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THE ROLE OF THE UNIVERSITY IN SUSTAINABLE DEVELOPMENT: A STATISTICAL ANALYSIS OF STUDENT AND FACULTY TRENDS AT THE UNIVERSITY OF TAMANRASSET

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ABSTRACT

Purpose: This article studies and analyzes the role of the university in achieving the goals of sustainable development, by revealing the orientations of students and faculty members of the University of Tamanrasset regarding the contribution of higher education and scientific research activities to the economic, social and environmental development of Tamanrasset region and the challenges that prevent the university from performing its functions in the best possible way, in addition to presenting proposals that would contribute to the integration of the university into its local and national environment and keeping pace with changes at the global level.

Methodology: The descriptive approach was adopted in this study, where descriptive indicators of educational activity and scientific publications of professors and students of Tamanghasset University that serve the goals of sustainable development were analyzed. The study also used the questionnaire tool to arrive at a standard model that helps in accurately interpreting the results obtained through various statistical data.

Results: The results indicate the importance of the university's functions in achieving the sustainable development goals, as the correlation coefficient between them reached 0.7, with an emphasis on the greater impact of scientific research compared to higher education. The results also showed that the level of university education and scientific research is still modest at the University of Tamanrasset, which was reflected in its performance in achieving the sustainable development goals due to several reasons, the most prominent of which were the weakness of educational programs and curricula and the absence of incentives for individual and collective initiatives related to finding solutions to economic, social and environmental issues in the region.

Practical Implications: The study suggests that the university should support university education for sustainable development by undertaking specific activities that translate into the university's work and its relations with the environment, and that educational programs and curricula should take into account labor market expectations and social and economic challenges, in addition to stimulating and valuing scientific research to solve issues with a local dimension and supporting individual and collective initiatives related to the environment through scientific clubs and student organizations to spread environmental awareness among students.

Originality/Value: This study contributes to the literature by providing a detailed analysis of the role of the university in achieving the sustainable development goals, which have become a topic of increasing interest due to the environmental challenges

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facing the world in recent years. The unique focus of the study on the University of Tamanrasset provides valuable insights and recommendations for valuing the outcomes of higher education and scientific research in Algeria in general and in the Tamanrasset region in particular to support sustainable development.

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O PAPEL DA UNIVERSIDADE NO DESENVOLVIMENTO SUSTENTÁVEL: UMA ANÁLISE ESTATÍSTICA DAS TENDÊNCIAS DOS ALUNOS E DOCENTES DA UNIVERSIDADE DE TAMANRASSET

RESUMO

Objetivo: Este artigo trata do estudo e análise do papel da universidade no alcance dos objetivos do desenvolvimento sustentável, revelando as atitudes dos alunos e docentes da Universidade Tamanghast em relação à contribuição do ensino superior e da atividade de pesquisa científica para o desenvolvimento econômico, social e ambiental. da região de Tamanghast e os desafios que impedem a universidade de desempenhar as suas funções da melhor forma possível, além de apresentar propostas que contribuam para a integração da universidade no seu entorno local e nacional e para acompanhar as mudanças a nível global.

Metodologia: A abordagem descritiva foi utilizada neste estudo, onde foram analisados indicadores descritivos da atividade educacional e das publicações científicas de professores e alunos da Universidade Tamanghast que atendem aos objetivos do desenvolvimento sustentável. O estudo também utilizou uma ferramenta de questionário para chegar a um padrão. modelo que auxilia na interpretação precisa dos resultados obtidos através de... Dados estatísticos diversos.

Resultados: Os resultados indicam a importância das funções universitárias no alcance das metas de desenvolvimento sustentável, pois o coeficiente de correlação entre elas atingiu 0,7, com destaque para o maior impacto da pesquisa científica em comparação ao ensino superior. a investigação científica ainda é modesta na Universidade Tamanghast, o que se reflectiu no desempenho. O seu papel na consecução dos objectivos de desenvolvimento sustentável é o resultado de várias razões, as mais proeminentes das quais são a fragilidade dos programas e currículos educativos e a ausência de incentivos para o desenvolvimento individual. e iniciativas coletivas relacionadas com a busca de soluções para questões econômicas, sociais e ambientais na região.

Implicações práticas: O estudo sugere à universidade a necessidade de apoiar o ensino universitário para o desenvolvimento sustentável, através da realização de atividades específicas que se traduzam no trabalho da universidade e nas suas relações com o meio ambiente, e de que os programas e currículos educativos tenham em conta as expectativas do mercado de trabalho. e desafios sociais e econômicos, além de estimular e valorizar a pesquisa científica para resolver questões locais e apoiar iniciativas individuais e de grupo relacionadas ao meio ambiente por meio de clubes científicos e organizações estudantis para difundir a consciência ambiental nos círculos estudantis.

Originalidade/Valor: Este estudo contribui para a literatura ao fornecer uma análise detalhada do papel da universidade no alcance dos objetivos de desenvolvimento sustentável, que se tornaram um dos temas de maior interesse devido aos desafios ambientais que o mundo enfrenta nos últimos anos. sobre a Universidade de Tamanghast também fornece informações e recomendações valiosas para avaliar os resultados do ensino superior e da investigação científica na Argélia em geral e na região de Tamangset em particular para apoiar o desenvolvimento sustentável.

Palavras-chave: Universidade, Ensino Superior, Pesquisa Científica, Desenvolvimento Sustentável, Análise Estatística, Tamanghasset.

EL PAPEL DE LA UNIVERSIDAD EN EL DESARROLLO SOSTENIBLE: UN ANÁLISIS ESTADÍSTICO DE LAS TENDENCIAS DE LOS ESTUDIANTES Y PROFESORES DE LA UNIVERSIDAD DE TAMANRASSET

RESUMEN

Objetivo: Este artículo aborda el estudio y análisis del papel de la universidad en el logro de los objetivos del desarrollo sostenible, revelando las actitudes de los estudiantes y profesores de la Universidad Tamanghast respecto de la contribución de la educación superior y la actividad de investigación científica al desarrollo económico, social y ambiental. de la región de Tamanghast y los desafíos que impiden a la universidad desempeñar sus funciones de la mejor manera posible, además de presentar propuestas que contribuyan a la integración de la universidad en su entorno local y nacional y a seguir el ritmo de los cambios a nivel global.

Metodología: En este estudio se basó en el enfoque descriptivo, donde se analizaron indicadores descriptivos de la actividad educativa y publicaciones científicas de profesores y estudiantes de la Universidad de Tamanghast que sirven a los objetivos del desarrollo sostenible. El estudio también utilizó una herramienta de cuestionario para llegar a un estándar. modelo que ayuda a interpretar con precisión los resultados obtenidos a través de... Diversos datos estadísticos.
Resultados: Los resultados indican la importancia de las funciones universitarias en el logro de las metas del desarrollo sostenible, ya que el coeficiente de correlación entre ellas alcanzó 0,7, con énfasis en el mayor impacto de la investigación científica en comparación con la educación superior. Los resultados también mostraron que el nivel de educación universitaria y. La investigación científica aún es modesta en la Universidad de Tamanghast, lo que se reflejó en el desempeño. Su papel en el logro de los objetivos de desarrollo sostenible es el resultado de varias razones, las más destacadas de las cuales son la debilidad de los programas y planes de estudios educativos y la ausencia de incentivos para los individuos. e iniciativas colectivas relacionadas con la búsqueda de soluciones a problemas económicos, sociales y ambientales en la región.
Implicaciones prácticas: El estudio sugiere a la universidad la necesidad de apoyar la educación universitaria para el desarrollo sostenible mediante la realización de actividades específicas que se traduzcan en el trabajo de la universidad y sus relaciones con el medio ambiente, y que los programas educativos y planes de estudio tengan en cuenta las expectativas del mercado laboral. y desafíos sociales y económicos, además de estimular y valorar la investigación científica para resolver problemas locales y apoyar iniciativas individuales y grupales relacionadas con el medio ambiente a través de clubes científicos y organizaciones estudiantiles para difundir la conciencia ambiental en el círculo estudiantil.
Originalidad/Valor: Este estudio contribuye a la literatura proporcionando un análisis detallado del papel de la universidad en el logro de los objetivos de desarrollo sostenible, que se han convertido en uno de los temas de mayor interés debido a los desafíos ambientales que enfrenta el mundo en los últimos años. sobre la Universidad de Tamanghast también proporciona ideas y recomendaciones valiosas para valorar los resultados de la educación superior y la investigación científica en Argelia en general y en la región de Tamangset en particular para apoyar el desarrollo sostenible.

Palabras clave: Universidad, Educación Superior, Investigación Científica, Desarrollo Sostenible, Análisis Estadístico, Tamanghasset.

1 INTRODUCTION

In light of the social and environmental threats facing the world, sustainable development has gained significant importance globally since the 1980s (Pisani, 2006). In 1987, the World Commission on Environment and Development presented a report titled Our Common Future. This document defined "sustainable development" as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987). The definition encompassed issues such as human populations, flora and fauna, natural resources, energy, water, and the Earth's atmosphere. Additionally, it outlined critical tasks, such as poverty eradication, decent work, human health and safety, gender equality, intercultural dialogue, and education for all (Mazur-Wierzbicka, 2006).

The definition of sustainable development gained further clarity as it emphasized a form of development that considers the needs of the current generation without undermining the ability of future generations to meet their own needs. It enables individuals to achieve a satisfactory level of social and economic development, as well as cultural fulfillment, through

the responsible use of Earth's resources while preserving species and natural habitats. Since then, a substantial body of environmental legislation, alongside numerous international agreements and environmental change mapping efforts, has served as a powerful driver for shifting global policies in this context (Adams, 2006).

Based on the Brundtland Report, eight measurable sustainable development goals were established in September 2000. The assessment of the Millennium Development Goals in 2015 culminated in the formulation of the Sustainable Development Goals (SDGs) as part of the 2030 Agenda for Sustainable Development. This agenda outlines an ambitious action plan centered on three pillars: people, planet, and prosperity (Serafini et al., 2022). It adopts a comprehensive approach that allows for the involvement of all stakeholders, including government institutions, individuals, and non-governmental actors (Leal Filho et al., 2021). Higher education institutions are essential in this process, as they play a significant role in preparing human resources responsible for working toward the achievement of the SDGs.

Higher education institutions, such as universities and research centers, have been recognized as key stakeholders in promoting sustainability capacity. This recognition has been documented in various declarations preceding the Decade of Education for Sustainable Development (DESD), including the Halifax, Talloires, Tbilisi, and Kyoto Declarations. Universities are expected to collaborate closely with local communities, fostering communication and productive partnerships that yield mutually beneficial outcomes (Karatzoglou, 2013).

The global prioritization of sustainability has heightened the commitment of universities and higher education institutions (HEIs) to demonstrate their contributions toward the United Nations Sustainable Development Goals (SDGs) (Leal et al., 2019). Universities play a crucial role in shaping the future of society through research, innovation, education, and community engagement, thereby actively contributing to the achievement of the SDGs (Hammer & Lewis, 2023).

Recognizing the significance of higher education institutions, Saudelli and Niemczyk (2022, p. 47) emphasized that "HEIs can play a key role in contributing to a sustainable future for our planet and its inhabitants." Numerous studies are being conducted in this domain to further explore the role of higher education in sustainability. However, it is important to note that these studies have highlighted the challenges in managing and measuring the impact of universities on both the environment and society (Moggi et al., 2015).

Algeria is no exception in this regard, and understanding the role of HEIs in sustainability is essential for the country. Specifically, this research aims to gain a deeper understanding of the attention given to this issue at the University of Tamanrasset. It seeks to statistically analyze the attitudes of students and faculty toward sustainability in Algeria.

2 THEORETICAL FRAMEWORK

In recent years, expressions such as "global learning for sustainable development", "sustainable university", "sustainable campus" and other terms related to the research topic related to the university's contribution to sustainable development have begun to recur indicating the interest of researchers and students in universities in the issue of sustainability. (Anderberg & Hansson,2009) (Disterheft et al., 2015). There is a consensus among researchers that universities play a crucial role in advancing sustainable development through their research, teaching. By fostering interdisciplinary collaborations, universities can develop innovative solutions to complex sustainability challenges, equipping students with the knowledge and skills to lead the transition to a more sustainable future (Sady et al., 2019).

Many researchers in the field of sustainable development see the formation of scientific competencies in educational institutions as a critical factor for sustainability, because these competencies have a positive impact on the individual's adaptation and function in society (Agnieszka, 2016). Therefore, a sustainable future will be achieved if societies are properly and effectively educated through better learning outcomes: deeper understanding, longer retention of knowledge and solid learning (Antonio & Persico, 2014) and this is especially evident in higher education where students are prepared to enter the labor market and implement the principles of sustainable development accordingly. It can be argued that the actions of universities in the field of education and research for sustainable development may have a positive impact on the formation of competencies related to the solution of social and environmental problems. Universities also contribute to the development of sustainability competencies through education that significantly supports the development of basic interpersonal, communicative and cognitive skills such as critical thinking, analytical skills, creativity and problem solving, which contributes to the promotion of the values of active citizenship and working life closely linked to sustainable development (Council of the European Union, 2018).

Halder et al. (2014) emphasized the issue of seeking to build awareness among future leaders. They did a study among randomly selected middle school students to examine their awareness of sustainable development. The researchers concluded that in addition to modifying school curricula to include a greater focus on ESD, school authorities need to organize workshops and seminars on ESD to raise awareness and dramatize the effects of behaviors that do not support environmental sustainability.

A study Leal et al. (2018) concluded that higher education institutions constitute a key driver in the development and expansion of knowledge and information, not only through teaching and learning channels, but also through community engagement, its various activities on campus and in research in general, thus promoting a more effective education for students for the problem of sustainable development. It becomes even more important if we consider that students, men/women and future professionals are the future leaders and heirs of technological, economic and social development.

A study Esther García-González et al (2020) that there is a positive movement on the part of scientists and researchers in general towards adopting a comprehensive and systematic approach by universities with regard to integrating the SDGs into their research and educational systems, as higher education institutions are strategic in terms of education, research, awareness and management for sustainable development. In addition, it has a significant role in educating the public about its responsibilities and providing future professionals with the knowledge and capabilities necessary to address sustainable development issues.

As for the case of Algeria, the study of Bousaha Mohamed Lakhdar and Nassima's research (2019) came to analyze the role of the university in embodying sustainable development by studying the orientations of faculty members at the University Center Tissemsilt, and this study concluded that the university can play a leading role in supporting sustainable development, but the results resulted in a lack of performance of the university's tasks for the benefit of sustainable development, whether in the field of Scientific research or in the methods and methods of education and training, and this is due to several reasons, the most important of which is the absence of a clear vision of goals to achieve sustainable development at the university and the lack of encouragement for individual and collective initiatives.

In the same context, the study of researchers Elmokrefi and Maache (2024) tagged with: The role of the university in achieving sustainable development, A field study at Lounici Ali University-blida2 On the role of innovation and entrepreneurship at the University of Blida in Algeria to achieve the goals of sustainable development, the study concluded that the university

is the main engine of innovation and leadership as a center for science and knowledge and contributes to the development of the qualified elite and stimulate creative ideas, as well as working to form an incubating environment for innovation and encourage students and faculty members to develop sustainable solutions to problems The efforts made by the Ministry of Higher Education in Algeria in recent years to support innovation and start-ups have yielded positive results, but many challenges remain for Algerian universities to reach better levels in supporting sustainable development.

The contributions of universities to sustainable development are multifaceted and impactful, encompassing various aspects such as energy efficiency, waste management, curriculum integration, and environmental initiatives. Through initiatives like green infrastructure projects, energy efficiency actions, waste management practices, and curriculum alignment with Sustainable Development Goals (SDGs), universities play a crucial role in promoting sustainability and raising awareness among students and staff. These roles can be summarized in four axes: Green Infrastructure Projects, Energy Efficiency Actions, Curriculum Integration, Waste Management

1. green infrastructure projects: universities implement green infrastructure like green roofs, green walls, and green parks, which offer environmental and social benefits contributing to SDGs such as good health and wellbeing, reduced inequalities, sustainable cities and communities, climate action, and life on land (Nguyen Dang et al., 2023);
2. energy efficiency actions: universities like the University of Passo Fundo in Brazil have been implementing energy efficiency measures such as lightening, photovoltaic solar power generation, and engaging in the free energy market to contribute to Sustainable Development Goal 7 on affordable and clean energy (Rebelatto et al., 2019);
3. curriculum integration: universities align their curricula with SDGs to educate students on sustainability. For example, the School of Social Sciences at the University of Évora integrates SDGs into undergraduate courses, focusing on objectives related to gender equality, reduced inequalities, decent work and economic growth, and peace and justice (Chaleta et al., 2021);
4. waste management: waste management practices at universities, like those at Dhurakij Pundit University in Thailand, directly contribute to SDGs such as sustainable cities and communities, responsible consumption and production, and life below water. These

initiatives help in reducing environmental impacts, enhancing resource efficiency, and preventing pollution (Phdungsilp, 2022).

Universities measure the impact of their sustainable development initiatives in several ways:

- participation in sustainability rankings: like the THE IMPACT Rankings to measure and benchmark the universities performance in promoting the UN Sustainable Development Goals (SDGs). This allows them to compare their contributions to sustainability against other leading universities (Saleh & Adly, 2024);
- tracking institutional initiatives and courses: the universities can measure their progress in integrating sustainability across their operations and curriculum by tracking the number and scope of initiatives related to sustainable development (Martínez-Acosta, 2023);
- surveying stakeholder perceptions: this type of stakeholder feedback allows universities to understand the impact of their sustainability efforts on the awareness and engagement of their campus community (Sandoval Hamón et al., 2020);
- analyzing environmental and social impacts: this analysis results highlight how universities are measuring the environmental and social benefits of their sustainable infrastructure projects, such as green roofs, which contribute to SDGs related to health, inequality, sustainable cities, climate action, and biodiversity4. By quantifying these impacts, universities can demonstrate the tangible outcomes of their sustainability initiatives (Nguyen Dang, 2023);
- global index of sustainability: universities assess their students' attitudes, behaviors, and level of knowledge concerning education for sustainable development (ESD). These metrics help universities evaluate the effectiveness of their sustainable development initiatives and identify areas for improvement, ultimately contributing to the achievement of the UN SDGs (Sandoval Hamón et al., 2020).

3 METHODOLOGY

3.1 STUDY AREA

This study was conducted at the University of Tamanrasset, a public university located in the Tamanrasset province, 1981 kilometers from the capital of Algeria. The University of Tamanrasset focuses on educating university students and conducting scientific research. The

university comprises five faculties: the Faculty of Economic Sciences, Management, and Commerce; the Faculty of Humanities and Social Sciences; the Faculty of Arts and Foreign Languages; the Faculty of Science and Technology; and the Faculty of Law and Political Sciences. In addition, the university includes other departments and offices such as the General Secretariat, the Central Library, Common Services, the Vice-Rectorate for Undergraduate Studies and Continuing Education, the Vice-Rectorate for Postgraduate Studies, Scientific Research, and External Relations, and the Vice-Rectorate for Development and Forecasting.

In 2024, the University of Tamanrasset registered 7,219 students, including 199 doctoral students. The teaching staff consisted of 311 professors across various faculties, while the number of administrative staff and workers reached 314.

3.2 RESEARCH DESIGN

The study utilized a questionnaire as the primary tool for analysis, which was prepared in four successive stages before reaching its final form. During the preparation and presentation stage, the questionnaire items were formulated based on previous studies related to the subject. The initial version of the questionnaire contained 45 items. In the second stage, it was reviewed by five field experts to ensure face validity, and the researchers made the necessary adjustments, reducing the number of items to 37. In the third stage, the questionnaire was distributed to a pilot sample of 32 individuals to verify the validity and reliability of the study instrument (Cronbach's Alpha = 0.90), and internal consistency between the items and their dimensions was calculated, with all correlation coefficients exceeding 0.6. Additionally, the structural consistency between the dimensions and the overall questionnaire was assessed, with all correlation coefficients exceeding 0.7. Based on these indicators, the pilot sample results were highly satisfactory, leading to the distribution of the questionnaire in its final form.

The questionnaire was divided into three sections: the first section is introductory and includes two questions regarding the respondent's status and faculty affiliation. The second section represents the independent variable of university functions, consisting of 7 questions on higher education and 8 questions on scientific research. The third section covered the main dimensions of sustainable development: the economic dimension with 9 questions, the social dimension with 8 questions, and the environmental dimension with 5 questions. A five-point Likert scale was employed to classify respondents' answers into five categories: very weak, weak, medium, acceptable, and very acceptable. To ascertain the reliability of the study tool, Cronbach's

alpha coefficient was applied, revealing a value of 0,96. This figure significantly exceeds the benchmark threshold of 0,70, confirming the high reliability of the study instrument.

3.3 SAMPLING

The study population consisted of all students and professors at the University of Tamanrasset in 2024, totaling 7,530 individuals. Based on this population, the sample size for the study was calculated to be 366 individuals, according to Richard Geiger's formula for determining sample size in finite populations, using the following law:

$$n = \frac{(\frac{z}{d})^2 \times (pq)^2}{1+\frac{1}{N}[(\frac{z}{d})^2 \times (pq)^2 - 1]} = \frac{(\frac{1,96}{0,05})^2 \times (0,5)^2}{1+\frac{1}{7530}[(\frac{1,96}{0,05})^2 \times (0,5)^2 - 1]} = 366 \qquad (1)$$

n: Sample size.

z:z-score for the confidence level 0,95.

d:Error lavel.

p: Population proportion (assumed to be 0,5).

N: Population size.

At an operational level, the researchers distributed an hard copy and an electronic version of the questionnaire via available electronic links, After examining the respondents' answers, 14 questionnaires were excluded for not meeting the conditions of statistical treatment, so the response rate was 96 %, which is a very acceptable rate.

3.4 DATA ANALYSIS

The analysis procedure included the preparation of data extracted from the answers of the study sample and unloading them into the Excel program and converting them into the program (SPSS V24), while the statistical indicators used were: percentages, arithmetic mean, standard deviation, correlation coefficient, coefficient of determination, modified coefficient, in addition to that, the study provided the results of important statistical tests in the analysis such as: Normal distribution test, Fisher test, student test, Levin test, difference tests.

In the same context, the study used the multiple regression analysis model to determine the relationship between sustainable development as a dependent variable and higher education

as a first independent variable and scientific research as a second independent variable according to the following mathematical function:

$$Y = b_0 + b_1X1 + b_2 X2 + \varepsilon \qquad (2)$$

The first hypothesis was that the curricula, methods, and programs of higher education, training, and development in the business incubator equip students with knowledge and experience related to the goals of sustainable development, thereby enabling them to apply these concepts in practice. The second hypothesis was based on the assumption that the scientific research conducted by professors, doctoral students, and other students contributes to achieving sustainable development goals and addressing economic, social, and environmental challenges, particularly in the Tamanrasset region.

To support the analysis results, the study tracked the efforts of professors and students regarding sustainable development by examining the number and quality of research projects and scientific articles available on the SCOPUS platform, given their accessibility and the focus of many journals within these databases on sustainable development. Additionally, individual and collective initiatives related to sustainable development at the university were also monitored.

4 RESULTS AND DISCUSSIONS

4.1 DESCRIPTIVE RESULTS:

The study's findings revealed a strong response from university professors, with 122 professors participating in the sample, representing approximately 35%. The remaining 65% comprised university students, totaling 230 students. Regarding faculty affiliation, the Faculty of Economic Sciences, Management, and Commerce accounted for the largest proportion at 45%, with a total of 158 individuals. This can be explained by the nature of the research, as most studies link sustainable development to economic sciences. The representation of both the Faculty of Science and Technology and the Faculty of Arts and Languages was equal, each contributing 17% of the sample. They were followed by the Faculty of Law and Political Sciences, with 40 students, representing 11%. Lastly, the Faculty of Humanities and Social Sciences contributed 9%, with a

total of 33 individuals. These data assist in identifying the statistical differences between the responses of the participants concerning the study's main dimensions.

The study results indicated a modest level of higher education quality at the University of Tamanrasset, with the average score for this dimension not exceeding 3.2, and a standard deviation of 0.78, reflecting consensus among the respondents on this view. This dimension comprised seven statements, with mean scores ranging between 2.6 and 3.3, indicating a moderate level, except for the statement: "The university relies on highly skilled and competent professors in higher education," which had a high mean score of 4.02, reflecting an acceptable level. The lowest average score was recorded for the statement: "The university creates a suitable environment for professors and students by providing all teaching requirements in terms of modern technologies and healthcare," with a value of 2.6.

As for the scientific research dimension, its results were similar to those of the higher education dimension, with an average score of 3.21. However, two statements scored at an acceptable level: "The university organizes outstanding and purposeful national and international conferences and symposia," and "The university organizes scientific workshops and study days that improve the knowledge of students and professors." The remaining six statements for this dimension were rated only at a moderate level.

Additionally, the mean scores for all sustainable development dimensions ranged between 2.81 and 3.02, indicating a moderate level. This result was consistent across all statements related to the university's contribution to sustainable development, whether in the economic, social, or environmental dimensions, as summarized in the following table:

Table 1

Descriptive Results of the Study

Dimension	Mean	Standard Deviation	Level
University education	3,29	0,78	Average
Scientific research	3,21	0,83	Average
Economic dimension	2,81	0,75	Average
Social dimension	3,00	0,76	Average
Environment dimension	3,02	0,83	Average
University missions	3,25	0,76	Average
Sustainable Development	2,93	0,71	Average

Source: Prepared by the researcher based on SPSS outputs.

4.2 STANDARD STUDY FORM

The study utilized an econometric model to analyze the relationship between sustainable development (independent variable) and university functions (higher education and scientific research). This model incorporated both variance analysis (ANOVA) and regression analysis.

The analysis revealed significant results, showing a strong positive correlation between sustainable development and university functions. This is evidenced by the correlation coefficient (R) of 0.725, indicating a strong direct relationship. Additionally, the results showed that the coefficient of determination (R-Square) was 0.52, meaning that 52% of the variation in sustainable development can be attributed to factors related to either higher education or scientific research. The remaining 48% of the variation is linked to other factors not included in this model, indicating the need for further research and investigation to fully understand all the influences on the university's contribution to sustainable development. This conclusion is further supported by the adjusted coefficient of determination, which also recorded a value of 0.52. The results are summarized in Table 2.

Table 2

Model Summary Results

Model	R	R-Square	Adjusted R Square	Std. Error of the Estimate
1	,725a	0,526	0,523	0,49194

Source: SPSS outputs.

The analysis of variance confirms the quality of the mathematical model based on a statistical value F = 193 with a significance level of less than 0.05, indicating that the higher education variable and the scientific research variable play an important role in achieving the sustainable development goals, and the results of this analysis are presented in Table 3.

Table 3

ANOVAa

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	93,555	2	46,778	193,291	,000b
	Residual	84,460	349	,242		
	Total	178,015	351			

a. Dependant Variable : : Sustainable development
b. Predictor : (Constant), Scientific research, university education

Source: SPSS outputs.

Furthermore, the multiple regression analysis table emphasizes the significance and relationship of sustainable development with the dimensions of higher education and scientific research. Scientific research is associated with achieving sustainable development in a medium relationship, as indicated by a coefficient of 0.399. This relationship is reinforced by the t-test value for this coefficient, which was 8.362, with a significance level of less than 0.05.

In comparison, the regression analysis showed that the contribution of higher education to sustainable development was relatively modest. The coefficient for this second independent variable was 0.28, with a Student's t-test value of 5.57 and a significance level of less than 0.05. This demonstrates the precision of this coefficient in the multiple regression equation. The following table summarizes this model.

Table 4

Coefficients[a]

Modèle		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,723	,117		6,182	0,000
	University education	,281	,050	,309	5,570	0,000
	Scientific research	,399	,048	,464	8,362	0,000
a Dependant Variable: Sustainable development						

Source: SPSS outputs.

According to these results, the form of the equation of the model is as follows

$$Yi = 0{,}723 + 0{,}281\ X1 + 0{,}399\ X2 + \varepsilon \qquad (3)$$

(6,182) (5,57) (8,362)

Yi : Sustainable development
X1 : University education
X2 : Scientific research

4.3 DIFFERENCE TESTS:

The primary purpose of difference tests in statistics is to determine the impact of descriptive variables on respondents' answers. In this study, the aim was to analyze the influence of the respondent's role (student or professor) and their faculty affiliation on their responses across each of the study's five dimensions. These tests require knowledge of whether

the data follow a normal distribution and whether the variance is homogeneous within and between groups, which determines the appropriate test to use for each case.

Since all groups, whether related to the respondent's role or faculty affiliation, exceed 30 individuals, the data are assumed to follow a normal distribution according to the Central Limit Theorem. Regarding the homogeneity of variance, when measured using Levene's test, it was found to vary across different dimensions. Based on these results, either the t-Student test or the Welch test was chosen to assess the differences.

The study revealed that the respondent's role (professor or student) had a significant impact on the responses in three key dimensions:

1. higher education dimension: when applying the Welch test, the difference favored the students, who had a more positive perception of higher education compared to the professors. The professors' average score for this dimension was 3.10;
2. scientific research dimension: using the t-Student test, the results showed that the difference in responses also favored the students, with their average score reaching 3.34, while the professors' average score was only 2.94;
3. social development dimension: unlike the previous dimensions, the Welch test showed that the difference in this dimension favored the professors, with an average score of 2.84 compared to the students' average of 2.66.

The details of these findings are summarized in Table 5.

Table 5

Testing differences related to the status of the respondent

Axe	Test	Test value	Sig	Mean professur	Mean students
University education	t-Welch	1,262	0,208	3,10	3,21
Scientific research	t-Student	4,100	0,000	2,94	3,34
Social dimension	t- welch	2,075	0,040	2,84	2,66

Source: Prepared by the researcher based on SPSS outputs.

The results of the study when analyzing the effect of belonging to the college on the respondents' answers resulted in a lack of homogeneity in the variance in all five dimensions, hence the appropriate test is Test de Kruskal-Wallis. All test values showed that they had significance levels greater than 0.05 and therefore there was no effect of the college affiliation variable on the respondents' answers to all the main dimensions of the study.

4.4 ANALYSIS AND DISCUSSIONS

The results of this study confirm the findings of previous researchers regarding the significant role universities can play in achieving the Sustainable Development Goals through educational programs, curricula, and scientific research aimed at solving economic, social, and environmental issues (Hammer, 2023). However, the reality of higher education in Algerian universities remains below the desired level. The results from a sample at the University of Tamanghasset revealed that the level of higher education is moderate, consistent with findings from previous studies (Boussaha, Behous, 2019). A closer look at this issue at the University of Tamanghasset shows that the student-to-faculty ratio is 23:1, which is considered quite acceptable for higher education levels. Nevertheless, the main challenges lie in the academic programs, training methods, teaching methodologies, and the limited use of digital education and platforms, according to the study's participants, despite the ministry's efforts to develop university education and digitize educational services. As for the level of scientific research, the study highlighted the significance of global university ranking indicators, revealing that Algerian universities have not achieved advanced positions. The best-ranking Algerian university was Setif University 1, which ranked between 131 and 150 in the QS rankings for June 2024. The University of Tamanghasset, however, did not appear in this prestigious global ranking (QS World University Rankings, 2024), and it is also absent from THE Impact Rankings (Times Higher Education, 2024). According to the Webometrics ranking for July 2024, the University of Tamanghasset improved its position, ranking 11,887 globally and 64th nationally. These numbers indicate that the university still requires significant development to improve its ranking in both national and international indicators (Webometrics ranks, 2024).

Table 6

*Scientific activities of Tamanghasset University*2024-2020

Activities	International Conference	National Conference	Study Day	Seminar	Training course
2020	1	3		0	2
2021	1	3	1	0	2
2022	1	5	1	3	0
2023	1	8	1	2	2
2024	0	1	1	0	4

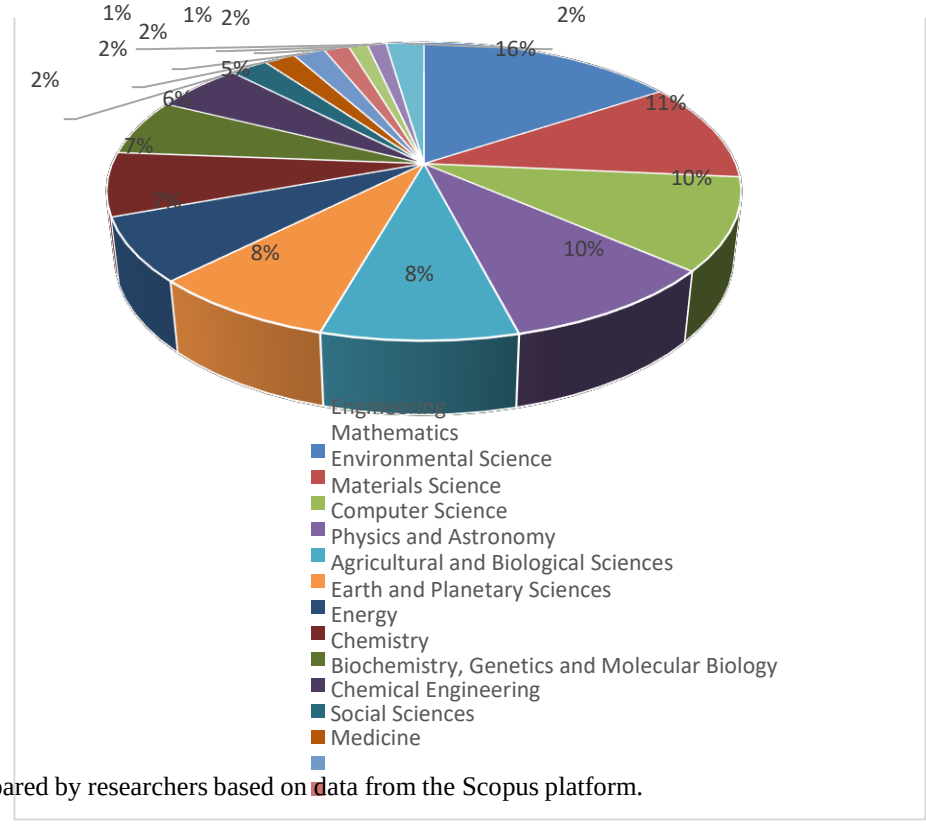
Source: Prepared by researchers based on data from the website of the University of Tamanghasset

A review of the topics covered by these scientific activities revealed that two international conferences directly addressed sustainable development. These were: The International Conference on Entrepreneurship and Sustainable Development in Border Regions held in 2023, and the International Scientific Conference on Social Risks between the Challenges of Sustainable Development and the Era of Globalization, also in 2023. Other scientific activities touched on some aspects of sustainable development; however, they primarily focused on national topics that do not precisely address local issues in the Tamanghasset region. This aligns with the opinions of the study sample, who indicated that the university's contribution to solving local economic, social, or environmental issues is moderate.

On another note, a search for scientific articles authored by researchers at the University of Tamanghasset on the Scopus platform revealed 148 papers across various scientific fields within the university until 2021. The Faculty of Science and Technology, with its diverse specializations, showed a notable lead, followed by the Faculty of Humanities and Social Sciences, and then the Faculty of Economics, Commerce, and Management Sciences, as illustrated in the following figure:

Figure 1

Distribution of Scientific Publications by Fields of Science



Source: Prepared by researchers based on data from the Scopus platform.

Most of these research efforts have contributed to 12 out of the 17 Sustainable Development Goals (SDGs) set by the United Nations, demonstrating the commitment of researchers at the University of Tamanghasset to align their work with both national and international developments. However, the absence of a conducive environment for both faculty and students to engage in research activities negatively impacts the productivity of university professors and students, as highlighted by the study sample. The following table outlines the SDGs achieved through these efforts.

Table 7

SDG contributions

N°	Sustainable Development Goals	Goal number	Documents
1	Zero hunger	Goal 2	6
2	Good health and well-being	Goal 3	4
3	Clean water and sanitation	Goal 6	8
4	Affordable and clean energy	Goal 7	29
5	Decent work and economic growth	Goal 8	4
6	Industry, innovation and infrastructure	Goal 9	1
7	Reduced inequalities	Goal 10	1
8	Sustainable cities and communities	Goal 11	7
9	Responsible consumption and production	Goal 12	2
10	Climate action	Goal 13	5
11	Life on land	Goal 15	6
12	Partnership for the goals	Goal 17	47

Source: scopus.

Based on the aforementioned findings, the modest level of higher education and scientific research at the University of Tamanghasset has directly impacted its contribution to achieving the Sustainable Development Goals. This is an inevitable outcome that must be acknowledged, so it should efforts directed towards improving the quality of educational services and creating suitable conditions to maximize the value of scientific research outputs at the university. However, it is worth noting that the study also found that the Environmental Club played a significant role in organizing environmental initiatives both within and outside the university. These initiatives included tree planting campaigns, campus clean-ups, and raising student awareness about their roles and responsibilities in the local community to enhance sustainable development. This aligns with the findings of other studies in the same field (Machado and Davim, 2023).

5 CONCLUSION

The study concluded, based on the perspectives of students and faculty at the University of Tamanghasset and an analysis of various indicators, that the university's contribution to achieving the Sustainable Development Goals (SDGs) remains modest. This is primarily due to the low level of higher education and scientific research at the institution. Consequently, the university's academic programs and curricula have failed to provide solutions to the economic, social, and environmental challenges in the Tamanghasset region. Moreover, an examination of the academic community's contributions through scientific activities and publications revealed a modest output. However, it also highlighted the desire of faculty members to intensify their research efforts to contribute to sustainable development, provided the right conditions for scientific research are established.

Based on the study's findings, it is recommended that university education go beyond knowledge acquisition and theoretical understanding of sustainable development to become a comprehensive educational and training process. This process should focus on exploring connections between local, national, and international dimensions. Thus, support for education geared towards sustainable development should be enhanced through specific activities that align with the university's operations and its relationship with the environment. It is also crucial that academic programs consider labor market expectations and the current socio-economic and cultural challenges, necessitating dialogue between academia and the business sector. Additionally, the university should support individual and collective environmental initiatives through scientific clubs and student organizations to promote environmental awareness among students.

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