Article

University 4.0 Sustainable Development in the Way of Society 5.0

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Abstract: Universities can contribute to economic and sustainable development (SD) in a variety of ways, such as mediating social debates, educating citizens on scientific and technical issues, fostering communication among various agents (politicians, businesspeople, higher education institutions' managers, and citizens), and advancing socioeconomic progress. By teaching the current and next generations of decision-makers, universities have a role in "shaping the ideals of society". Numerous publications address the topic of sustainable development, but they do so from the standpoint of how its responsibilities are implemented and how students are prepared and aware of it. This manuscript addresses this vacuum by looking at how students assess university activities and specific pillars of sustainable development, which is an unique approach. The investigation used the CAWI questionnaire. The sample consists of 115 Pakistani respondents, and information was gathered between February and August of 2022. The research built a logistic regression model. Our research's findings and their analysis revealed that University 4.0s should take initiatives for sustainable development, and that these issues are top priorities for them. The analysis revealed that Society 5.0 is active in University 4.0s' sustainable development initiatives, and that these initiatives are vital for Society 5.0.

Keywords: University 4.0; society 5.0; statistical analysis; education; regression model; sustainable development

1. Introduction

A university exists in the Society 5.0 era. Society 5.0 is an intelligent society that is well interwoven with the physical and digital worlds [1]. The goal of Society 5.0 is for everyone to actively take part in integrating digital technology into numerous processes to accelerate their adoption [2]. The way society addresses and governs social concerns has changed from many earlier conceptions. With such innovative initiatives as Society 1.0 (hunger gatherer), Society 2.0 (agricultural), Society 3.0 (industrialized), and Society 4.0, society has progressed from many of these earlier conceptions (information) [1,3]. It is anticipated that the Society 5.0 period will be able to fill in any gaps and fix any issues with the systems of the social and virtual worlds. In order to advance humanism, Society 5.0 places a high priority on the advancement of scientific and technology advancements that primarily serve the economics sector's development needs [4]. The characteristics of Society 5.0 are as follows: (1) complete information and communication technology utilization; (2) community focus; (3) engagement from people; (4) shared ideals of sustainability, inclusivity, effectiveness, and intellectual power; and (5) growth of economic disruption. Sustainability in Society 5.0 emphasizes maximizing the capacity of individual technology interactions to advance societal benefit [5]. Higher education institutions are essential

to a sustainable society's growth and development, and may function as transforming forces [6,7]. Students need to be able to thank critically, constructively, and creatively, as well as have a suitable awareness of their learning styles in order to actualize or prepare for the Society 5.0 era, especially in the area of education [5,8]. Institutions of higher education play a crucial part in sustainability.

Higher diagonally across the many academic fields. A strong and teaching methodologies brought about by Industry 4.0 (known as an Education or Edu 4.0) [9–12]. According to Marques et al. [13], the superior education sector has been considerably impacted by the growing demand for a more sustainable society. The university's traditional function as a knowledge institution and as an actor in society has been evolving [14]. Academics, students, and policymakers in this sector face a growing challenge related to sustainability [15]. Recently, social responsibility and sustainability have attracted more of the university system's attention [15–18]. Demands for higher education institutions (HEIs) to disclose how they incorporate and support sustainability are rising [19,20] as a result of quality management systems or by taking part in voluntary programs, such as the Principles for Responsible Management Education (PRME, 2016). Many authors have noted the relevance of higher education institutions in achieving the Sustainable Development Goals [21–25]. They play a significant role in preparing future leaders who will support the UN's Sustainable Development Goals (SDGs) implementation [26,27]. Universities serve as "shapers of the values of society" by educating the present and the next generation of decision-makers [28]. Universities can contribute to economic and sustainable development (SD) in a variety of ways, such as: (1) mediating social debates, (2) educating citizens on scientific and technological issues, (3) fostering communication between different agents (politicians, businesspeople, HEI managers, and citizens), and (4) advancing socioeconomic progress. [29,30].

Many articles discuss the issue of sustainable development but from the perspective of implementation of its tasks, readiness, and awareness of students in relation to sustainable development [26,31–36]. This article fills the gap by examining how students evaluate initiatives taken by universities and individual pillars of sustainable development, which is novel at work. We believe that this article contributes to the development of literature by being a good guide for universities in implementing the pillars of sustainable development. The article analyzes the literature on sustainable development in the university field, including Society 5.0. The research aims at investigating how students evaluate university initiatives and individual pillars of sustainable development. So far, various studies on the issue of sustainable development have been carried out at universities in different countries. However, we have not found a study that assesses a student's perspective on the activities undertaken in the field of sustainable development at a university. To achieve the manuscript goals, we have ordered the article as follows: Section 2 is devoted to a brief review of relevant literature. Section 3 presents data and methodology. Section 4 presents empirical results. Section 5 presents the discussion, and Section 6 presents the conclusion. There are some limitations connected with our manuscript, and we present them at the end of our manuscript.

2. Literature Review

2.1. Higher Education with Respect to Technology

The application of education technology throughout the educational process contexts, where the current teaching paradigm is being modified, is what is referred to as "Education 4.0." [26,37]. One such example is the use of massive open online courses (MOOC), online learning platforms, devices that may assist teaching and learning, and the improvement of lecturer and staff abilities as developing technologies. For the aforementioned reasons, the higher education institution has to start establishing its learning plan in line with the digital revolution of education [38,39]. Figure 1 shows the evolution of the university from University 1.0 to University 4.0.
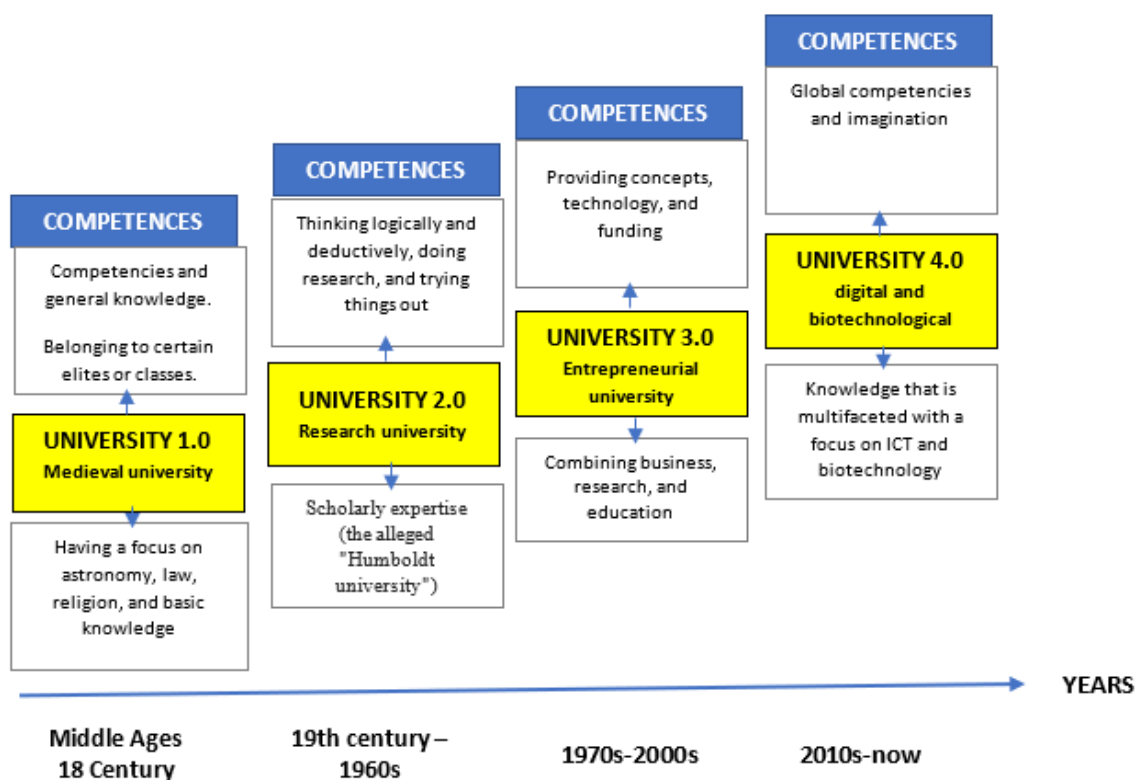
Figure 1. The evolution of the university from University 1.0 to university 4.0.

University 4.0 now engages in the emerging technology markets. The significance of information and communication technology (ICT) is seen in this. Hawaii is one example of an area that makes use of its distinctive geographic characteristics to foster the growth of enterprises and talents that have the ability to be of the highest caliber and to lead the growth of high-tech industries like robots, artificial intelligence (AI), and machine learning. Here, collaboration with universities and research institutes is crucial. The University of Hawaii cluster, for instance, is a significant center for the creation, manufacturing, and research of cutting-edge technologies and services, and it shares characteristics with Hawaii Island, which is located on the island of Oahu [40]. This kind of institution of higher learning places a strong emphasis on the improvement of students' academic talents. ICT generally works with a broad variety of partners from the public sector, commercial sector, and education sector. Additionally, ICT strengthens students' capacities to acquire technical and English abilities. Utilizing hybrid technology and collaborative intelligence, 4.0 universities would be manifestations of a "cognitive society" [9,41].

2.2. Sustainable Development from an Interdisciplinary Perspective

Higher education institutions (HEIs) might play a crucial role in promoting sustainable development (SD) at a time of global climate action. The demands of massification, globalization, marketization, and digitization are only a few of the more complicated factors that HEIs must address at the same time [42]. The idea of sustainable development (SD) is the following: "Development that satisfies the wants of the present without sacrificing the capacity of the future generations to satisfy their own" [43]. As a result, they develop into "a highly open environment—a hub for various communications, a node at the junction of different networks." In addition to academics and students, a broad spectrum of outside partners are involved in these communications, research projects, and development initiatives [9]. Since education is a key tool for communication and the foundation of the "sustainable mentality," it is the driving force behind developing sustainability. According to this idea, "a systemic approach to knowing, one which goes beyond technical knowledge and even grasping the fundamentals of a healthy environment and a functioning society,"

is necessary. Numerous studies have emphasized the strategic role that higher education plays as a promoter of local economic progress [33,44–47]. In addition, it is a notion based on the economic, social, and environmental foundations [12,48]. Universities may support sustainability both internally (as an entity) and externally (as a regional actor) [49]. A significant number of national and international declarations concerning higher education institutions and sustainability have been created [34,50], which further supports the relevance of sustainability on universities' agendas. The realization of the SDGs depends on education, which also plays a crucial role in creating a society that is supportive of various SDGs components [26]. Geographic disparities exist in the formation of sustainability education, and global disparities must be lessened via increased efforts [12,36]. Innovating, producing knowledge, and developing human capital are three key ways that higher education institutions may contribute to the attainment of the SDGs [35]. The influence of universities on the SDGs will mostly depend on two factors, according to [51]: (1) Collaborations between local institutions of higher learning; and (2) Obtaining funds for community research. Higher education institutions are responsible for cultivating the next generation of sustainability leaders. The next generation of sustainability leaders must be developed at higher education institutions, leading important global, regional, and local efforts, and playing a crucial role in achieving the SDGs' aspirations [52]. Education for Sustainable Development (ESD) focuses on SD concerns [53].

2.3. Training Process at a University in Connection with Sustainable Development

Students are acutely aware of the issue of sustainability; they value ecology and sustainability as major facets of their education, and actively pursue information in these areas. With this mindset, integrating sustainable and ecological design components into the curriculum may enhance student happiness and engagement [54,55]. According to Cottafava et al. [26], in order to ensure that students really understand the SDGs, active student involvement must be fostered.

Mulà et al. contend that, rather than fostering sustainable thinking and behaviors, today's educational institutions reward unsustainable ones. According to those writers, attempts to change society must concentrate on educators, who must increase their knowledge of sustainability and their capacity to alter curricula and expand learning opportunities [56]. This demonstrates the critical role that academics play in incorporating sustainability into educational programs and the necessity for them to continue their professional development in the sustainability sector [57,58].

The implementation of education for sustainability depends on higher education institutions for three reasons: (1) projects developed by teaching and research centers that integrate sustainability principles across disciplines can improve sustainability; (2) outreach activities can help different teaching methods influence broader opinions; and (3) an institutional culture of sustainability raises awareness among university staff and the local and wider communities (for instance, promoting biodiversity, lowering greenhouse gas emissions, using energy more effectively, and minimizing the ecological impact). Institutions of higher learning may set an example for students and have an impact on them. The campus's diverse activities, including institutional framework and assessment, research, teaching, experiences, and outreach, have a big impact on the outside world, namely on stakeholders' awareness of sustainability concerns in the environment, economy, and society [55,59,60]. According to studies [58,61–63], higher education institutions in different nations are addressing the sustainability problem and may be adjusting the teaching programs they provide in a variety of subjects. Both teachers and pupils need to get significant attention [64]. A technical understanding of inter- and trans-disciplinarity is one thing that educators must possess [63,65]. On the other hand, students must understand their place in the world and their obligation to it [66].

Online technology, particularly in the present special environment, has become a priority, and is seen as the future path of educational progress. Numerous studies and revisions have been made regarding the effects and inclusion of sustainability concepts in

degrees and course materials [26,67,68], as well as learning methodologies [69], in higher education institutions. In higher education, environmental problems are increasingly being included and accepted [70]. However, in other instances, they are not equally developed and unevenly distributed among degrees, in Spain [71], or they are not completely included into the programs, as noted by Stough et al. in Belgium [32]. This is despite the fact that a number of courses incorporate promoting or using sustainable practices in their curriculum learning goals [72,73]. Systematic review has been very successful in teaching sustainability-related topics if they are included in obligatory core courses rather than elective courses (mandatory disciplines) [68].

3. Data and Methodology

In order to analyze how students assess university activities and specific pillars of sustainable development, a survey method was adopted by employing a questionnaire. The questionnaire was based on the students' opinions regarding sustainable development in order to achieve Society 5.0. The sample consisted of 115 respondents who were students from universities located in Pakistan, with data collected from February to August of 2022.The survey was based on a three-stage probability sampling procedure. The respondents were selected using a random walk procedure. The survey consisted of 21 questions to obtain information regarding the important factors for a career or job type in order to achieve sustainable development, while considering demographic characteristics, level of education, and education domain. To achieve our research objective, we chose to use logistic regression, because it allows for investigating the factors that influence respondents' opinions on sustainable development in order to achieve Society 5.0, while considering careers or types of jobs in the future.

The supervised multiple linear regression model known as logistic regression (LR) employs a linear weighted computation as its input to derive the weight coefficients for the model [74]. The dependent variable is represented by the characteristics important for career or type of job in the future sustainable development context. The independent variables are the demographics, such as gender, age, place of residence, country, and university type (public or private), level of education (from bachelor to PhD), and field of study.

The conditional mean of the regression model is written as follows:

$$E\left(y \mid X\right) = 1 \cdots P(y = 1 \mid X) + 0 \cdots P(y = 0 \mid X) = P(y = 1 \mid X) \tag{1}$$

According to (1), the probability can vary between 0 and 1; therefore, the linear regression function cannot be used, and it is necessary to respect the model response:

$$p = P(y = 1 | X) = f(\alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k), \text{ with } p \in [0; 1] \tag{2}$$

The link between the explanatory variables and probabilities in the case of logistic regression is reflected through the following equation:

$$p = f(\alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k) = \frac{\exp(\alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k)}{1 + \exp(\alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k)} \tag{3}$$

As this function can oscillate between 0 and 1, it can also be written as follows:

$$log \frac{p}{1 - p} = \alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k \tag{4}$$

The link between probability of success (p) and the probability of failure ($1 - p$) is reflected by $p/(1 - p)$, called the odds of success. The value $log\left[p/(1 - p)\right]$ is the logit of p and represents the log odds of success. In this context, the logistic regression model becomes a linear function for the odds of success that uses the logit transformation to model a binary response variable as a linear function of the explanatory variables.

4. Empirical Results

In order to achieve sustainable development, the universities and colleges provide opportunities for students to get involved in action that limits the negative impact it has on the environment and society. When considering the career or type of job in the future, accountability and ethics are very important. The students' opinions on this were not influenced by demographic characteristics, place of residence, or type of university. Instead, they were significantly influenced by education. There are also differences according to countries and the field of study (Table 1).

Table 1. Characteristics influencing the importance of accountability and ethics for the career or type of job in the future.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	135.387	0.000	0	
Gender	137.676	2.289	2	0.318
Age	146.659	11.272	8	0.187
Place of residence	136.581	1.194	2	0.551
University type	136.603	1.216	2	0.544
Education	149.498	14.111	8	0.079
Field of Study	147.415	12.027	8	0.150
Country	159.978	24.590	18	0.137

Furthermore, students registering a higher level of education agreed less with this opinion. For example master students were 0.97 less likely to agree with this compared with bachelor's students, and PhD students were 0.99 less likely to agree with this compared with bachelor's students. For the universities and colleges take enough action to limit the negative impact they have on the environment and society, students agreed with this, without noticing significant differences according to other variables. Therefore, regardless of gender, education, type of university, field of study, or country, the students agreed that universities and colleges should contribute to limiting the negative impact on the environment and society. When considering the career or type of job in the future, an important aspect is being suited to its personality, and no significant differences were noted according to other variables.

Job security is another important aspect in choosing the career. The students' opinions on this were significantly influenced by age (Table 2).

Table 2. Characteristics influencing the importance of job security for the career or type of job in the future.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	152.523	0.000	0	
Gender	152.803	0.281	4	0.991
Age	180.574	28.052	16	0.031
Place of residence	155.879	3.356	4	0.500
University	159.326	6.803	4	0.147
Education	174.665	22.142	16	0.139
Field of Study	169.962	17.440	16	0.358
Country	179.328	26.806	36	0.867

Furthermore, compared to people less than 22 years of age, people aged 23–26 were 0.92 less likely to agree more, people aged 27–30 were 0.921 less likely to agree more with this opinion, people aged 31–34 were 0.97 less likely to agree, and people more than 35 years of age were 0.932 less likely to agree.

Using skills developed through the course is an important factor considered for the career or type of job in the future, and people agreed with this. Some differences were noticed according to gender, with men agreeing less with this opinion (Table 3).

Table 3. Characteristics influencing the importance of using skills developed through the course for the career or type of job in the future.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	144.427	0.000	0	.
Gender	150.591	6.163	4	0.187
Age	152.422	7.995	16	0.949
Place_of_residence	146.217	1.789	4	0.774
University	146.506	2.079	4	0.721
Education	152.701	8.273	16	0.940
Field_of_Study	154.534	10.106	16	0.861
Country	164.181	19.754	36	0.987

For the career or type of job in the future must be associated with the course and subject, the factors significantly influencing this opinion on it were: age, place of residence, type of university, education, and field of study (Table 4).

Table 4. Characteristics influencing the opinion on the importance of course or subject for future career.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	165.183	0.000	0	
Gender	168.412	3.229	3	0.358
Age	226.660	61.477	12	0.000
Place of residence	173.780	8.597	3	0.035
University	180.075	14.893	3	0.002
Education	546.141	380.958	12	0.000
Field_of_Study	187.159	21.976	12	0.038
Country	164.256	.	27	.

Compared to people less than 22 years of age, people aged 23–26 were 0.074 less likely to agree more with this opinion, people aged 27–30 were 0.41 less likely to agree more with this opinion, people aged 31–34 were 0.905 less likely to agree more, and people more than 35 years of age were 0.327 less likely to agree. For considering the importance of opportunities for progression for the career or type of job in the future, the factor significantly influencing this opinion was age (Table 5). People aged 23–26 were less likely to agree more than people less than 22 years of age. People aged 27–30 were 0.985 less likely to agree more, people aged 31–34 were 0.999 less likely to agree more, and people more than 35 years of age agreed as much as people less than 22 years of age.

Table 5. Characteristics influencing the opinion on the importance of opportunities for progression for the career or type of job in the future.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	110.744	0.000	0	.
Gender	117.436	6.692	4	0.153
Age	140.197	29.453	16	0.021
Place of residence	113.311	2.567	4	0.633
University	115.051	4.307	4	0.366
Education	127.209	16.465	16	0.421
Field of Study	127.783	17.039	16	0.383
Country	143.167	32.423	36	0.639

For if the job has or contributes to a social purpose presents a high importance for the career or type of job in the future, results were significantly influenced by gender, age, place of residence, university type, education, country and field of education (Table 6). Men and people less than 22 years of age were more likely to agree with this opinion. People graduating from a public university and people living in cities agreed more with this opinion. Regarding the field of study, people studying environmental studies agreed more compared to other fields. People registering MS/MPhil or Bachelor's and people from China were more likely to agree more with this opinion.

Table 6. Characteristics influencing the opinion on the importance of having or contributing to a social purpose.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	91.864	0.000	0	.
Gender	121.059	29.196	4	0.000
Age	142.639	50.776	16	0.000
Place_of_residence	111.556	19.693	4	0.001
University	120.629	28.765	4	0.000
Education	621.860	529.996	16	0.000
Field of Study	117.167	25.304	16	0.065
Country	208.868	117.005	36	0.000

Benefits, qualification requirements, and if the company or organization contributes to helping the environment were also important for the career or type of job in the future. The importance of starting salary for the career or type of job in the future was significantly influenced by place of residence, type of university, education, and field of study (Table 7). The people living in the country side were 0.863 less likely to agree more than people living in cities. People graduating from a private university were 0.555 less likely to agree more than people graduating from a public university. People with a higher level of education were less likely to agree more, and people studying other fields than environmental studies were less likely to agree more.

Table 7. Characteristics influencing the opinion on the importance of starting salary for the career or type of job in the future.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	123.743	0.000	0	.
Gender	129.290	5.546	4	0.236
Age	146.565	22.822	16	0.119
Place of residence	134.588	10.845	4	0.028
University	132.204	8.461	4	0.076
Education	155.942	32.199	16	0.009
Field of Study	160.103	36.359	16	0.003
Country	164.282	40.538	36	0.277

Also, the program flexibility is important when considering the career or type of job in the future. Considering the importance of the job contribution to helping the environment, the factors significantly influencing this opinion were age and type of university (Table 8). People aged 23–26 were 0.341 less likely to agree more than people less than 22 years of age, people aged 27–30 were 0.938 less likely to agree more than people less than 22 years of age, people aged 31–34 were 0.174 less likely to agree more than people less than 22 years of age, and people more than 35 years of age were 0.592 less likely to agree more than people less than 22 years of age.

Table 8. Characteristics influencing the opinion on the importance of job contribution to helping the environment.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	164.001	0.000	0	
Gender	168.765	4.765	4	0.312
Age	585.597	421.596	16	0.000
Place of residence	164.929	0.928	4	0.921
University	172.419	8.418	4	0.077
Education	114.830		16	
Field of Study	178.507	14.506	16	0.561
Country	145.336		36	

People also agreed with the importance of how well-respected the job is for the career or type of job in the future, and the significantly influencing variable was education (Table 9), with a higher level of education being associated with less agreement with this opinion.

For considering the experience when considering the career or type of job in the future, respondents agreed with this, without noticing significant differences.

Thus, students consider accountability and ethics as being very important in order to achieve sustainable development, with the differences being registered between domains and education. These results are normal due to the fact that different measures are being considered in order to achieve sustainable development. Also, the domain generated different results, with accountability not being associated with all programs considered by the universities. It is critical to match personality with a career or type of job in the future. Job security is also important in choosing a career, and was significantly influenced by age. The skills developed through the course are seen as important factors for a career or type of job in the future question had different opinions according to gender, with women appreciating their importance more. The opportunities for progression are also important for the career in the future question was significantly influenced by age, place

of residence, type of university, education, and field of study. The question for a future career or type of job is a response to the job's contribution to a social purpose was heavily influenced by gender, age, place of residence, university type, education, country, and field of education. Benefits, qualification requirements, and whether the company or organization contributes to helping the environment are also important for a future career or type of job. The importance of the starting salary for the type of career or job in the future question was significantly influenced by the place of residence, type of university, education, and field of study. Also, when deciding what type of career or job to pursue in the future, program flexibility is critical. For considering the importance of the job's contribution to helping the environment, the factors significantly influencing this opinion were age and type of university. Respondents also agreed that how well-respected a job is was important for a future career or type of job, with education being a significant variable. In this context, the transition through sustainable development is realized with the help of universities. Their strategies are influencing the future careers of the students to achieve sustainable development.

Table 9. Characteristics influencing the opinion on the importance of how well-respected the job is for the career or type of job in the future.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	109.353	0.000	0	.
Gender	114.618	5.265	4	0.261
Age	124.991	15.638	16	0.478
Place of residence	109.677	0.324	4	0.988
University	114.646	5.293	4	0.259
Education	135.747	26.394	16	0.049
Field of Study	127.173	17.820	16	0.335
Country	154.547	45.194	36	0.140

5. Discussion

Due to review and ongoing improvement, the teaching and learning processes at universities are continually evolving [46,75]. A university's strategic choices or an outside interruption making sustainable development a reality includes the provision of high-quality education [76,77]. In terms of the advancement of sustainability, universities have evolved into crucial players [78,79]. Universities themselves must practice sustainability in order to create effects for the SDGs [80,81]. To paraphrase Gandhi, they should "be the change [they] desire to see in the world" and lead by example [82]. Last but not least, universities should broaden their definition of success. Success involves more than just financial gain, recognition in the media, and student learning; it also involves fostering a sustainable society. Students should be familiar with how to run their lives on renewable energy, do away with the idea of trash, transform every waste product into a resource or nutrition for another species or activity, and recycle resources back into the natural cycles [83–85]. Universities are hubs for knowledge creation where the evolution of the human person and its surroundings are continuously assessed from the many fields of study [46,86]. The institution has been evolving throughout the years, which necessitates the development of fresh strategies for advancing culture and knowledge [87–89]. However, these initiatives must be connected to research, innovation, and technological development to achieve the training of professionals who meet the needs of their environment and can thereby contribute to sustainability management, in order to clearly achieve the fulfillment of the goals of sustainable development, including quality education, decent work, economic growth, industry, innovation, and infrastructure, as well as the reduc-

tion of inequalities, peace, justice, and indifference [90,91]. Due to the universal need to eradicate poverty, safeguard the environment, and ensure that all people experience peace and prosperity, promoting the articulation from all stakeholders and the feedback of the various procedures undertaken is necessary [91]. Academic sustainability's main goal is to provide both teachers and students with the capacity to engage in sustainability research and problem-solving techniques that are based on (a) value systems and critical thinking, (b) anticipatory/normative thinking, (c) strategic thinking, and (d) interpersonal abilities. Interdisciplinary work has taken on a major role in the university sustainability domain in order to develop sustainability diagonally across the many academic fields. A strong cooperation with many stakeholders is essential. In this new paradigm, intellectual property is crucial, and partnerships between governments, universities, and businesses must foster sustainable growth. Universities strive to present themselves as research hubs on a worldwide scale, and as a result often draw collaborations. As Lozano et al. [34] discovered, universities must make sure that the needs of the present and future generations are better understood and addressed in order for professionals who are knowledgeable in SD to effectively educate students of "all ages" to aid them in the transition to "sustainable societal patterns." [92,93].

6. Conclusions

This study aims to describe the features of 4.0 universities, assess the components of the university's Society 5.0, and assess the degree to which universities are active in sustainable development. The results of our research and their analysis showed that 4.0 universities should take actions for sustainable development, and that the aspects of sustainable development must be a priority for them. The analysis of the results showed that for Society 5.0, the actions of University 4.0s on sustainable development are important, and Society 5.0 is involved in these actions. What the also survey found reveals how students see their future occupations and how they relate to the SDGs. In the case of education, it was shown that it is important to raise public awareness towards sustainable development. The sustainable mentality motivates us to leave behind the old management discipline silos by emphasizing management ethics, entrepreneurship, environmental studies, systems thinking, and self-awareness [94]. In student education and particular initiatives, the SDGs must be widely disseminated. Gatti et al proposal's to teach sustainable development using business simulation games is one of the methods that may be utilized to help students get more familiar with the SDGs [55,95]. This method gives the learner a feeling of realism in their learning by exposing them to the immediate results of management choices, by encouraging sustainability, and by demonstrating how these actions have an impact on the managed organization. When getting sustainability education, a student should focus on the following three concerns, according to Wheeler: (a) Comprehend the social, economic, and environmental systems in detail. (b) Acknowledge the significance of these systems' interdependence for a sustainable world. (c) Honor the variety of viewpoints and approaches to difficult problems. Specific curriculum are needed in order to guarantee that students can properly learn about the SDGs [96–99]. The significance of this was highlighted by André and Hastie [100] and Naik et al. [101], who documented the considerable benefits of technology-based SDG programs to supplement face-to-face learning. In order to ensure the success of sustainability education, it is crucial to adhere to specified pedagogical and content standards as described by the UN [98]. The student must understand the notions of severe and relative poverty and be able to critically reflect on their underlying cultural and normative assumptions and behaviors, such as the suggested cognitive learning goals for education in poverty reduction. In addition to behavioral learning objectives like "The learner can plan, implement, evaluate, and replicate activities that contribute to poverty reduction," socio-emotional learning objectives, such as "The learner can collaborate with others to empower individuals and communities to affect change in the distribution of power and resources in the community and beyond" are needed. It is also essential to suggest specific workshops on subjects such as "The Interrelation of Poverty, Natural

Hazards, Climate Change, and Other Economic, Social, and Environmental Shocks and Stresses," and to use teaching strategies and instructional techniques such as "Plan and Run an Awareness Campaign about Poverty Locally and Globally" [99]. The enormous potential for leveraging social networks like Twitter to spread awareness of the SDGs is described by authors Andre et al., Naik et al., Bellantuono et al., Goritz et al., [100–103] and Killian et al. [104]. However, Cerro Velázquez and Morales Méndez [105] emphasize that a significant amount of the material that can have the most effects on students be disseminated through applications on mobile devices. By tailoring instruction to the user's browsing tastes and lifestyle, the SDGs may be made more readily attainable via the use of education.

When it comes to promoting sustainable development (SD) at a time of global climate action, higher education institutions (HEIs) might play a crucial role. The demands of massification, globalization, marketization, and digitization are only a few of the more complicated issues that HEIs must address at the same time [42]. The intrinsic complexity of SD, which requires systemic change rather than just adaptation [103,104], is probably one of the reasons it has not permeated mainstream academics and university administration. In other words, addressing the SD problem head-on will result in more conflicts and impasses and, thus, greater complexity [105].

Our findings show that domain, personality suitability, job security, skills developed through the course, opportunities for advancement, job contribution to a social purpose, benefits, qualification requirements, whether the company or organization contributes to helping the environment, starting salary, program flexibility, job contribution to helping the environment, and how well-respected the job is, are viewed as important factors for the future career.

A large number of studies in recent years evaluated the effects of higher education on sustainability [33,47,106], and higher education institutions are typically seen as "changing agents" and "catalysts" in the development of sustainability-related issues [107]. In general, a sustainability-based education influences educational content, as well as the related procedure and results [95]. The SDGs are requiring universities to adapt in order to meet the needs of a world in crisis. In order to address the most pressing issues of our day, there is a need for a change in mindset and ethical behavior. All university curriculum should take into account vital subjects such as systems thinking, anticipating abilities, and integrated issue solving. To establish sustainable practices, a multidisciplinary approach should be the driving force [108]. The difficulties in implementing the SDGs were enumerated by Richardson [78]. Among them, it is crucial to draw attention to the following: (1) the undereducated, unmotivated, and poor teaching techniques, the unrelated content, and the audience; (2) the uneducated target audience, who is remarkably ignorant of world issues like global warming; (3) consumption habits and attitudes regarding the environment, as influenced by various cultures; (4) individual viewpoints; and (5) the exclusion of minorities and elitism. Given that it calls for combining business, the environment, and people—which are three major factors—the idea of sustainability is inherently difficult. For universities to effectively serve as sustainability models, a strong organizational culture must be created. The development of a new set of values and behaviors is essential for this to occur, and major adjustments must be made in this direction [31]. According to Howlett et al. [79], the responsibility for the present environmental problem is what drives higher education institutions' involvement in promoting sustainability. Universities' sustainability-related initiatives, plans, and initiatives make up their strategy. In order to comply with the SDGs, universities must incorporate sustainability-related material into their curricula, establish monitoring metrics to evaluate how well they are meeting the goals, encourage collaboration and coordination among departments to work toward common goals, and support interdisciplinary research that aims to find novel solutions that are sustainable [78].

From a pedagogical standpoint, understanding education for sustainable development has certain issues as well. The disciplinary paradigm that has developed in institutions/schools is clearly challenged by the ESD's demands on teacher literacy, teaching

material, and learning methodologies. Many educational approaches in schools are unable to accommodate the transdisciplinary character of the ESD. There would be fewer issues with organization, management, coordination, and technical operations if instructors from other disciplines could collaborate and learn from one another.

Bauer et al. [61] argue that in order to promote transformational behaviors at all levels, SD should be embraced by universities as a whole-institution approach. According to the authors [42,109] institutions should strive to increase students' abilities to handle complexity and ambiguity as well as lean toward a more integrated viewpoint. For society to flourish sustainably, universities are important institutions. This is shown by organizations like the University Leaders for a Sustainable Future group, which was founded in 2015, as well as by how crucial it is for institutions to collaborate in this area, creating networks and clusters like sustainable campuses or macro-campuses [110–113] It is also important to develop what is referred to as sustainable thinking, as well as accountability and social commitment. The relevant integration of sustainability ideas in university study programs is also important [114]. They create an interdisciplinary understanding together of the three areas of sustainable growth and climate, economy, and society, while recognizing that they are always a part of society and through partnerships and communication. Establishing accountability with other specialized institutions while taking protection of human rights into account is necessary.

In the future, we will focus our research on teachers and the skills they will need to help students become aware of and develop skills for sustainable development in different countries.

7. Limitations and Future Suggestions for Future Research

Data as well as the absence of relevant working papers are the study's shortcomings. With regards to the relevant literature at colleges in different nations, several studies on the topic of sustainable development have so far been conducted. We were unable to locate research that evaluated the viewpoint of towards the initiatives made in the area of sustainable development at a university. There is a shortage of relevant statistics about internet usage in higher education, as well as a restricted availability of data. In the future, students from EU countries will be asked to evaluate the work done by universities and the many pillars of sustainable development.

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