovación que se desarrollan dentro de las organizaciones, en este caso particular, las universidades. Igualmente se definió que el tipo de muestreo aplicado fue no probabilístico por conveniencia. Lo anterior, tiene la intención de contribuir al stock de conocimiento científico y reducir la brecha del saber entre ambas variables, identificando la necesidad de seguir desarrollando investigación en función de ello, así como exponer referentes empíricos para futuros expertos interesados en las mismas líneas de investigación.



Sustainable Development, Structural Analysis, Social Change

Desarrollo Sostenible, Análisis Estructural, Cambio Social

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Introduction

The environment is currently undergoing constant change through natural processes due to human influence. These changes can be perceptible in the short term, long term or medium term, as well as have a significant impact on our quality of life. Pérez-Vallejo et al. (2017) mention that it is currently known that organisations function as open systems, which implies that they operate in dynamic scenarios with respect to the environment that surrounds them, bringing with them a series of constant movements that lead them to generate a high capacity for response and adaptability in the face of these challenges.

This is why organisations are one of the main stakeholders in remaining attentive to these changes that impact the environment. This is where the importance of being informed and prepared to face these transformations lies, leading them to remain constantly updated with respect to the trends that ensure their adaptability, thus guaranteeing a sustainable future (Aponte, 2017; García et al., 2022, Villarreal et al., 2023).

De Faria (1983) defines change as "the modification of a state, condition or situation", thus understanding that a change is any alteration or transformation of characteristics, dimensions or aspects that are significant for the environment. However, it is important to differentiate that there are different terminologies or concepts referring to change: there are superficial changes, immediate changes, medium-term changes or changes with a long-term vision, better known as megatrends.

A megatrend are those "social, technological, cultural, economic, environmental and institutional changes that are long-standing and, once embedded in the system, have a lasting and significant effect on government and society" (Gauna, 2019, p. 15). The importance of studying megatrends dates from the relevant information that can be obtained about future changes through the statistics that this type of study generates, allowing us to know percentages, increases and decreases in an endless number of issues that have a significant impact on our society.

There are several authors who categorise megatrends according to their area of application, such as Alarcón (2016), Martínez and González (2018) and García (2022), who classify megatrends according to social, technological, educational, health, environmental, etc. aspects.

However, over the years, experts have managed to agree on the imminent inclination to generate trends that respond to the different needs of the environment, emphasising a sustainable approach.

In view of this position, organisations, regardless of their line of business, have in recent years focused on appropriating the implementation of innovative proposals in order to meet the needs of society without neglecting the guidelines of sustainability, and in turn, higher education institutions have not remained on the sidelines, joining this new vision in favour of social change.

This is how a new gap is opening up for innovation practices within universities in collaboration with sustainable development. The growing interest in promoting sustainability in higher education is a trend that has emerged in response to the growing concern for the environmental and social problems facing our society. More and more educational institutions are incorporating courses and programmes with multidisciplinary approaches that address environmental, social and economic issues. This allows students to acquire knowledge and skills that enable them to address sustainability challenges effectively. (Belda y Pellicer, 2019; Walker, 2020; Ermólieva et al., 2019; Semanate-Quíñonez et al., 2021).

It is clear that innovation and sustainability are two fundamental aspects that need to be addressed comprehensively in universities. The implementation of innovative and sustainable strategies makes it possible not only to improve the quality of education, but also to contribute to the sustainable development of society. Universities have the responsibility to train professionals committed to caring for the environment and capable of generating innovative solutions to current and future challenges (Rojas, 2022). In this sense, universities assume a crucial role in the achievement of sustainable development goals and in the training of leaders capable of transforming the world for the benefit of present and future generations.

In short, trends in higher education reflect a growing awareness of the importance of addressing environmental and social challenges in a holistic manner. The inclusion of sustainability issues in curricula, the promotion of innovative practices, community engagement, and collaboration with external actors are some of the ways in which educational institutions are contributing to the formation of professionals committed to a future.

Theoretical review

As part of the emergence of the term sustainability, Sánchez and Anzola (2021) mention that it had a predecessor called ecodevelopment, this concept was coined in 1974 by the executive director of the United Nations Environment Programme (UNEP) at the first meeting of the governing council and it was from that decade that the use of terms with reference to environmental topics was triggered.

Sachs (1974) mentions that ecodevelopment is a "type of strategy that is considered viable in several regions of Latin America and that could be useful in regional planning, and especially in the planning of the settlement of uninhabited spaces" (p. 57). According to the author, this concept was aimed at avoiding the waste of resources and minimising the creation of waste.

It was not until 1987 when this concept evolved and a new term called sustainable development was officially presented (Sánchez and Anzola, 2021), which, unlike the concept of ecodevelopment, not only addressed the needs of the current society, but also committed itself to not reducing the possibility of future generations to address the challenges that they could possibly face in the same way, thus generating an imposition compared to the concept of ecodevelopment.

In contemporary terms, the concept of sustainability has emerged in response to social problems and challenges, such as poverty, inequality, climate change and social exclusion. Various organisations and individuals have realised the need to find innovative and sustainable solutions to address these problems, which has led to the emergence of sustainability as an approach and field of study.

Therefore, sustainability can be defined as "a conceptual and ethical vision that, in addition to environmental care and economic development, includes the social dimension: respect for the human rights of all people without exception" (Escámez and Péris, 2021, p. 2). It is thus understood that these technological, social or organisational changes must be carried out under the premise of not compromising the social, economic and environmental well-being of future generations.

This is how this new boom in research began in the 2000s, with organisations such as the Economic Commission for Latin America and the Caribbean (ECLAC) making its first contributions by coining this concept.

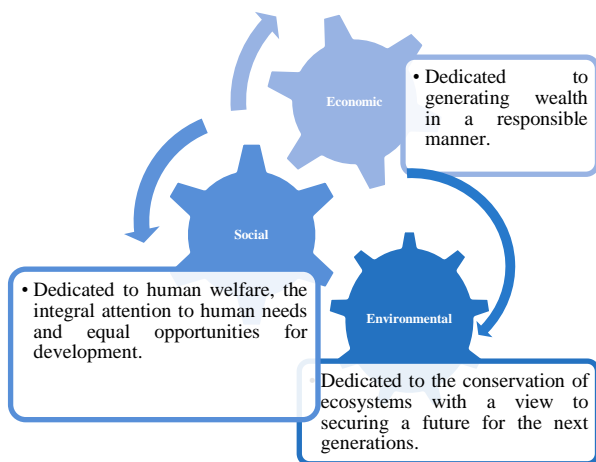
Likewise, it is then when the first scientifically rigorous texts were developed, focused on establishing a first approximation to its conceptualisation and to understanding this phenomenon in greater depth (ECLAC, 2024).

Rubio (2006) establishes that sustainability has its origins in globalisation, consumption patterns, overpopulation, global warming, among other world problems. The consequences that this series of problems generate on planet earth and those who inhabit it have led national and international organisations to urgently address these difficulties that compromise the future of the planet. Such is the case of the World Health Organisation (UN), which since 1984 has been working to address the needs regarding pollution and climate change, which was already considered a threat to current and future society, and has been implementing programmes that seek to solve these needs and, over time, have been extended to different sectors in order to improve their practices and work towards sustainable development objectives.

Currently, it is through the 2030 agenda that the sustainable development goals and the action plan to be followed for the next fifteen years in favour of people, the planet and prosperity are known, in order to strengthen universal peace and access to justice, according to the United Nations (2015).

Similarly, institutions such as the Economic Commission for Latin America and the Caribbean (ECLAC) were created in Latin America, which is a mediating body between 46 states for collaboration between Latin American governments that work in terms of research and analysis of the different sectors of the regional and national socio-economy.

Now, according to the UN's 2030 Agenda (2018), sustainability is made up of different areas of development to work on proposals that address needs in different dimensions. These dimensions are defined below (see figure 1).

Box 1**Figure 1**

Dimensions of sustainability

Source: Own elaboration according to UN (2018).

In turn, Alarcón and Zepeda (2021) state that the sustainable approach represents an opportunity to reconsider the development strategies of our nations and opens up a new horizon to strengthen the major transformations that will allow us to move towards inclusive, dynamic and sustainable societies. This is precisely the vision embodied in the 2030 Agenda for Sustainable Development, a proposal that distances itself from the conventional vision of development based solely on economic growth.

The notion of sustainable development entails building societies in which well-being, inclusion and equity are fundamental values. The challenge lies in the formulation of models and public policies necessary to facilitate this transition. This is why the education sector has experienced sustainable development through innovation practices that strengthen the collaboration of academia (Casas, et al, 2017; Keck and Saldivar 2016; Monforte-García et al 2016 & González-Gaudio, et al 2015). Thus, higher education institutions (HEIs) have begun to implement models within their organisational structures and curricula that integrate innovative practices in order to increase their sustainability indexes (Jaca, 2011). Such is the case of Alvarenga et al., (2022) who proposes a model that consists of addressing four main categories within HEIs: 1) organisational philosophy, 2) curriculum, 3) campus and 4) healthy environment, in order to gradually appropriate this new ideology in terms of innovation and sustainability.

Understanding that innovation in universities reflects the ability to generate and apply ideas with creative solutions to address challenges or improve processes within the academic environment, manifesting itself in various ways, such as the creation of updated academic programmes, the implementation of innovative teaching methods.

Promoting research, the development of technology and collaboration between companies, as well as the exchange of knowledge between teachers, students and other educational actors, fostering adaptability and continuous learning, promoting multidisciplinary, improving educational quality and linking with the environment (Palacio-Fierro et al, 2017; García-Flores and Palma, 2019; Giraldo-Gutierrez et al., 2020; Hernández, 2022).

Therefore, this paper aims to analyse the influence of innovation on the social, economic and environmental dimensions that make up the sustainability of a higher education institution in Sonora from the student perspective.

Hi: Innovation significantly influences sustainability.

H1: Innovation significantly influences the social dimension of sustainability.

H2: Innovation significantly influences the economic dimension of sustainability.

H3: Innovation significantly influences the environmental dimension of sustainability.

Methodology

However, for the purposes of this research, it was established that this is a non-experimental quantitative cross-sectional study and is correlational, as a result of being "a process that consists of discovering and evaluating the existing relationships between the variables involved in a phenomenon" (Rodríguez-Arainaga, 2011, p.50), i.e. it analysed the effects of the innovation variable on the dimensions that make up sustainability.

In addition, it should be noted that higher education students were chosen as part of the sample, as they are one of the main interest groups to which sustainability is addressed, as well as the main clients of the innovation processes that are developed within organisations, in this particular case, universities (Sanz-Hernández and Martínez, 2020).

It was also defined that the type of sampling applied was non-probabilistic by convenience, who [Hernández-Sampieri and Mendoza \(2018\)](#) state that this type of study has the advantage of having greater control over the information to be collected, as it allows for the careful selection of the subjects who will serve as participants; for this reason, the instrument was applied only to those participants who were considered to provide ah doc information regarding the objective established in the research.

Once the participants were determined, it was necessary to identify how the information would be collected. Therefore, it was established that the appropriate instrument according to the interests and the type of questions to be asked in order to obtain reliable information was a questionnaire with response options on a five-point Likert-type scale, where one (1) represented a level of total disagreement up to a level of five (5) of total agreement.

In this sense, for the construction of the questionnaire, a table of operationalisation of variables was developed, by means of which empirical references were identified with respect to the conceptual analysis and the establishment of the dimensions that make up the theme of sustainability, in order to subsequently propose a series of items based on the research consulted and obtaining as a result a proposal for an instrument that allows the variables to be measured.

The content of this instrument was validated by doctoral researchers with expertise in the areas of sustainability, innovation, social responsibility and management, among others. Likewise, a construct validity was carried out through the statistical test Cronbach's Alpha, who [Soler and Soler \(2012\)](#), establish that to obtain significant results the value should range between 0 and 1, the closer it is to 1 means that the instrument is highly reliable (see Table 1).

Box 2

Table 1

Reliability of the variables

	Cronbach's alpha	Cronbach's alpha based on standardised items
Sustainability	.928	.929
Innovation	.783	.784

Source: Own elaboration

From the above, it is understood that the items that made up each of the variables to be studied were reliable, thus allowing the instrument to be applied to the participating subjects and, based on this, obtaining results on the research assumptions established previously.

Results

At the conclusion of the research design phase and the validation of the instrument, it was possible to begin with the application of the questionnaire to obtain data.

Based on this, information was collected from 100 students belonging to different educational programmes offered at the university, with the selection criterion of belonging to a semester equal to or greater than the fifth, since being in semesters closer to graduation, it is understood that they have had a greater approach and experience on the actions and practices that are developed in the institution with respect to the variables of study. Once the data for each participant had been obtained, a database was created in the SPSS statistical programme, which was used to obtain data to characterise the sample (see table 2).

Box 3

Table 2

Participating demographics		
Feature	n	%
Gender		
Female	58	58%
Male	42	42%
Educational programme		
Administration	27	27%
Education	11	11%
Accounting	48	48%
Graphic design	1	1%
Economics and finance	6	6%
Psychology	7	7%
Total	100	100%
Features		
Age	21	
Semester	7	
Total	100	

Source: Own elaboration

As can be seen, the average age of the participants is 21 years old, and it is also possible to identify the degree of participation from different educational programmes, where the students belonging to the Bachelor's Degree in Accounting were the ones who participated the most.

Now, as part of the results obtained particularly on the variables of the study, the behaviour obtained with respect to the descriptive data on the variables of innovation and sustainability is shown below (see Table 3).

Box 4

Table 3

Descriptive variables

Variable	Dimension	N	M	Med	M
Innovation	Update	100	3.95	4.00	4
	Models	100	4.08	4.00	4
	Changes insocial value	100	4.11	4.00	4
	Technologies	100	3.96	4.00	4
Sustainability	Environmental	100	4.09	4.00	4
	Economic	100	4.20	4.00	4
	Social	100	4.18	4.00	4

Source: Own elaboration

As can be observed, in both variables and in each of the dimensions that comprise them, the mean response value obtained was equal to or close to four (4), which is a favourable indicator, as it expresses how the responses are located at a good level of acceptance on the Likert scale proposed in the instrument.

Next, the results obtained are presented in order to support the model that was used to test the hypotheses of the study, who Martínez and Fierro (2018) mention that it is required to present test results on internal consistency, convergent and discriminant validity, these tests allow measuring aspects ranging from internal consistency to reach the final results of the acceptance or rejection of the hypotheses, which were generated through the statistical programme Smart PLS.

Initially, to validate the internal consistency it is required to expose results on Cronbach's Alpha, who González and Pazmiño (2015) establish that this should be of a value ranging between 0 and 1, being closer to 1 it can be considered that the instrument has a higher reliability. For its part, composite reliability is interpreted by Nunnally and Bernstein (1994) that if $FC \geq 0.7$ is a good value, however, $FC \geq 0.8$ is ideal. Thus, by meeting both criteria, it can be affirmed that the results obtained with respect to the consistency tests are significantly fulfilled (see Table 4).

Box 5

Table 4

Internal consistency indicators

Dimensions	Cronbach's alpha	Composite reliability (rho_a)
Innovation	0.784	0.792
Environmental	0.897	0.904
Economic	0.816	0.819
Social	0.817	0.818

Source: Own elaboration

Continuing with the consistency results, we present the data obtained with respect to convergent validity (AVE), which allows us to identify whether there is a close relationship between the items that make up the instrument and the theoretical constructs. Henseler et al (2016) establish that an AVE value greater than 0.5 is positive, and consequently, when values ranging between 0.610 and 0.713 are obtained, it can be said that the results are significant.

Box 6

Table 5

Convergent validity analysis

Dimensions	AVE
Innovation	0.477
Environmental	0.593
Economic	0.528
Social	0.527

Source: Own elaboration

The Heterotrait Monotrait Ratio Test (HTMT) allows the correlation between indicators to be analysed. According to Santi-Huaranca et al. (2018) the value must be less than 0.9, and as can be seen in table 10, only some of the values obtained are outside this criterion.

Box 7

Table 6

HTMT discriminant validity analysis

	Innovation	Environmental	Economic	Social
Innovation				
Environmental	0.756			
Economic	0.839	0.655		
Social	0.865	0.870	0.786	

Source: Own elaboration

In accordance with Martínez and Fierro (2018), to determine the factor loadings of each indicator, this must be contrasted between all the latent variables, and must have a higher value with its own latent variable than with the rest of the model (see Table 7).

Box 8

Table 7

Cross-load analysis

	INO	S_AMB	S_ECO	S_SOC
INO1	0.614	0.437	0.557	0.524
INO2	0.667	0.557	0.509	0.581
INO3	0.801	0.571	0.702	0.705
INO4	0.668	0.532	0.541	0.577
S_AMB1	0.566	0.743	0.478	0.643
S_AMB2	0.468	0.616	0.443	0.660
S_AMB3	0.575	0.755	0.500	0.618
S_AMB4	0.694	0.912	0.570	0.769
S_AMB5	0.592	0.778	0.556	0.671
S_AMB6	0.598	0.785	0.457	0.666
S_ECO1	0.642	0.532	0.764	0.605
S_ECO2	0.642	0.368	0.763	0.483
S_ECO3	0.579	0.558	0.689	0.592
S_ECO4	0.578	0.444	0.687	0.594
S_SOC1	0.582	0.532	0.597	0.670
S_SOC2	0.625	0.674	0.493	0.719
S_SOC3	0.663	0.622	0.530	0.763
S_SOC4	0.649	0.696	0.648	0.747

Source: Own elaboration

Results of the innovation and sustainability variables

With regard to the required test analysis to measure the relationship between innovation and the dimensions of sustainability, it was necessary to calculate Path coefficients, which determine the significance of the relationship between the dependent and independent variable, for which Rositas (2005) establishes the following classification: imperceptible ($0 > \beta \leq 0.09$), perceptible ($0.1 > \beta \leq 0.15$), considerable ($0.16 > \beta \leq 0.19$), important ($0.2 > \beta \leq 0.29$), strong ($0.3 > \beta \leq 0.5$) and very strong ($\beta > 0.50$).

Box 9

Table 8

Path coefficient analysis

	Innovation
Environmental	0.761
Economic	0.841
Social	0.869

Source: Own elaboration

Now, as part of the results and once the characteristics of the participants and the necessary tests regarding the measurement model have been exposed.

The following section focuses on developing a verification analysis to evaluate the veracity of the hypotheses raised in the research, by means of the hypothetical model, which is why it was necessary to process the data through the Partial Least Square (PLS) statistical programme, thus obtaining the following graphic.

Box 10

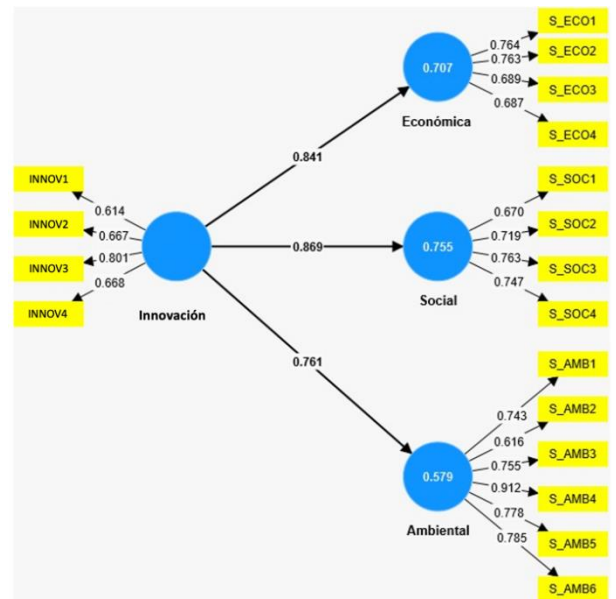


Figure 2
Hypothetical model results

Source: Own elaboration

Interpretation of the model

Initially, it is necessary to understand that a structural equation model such as the one presented above allows measuring the degree of significance between the different dimensions of the independent variable (VI) in relation to the dependent variable (DV), in order to determine the importance of the effects generated by each dimension of innovation in sustainability (Ortiz and Fernández, 2018).

Likewise, it can be said that the value of greater significance is referred to as R2, which is a predictive measurement value, indicating the amount of variance of VI explained by DV. To determine the level of significance Chin (1998) classifies them as follows: R2 values ≥ 0.1 are weak, $R2 \geq 0.33$ moderate and $R2 \geq 0.67$ substantial.

However, in complex models Hair et al. (2019) stipulates that a value around 0.1 can be satisfactory. Consequently, Figure 4 shows the β obtained for each of the dimensions that make up the VI with respect to the DV proposed in the hypothetical model. It is worth highlighting the fact that the three path coefficients presented obtained a significant result, i.e., it is possible to consider that they have a relevant effect on the DV.

On the other hand, with reference to the result obtained for the first dimension that integrates sustainability, it reached an R2 of 0.707, being a favourable and significant indicator that is classified at a substantial level according to Chin (1998), interpreting a 70% relationship between innovation and the economic dimension of sustainability in higher education institutions, being this percentage whose value contributes greater significance as it is the highest in the model.

In addition to this, the second dimension of sustainability, which refers to the social aspect, also obtained a significant R2 of .755, classifying it at a substantial level and understanding in this sense that innovation does generate a significant effect on the social dimension by explaining 75% of the phenomenon under study.

Finally, the environmental dimension obtained an R² of .579, which despite being the lowest result compared to the other dimensions, is still positioned at a moderate level, explaining 57% of the impact that innovation has on the environmental dimension of the sustainability variable.

In view of the results presented here, the acceptance or rejection of each of the hypotheses put forward for this study can be verified, thus analysing their fulfilment, obtaining as a result the acceptance of four of them and the rejection of one (see Table 13).

Given the results presented here, the acceptance or rejection of each of the hypotheses proposed for this study can be verified, analysing their fulfilment, under the acceptance criteria that include the values of the statistical tests: path coefficient, t student and p value (see Table 9).

Box 11

Table 9
Contrast of hypotheses

Hypothesis	Path	T student statistics	P value	Result
H_i : Innovation significantly influences the sustainability of HEIs.				Accepted
H¹ Innovation significantly influences the environmental dimension of sustainability.	0.761 Very strong	9.095	0.000	Accepted
H² Innovation has a significant influence on the economic dimension of sustainability.	.841 Very strong	11.057	0.000	Accepted
H³ Innovation has a significant influence on the social dimension of sustainability.	.869 Very strong	11.512	0.000	Accepted

Source: Own elaboration according to Hair et al., 2019 T student sig. >2.00. Molina, 2017 P sig. value between 0 and 1

Conclusions

This research sought to demonstrate how innovation has a significant impact on the sustainability of higher education institutions. The above results statistically support this assertion, coinciding with the conclusions of Smith and Webster (2018), who conducted a study with the aim of demonstrating and arguing the need for institutions to be constantly innovating, as this will allow them to adapt better and be more sustainable in the face of environmental changes. Furthermore, the acceptance of the hypotheses put forward in this research coincides with Gobble (2012), who highlights the importance of considering the different areas in which innovation can be fostered within organisations. According to him, adopting a holistic perspective on innovation will enable the creation of comprehensive models that address several areas of opportunity within the same entity, thus challenging the long-established paradigm that sustainability focuses exclusively on environmental aspects.

One of the main advantages of sustainability is that it can have a positive impact on the community and society at large. By developing and implementing innovative solutions, organisations can contribute to job creation, sustainable economic development, poverty reduction and social equity (Muñoz, 2020).

At the same time, it coincides with the significant results obtained, allowing the generation of multidimensional proposals that address the needs of the environment more comprehensively, as stated by Medina and Basurto (2018). By visualising a clear classification on innovation, it promotes awareness of creating more effective organisational and management strategies, which increases the sustainability of resources. Under these circumstances, it is recognised that the success of institutions no longer depends on factors such as facilities, production and capital, but on intellectual products, information and knowledge to drive innovation, which impacts on long-term development and increases the importance of intellectual property in modern society.

In relation to the general acceptance that has been achieved regarding the influence of innovation and sustainability, it is important to highlight that both institutions, organisations and companies should begin to consider the commitment to these two areas in their businesses, since the comprehensive vision provided by innovation allows access to new markets, providing greater business opportunities in social, environmental and economic areas (Clouet, & Lozada, 2023).

In conclusion, innovation and sustainability are two concepts that must go hand in hand to achieve economic, social and environmentally responsible development. Innovation drives change and improvement of processes and products, promoting the efficient use of resources and reducing the negative impact on the environment. On the other hand, sustainability invites us to think long-term, considering the needs of future generations and working together with nature rather than against it (Ternera et al., 2018; Colpas et al., 2019; Uribe, 2020, Flórez et al 2021).

It is therefore essential that organisations embrace innovation and sustainability as two pillars to build a prosperous, equitable future in harmony with the planet. Collaboration between sectors, investment in research and development, and the implementation of appropriate policies and regulations are some of the essential actions to drive this transformation towards a more sustainable economic and social model. This is the only way to ensure a better world for future generations and to preserve diversity, encouraging informed decision-making to contribute to positive change.

Declarations

Conflict of interest

The authors declare that they have no conflicts of interest. They have no known competing financial interests or personal relationships that could have influenced this article.

Author contribution

Salguero-Cruz, Yizel Carolina: The main contribution he made was the search for information, field work, study of the art and formulation of hypotheses.

Flores-López, José Guadalupe: Generated the methodology, the use of software and results.

Availability of data and materials

The data were obtained through the application of instruments directly to the study subjects.

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Abbreviations

AVE.	Convergent Validity
ECLAC	Economic Commission for Latin America and the Caribbean
HTMT	Heterotrait Monotrait Ratio
HEI	Higher Education Institutions
INO	Innovation
M	Mean
N	Sample
UN	United Nations
PLS-SEM.	Structural equation modeling
UNEP:	United Nations Environment Programme
S_AMB	Environmental_Sustainability
S_ECO	Economic_Sustainability
S_SOC	Social_Sustainability
SPSS	Statistical Package for the Social Sciences
DV	Dependent variable
VI	Independent variable

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