Cultural influence on sustainability: A statistical analysis within Triple-Layered Business Model Canvas; Italian, Irish, and International scholars.

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National College of Ireland

Submitted to the National College of Ireland, August 2025

Submission of Thesis and Dissertation

National College of Ireland
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Degree for which thesis is submitted: MSc Science of Management

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Date: 15th August 2025

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Submission Due Date:	15th August 2025		
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1. ABSTRACT

The growing interest in sustainability is deeply intertwined with cultural factors, influencing how companies and policymakers design context-sensitive strategies. The dominant exploration of this trend often treats Culture as a standalone item, separate from economic, environmental, and social considerations. Additionally, several studies have implemented analyses that explain national or local features, but do not explain the interconnections with Culture items and SDGs. These limitations enabled this research to explore possible influences between cultural variables and sustainability, implementing a quantitative exploration.

This dissertation utilized a sample of 85 respondents from Italian and Irish universities, collected in the spring of 2025, and conducted regressions and cluster analyses to provide a novel perspective on interdisciplinary and influencing factors. Implementing the Triple Layered Business Model Canvas (TLBMC) framework (Joyce & Paquin, 2016), we examined the impact of multiple cultural dimensions on economic, environmental, and social layers through statistical assessments. The first set of analyses was based on the FIELD, GENDER, NATIONALITY, and UNISTUDY as possible influences on variables, namely, WORD CONCERN and MAIN CONCERN (please see Annex 2). Subsequently, multiple regressions were conducted to explore the role of BARRIERS concerning two independent variables: WORD CONCERN and MAIN CONCERN. Additional models were also tested, including NATIONALITY, FIELD, and GENDER as independent determinants. Cluster analyses were also conducted, focusing on the FIELD variable linked with the BARRIERS, to explore potential associations between the type of university program and the patterns of responses. The model also investigated the role of GENDER and UNISTUDY, with further exploration based on MAIN CONCERN and WORD CONCERN. Lastly, two clusters were analyzed to explore the hypothetical influence of GEO on BUSINESS and COLLABORATION.

The results suggested that it is already difficult to define a clear cultural impact on sustainability; however, some outcomes highlighted a possible interconnection that requires further investigation in deeper studies. Therefore, the relationship between Culture and sustainability remains ambiguous and underexplored.

2. INTRODUCTION

2.1. BACKGROUND AND CONTEXT

Culture, one of the most intricate words, was defined by Williams in '*A vocabulary of culture and Society*' – Oxford University Press (1976). It might be seen as: a) a general intellectual process; b) a particular way of life; c) works and intellectual artistic activity. In this study, the concept of work and intellectual artistic activity was adopted as a broad, integrative framework for examining human and social life, drawing on Geertz's (2010) holistic anthropological perspective. Moreover, the definition linked with the '*culture as sustainability*' (Soini, 2014) permitted treating sustainability as an embedded variable in Culture.

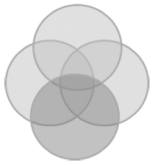
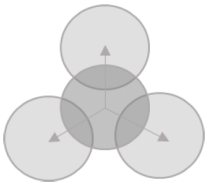
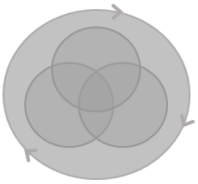
	First: Culture *in* Sustainability	Second: Culture *for* Sustainability	Third: Culture *As* Sustainability
			
Definition of culture	culture as a capital	culture as a way of life	culture as a semiosis

Figure 1: Culture definition in the sustainability field (Soini, 2014, pp. 4).

Previous studies have conceptualized the integration of Culture within the framework of the Sustainable Development Goals (SDGs), highlighting SDGs 4, 8, 9, 10, and 11 as those in which cultural dimensions are most prominently embedded (Yildirim *et al*., 2019). Still, Culture can create connections with other multiple sectors, such as education, tourism, and creative industries (Dessein *et al*., 2015). That said, the study ran different models to capture the possible influence of the Culture variable. In this specific case, the Culture concept adopted a different view, based on Zheng *et al*. (2021). The authors explained how Culture is an intangible asset that can influence perceptions and activities related to sustainability. The latter is based on a tangible item, underscoring its physical presence (Zheng *et al*., 2021). Moreover, conceptualizing Culture in terms of sustainability seems to be challenging, but other authors have attempted to do so, implementing Hofstede's (2001) cultural dimensions. For instance, Sedita *et al*. (2022) approached cultural factors to investigate the importance of cultural differences among SDGs in many countries.

3. LITERATURE REVIEW

Sustainability is one of the most pressing challenges facing humans, as climate change is increasingly disrupting business operations and economic performance (Horbach & Rammer, 2025; OECD, 2022). Consequently, industries need to update their business model, Culture, and approaches (Horbach & Rammer, 2025). Sustainability, as a concept, was introduced by the 'Brundtland Commission' in 1987, also known as 'World Commission on Environment and Development' (WCED), in the report titled 'Our Common Future'.

Later, as a reply to the WCED statement, the United Nations (United Nations, 2024) developed the Sustainable Development Goals (SDGs) framework. This model embodies a holistic approach for organizing activities, engaging stakeholders, and informing policymakers' processes (Demastus *et al*., 2025). The Sustainable Development Goals (SDGs) comprise 17 overarching objectives accompanied by over 160 specific targets spanning various domains, outlining a comprehensive framework for the global implementation of sustainability initiatives (United Nations, 2024). The sustainability concept is linked to sustainable development, based on environmental, economic, and social pillars (Figueira & Fullman, 2025). In the last year, the concept has been widely opened, integrating also Culture as a fourth variable (Figueira & Fullman, 2025). Moreover, the traditional pillars of sustainable development, like economic growth, social inclusion, and environmental balance, are paramount and central; however, an increasing number of institutions (e.g., United Nations – World Summit on Sustainable Development) have defined Culture as the fourth aspect (Kagan *et al*., 2018; Loach *et al*., 2017; Rayman-Bacchus & Radavoi, 2020). Culture plays a considerable role among the three main pillars, hereby endorsing an integrated framework for achieving the SDGs (Baltà Portolés & Dragicevic Šešić, 2017; Bervar & Trnavčevič, 2019; Sabatini, 2019). The achievement of sustainability is widely recognized as a fundamental requirement for social, economic, and environmental resilience (Lepore & Cunningham, 2023); nevertheless, it is often complicated to tie it to Culture as a new concept. To support progress and development in society, it is vital to shape and build a future that preserves the autonomous action capacity at the global, national, and local levels, allowing societies to be aware of the choices and adapt to unforeseen or emerging challenges (Figueira & Fullman, 2025). Making this real necessitates developing regenerative policies, including those related to Culture, reflecting on the interconnections between Culture and environment (Figueira & Fullman, 2025).

Literature has developed two main definitions for Culture, adopting *constituent* and *functional* approaches. The former is related to values, beliefs, and norms that societies interpret or respond to actions and environments. The latter treats Culture as a bundle of cultural production, consumption, and participation (Throsby, 2019).

Literature, furthermore, reveals other studies that have introduced new variables to identify the cultural differences among countries. Sedita *et al*. (2022) employed the Hofstede (2001) cultural dimensions, specifically *individualism*, *power distance*, and *long-term orientation,* as drivers for defining SDGs achievements. This specific approach enabled the research to highlight how the cultural dimension can or cannot lead to the accomplishment of different SDGs. In addition, multiple researchers have addressed that Culture plays a crucial role in mediating between social, environmental, and economic facets of sustainability, offering a comprehensive strategy for accomplishing the SDGs (Trnavčevič, 2019; Kagan *et al*., 2018; Rayman-Bacchus & Radavoi, 2020). Moreover, Culture has been increasingly recognized as a mediator or catalyst for sustainable development within academic discourse over the past few decades (Davies, 2020), providing intangible resources that impact citizenship, identity, social cohesion, and environmental stewardship.

Its contribution to economic growth via creative industries and cultural heritage highlights how Culture can advance socioeconomic sustainability (Greenfield, 2016). Culture is inherently diverse, comprising a wide array of values, beliefs, languages, epistemologies, artistic forms, and traditional knowledge. Culture is a dynamic and evolving force that significantly influences human experience, social organization, and democratic institutions (Benito *et al*., 2025). In these times, Culture is understood not merely as a reflection of a society but also as a critical catalyst for sustainable development (Benito *et al*., 2025). It can shape individuals' perceptions, behaviors, and commitment to enhance the sustainable environment. Allowing it to be not only a driver but also an enabler of sustainable practices (Benito *et al*., 2025). Instrumentally speaking, Culture can contribute to economic growth, generating income, creating employment opportunities through the production and consumption of cultural goods and services (Benito *et al*., 2025). Policy makers, stakeholders, and all future generations will be able to leverage Culture as a strategic resource in advancing the Sustainable Development Goals (Zheng *et al*., 2021).

The impact of Culture on sustainable development emerges as a significant yet frequently under-explored domain (Benito *et al*., 2025). Currently, there is a paramount absence of frameworks integrating cultural dimensions within the SDGs, reflecting an underestimation of cultural elements as a driver for sustainable development (Figueira & Fullman, 2025). Achieving SDGs requires a multi-faceted approach encompassing lifestyle transformation, developing new technologies, and modelling the Culture (Benito *et al*., 2025). There are three main reasons why Culture and sustainability are still underestimated, and the bond is ambiguous. Firstly, actual knowledge is based on isolated studies and research, with a multidisciplinary approach, allowing connections among different fields. Consequently, this developed a negative approach in terms of specific industry exploration (Zheng *et al*., 2021). Secondly, the differences in methodology; as cultural aspects required more qualitative exploration and definition, while sustainability is likely more approached quantitatively (Adger *et al*., 2013). The consequence is a mismatch between the two different approaches, with difficulties in combining the outcomes. Lastly, policymakers and scientists do not use a sensitive approach while studying Culture, as they prefer a homogeneous pathway. The issue is paramount, as Culture is different across the world, from country to country, and usually this creates strong limits in the exploration of the Culture and sustainability relationship, without enhancing the literature's gap (Soini *et al*., 2015).

A detailed comprehension and understanding of how cultural values support or obstruct a nation's pursuit of sustainability is essential for identifying cultural opportunities and defining potential barriers to sustainable development (Beugelsdijk, 2018). Existing literature shows how Culture impacts addressing challenges across all five dimensions of social sustainability (e.g., SDGs 3, 4, 5, 10, and 16). Culture highlights a strategic role in advancing outcomes linked to both physical health and mental well-being (Bavel *et al*., 2020). Moreover, Culture might be able to shape an individual's worldview, emotional interpretations, and reactions, approaches to managing affective disorders, and access to social support networks (De Vaus *et al*., 2017). Examples of this influence are shown in the literature by multiple authors. *Socially* speaking, Culture influences the accessibility of resources for women, marginalized groups, and vulnerable populations. In a context where women are undervalued or associated with traits such as passivity and subordination, their access to education and economic resources is often restricted (Johnson *et al*., 2019).

From the *environmental* side, it is important to address how Culture can affect the realization of all the SDGs linked to this field. It might shape the understanding of human environmental challenges and lead to perceived risks to respond to the sustainability goals (Zheng *et al*., 2021). Lastly, the *economic* side is influenced by Culture, as it can explain the success of particular regions around the world, while others fail (Zheng *et al*., 2021). These outcomes are strategic for the development of the following analysis, as they might be used as a foundation for conclusions.

Over the years, researchers have developed new and different types of metrics to evaluate cultural dimensions. The main authors are Hofstede (2001), Beugelsdijk & Welzel (2018), and Schwartz (2004). Hofstede was the first researcher to elaborate on cultural dimensions. He represented one of the earliest frameworks for conceptualizing national Culture and has served as a foundational basis for numerous empirical investigations into cultural influences (Zheng *et al*., 2021). Most of the time, literature rejects his model, whereas the accuracy is in doubt (Taras *et al*., 2012). Secondly, Beugelsdijk & Welzel (2018) combined Hofstede's cultural framework with the dynamic theory of cultural change, underlining that the generation shift redressed their model's weakness (Zheng *et al*., 2021). Lastly, Shwartz (2004) defined a valid second option instead of Hofstede's cultural items, mostly used in the psychology field (Zheng *et al*., 2021).
Culture serves as the foundation for developing the imagination required to envision a future in which all life forms may be connected to each other. According to Kagan (2015), sustainable approaches are reinventing the world, and what is happening might be called a 'cultural project'. This highlights the burden of applying sustainable solutions valid for all the issues around the world, without thinking about the multiple values and beliefs (Figueira & Fullman, 2025). Omitting Culture and defining it as an independent SDG(s) has constrained the ability to deeply contribute to strategy development, reducing the potential to advance sustainable outcomes (Figueira & Fullman, 2025). The possible consequence of not embracing Culture is explained by Benito *et al*. (2025),
underlining the indirect benefits of cultural items using culturally-driven activities that might be able to influence the possibility of reaching or not reaching the SDGs goals. Moreover, studies based on cultural effects are strategic as guidelines in terms of which type of investments governments should make, and for resource allocation, avoiding misallocations or inefficiencies (Benito *et al*., 2025). That said, the main goals for each institution might be to enhance population

awareness in terms of a sustainable future, sharing the possible and different ways in which Culture plays a driver role (Benito *et al*., 2025).

One of the most recent and concerning studies on Culture embedded in sustainability is the paper elaborated by Benito *et al*. (2025). The authors aimed to define the role of Culture in achieving the Sustainable Development Goals in the Spanish public sector. It is essential in literature, as it has attempted to define Culture differently, analyzing external factors that affect the implementation of SDGs (Benito *et al*., 2025).

Firstly, they defined how education level is strategic in terms of awareness, as the higher the level is, the higher the awareness is (Benito *et al*., 2025). This outcome contributes to the literature, explaining how the cultural element based on education might influence the sustainability view. However, Benito's paper (2025) analyzed not exclusively the education variable, but also political ideology, population, and unemployment as cultural determinants. For instance, authors highlighted how '*municipality's population*' was able to influence and bias sustainability views (Raimo *et al*., 2023; Benito *et al*., 2025), discovering that the more people live in a specific area, the more investments are made for a sustainable environment (Raimo *et al*., 2023). Consequently, the region's size may also directly impact the environment's capacity to develop a sustainable setting (Mutiarani & Siswantoro, 2020). Local institutions must reconsider their future sustainable plans, placing more emphasis on cultural dimensions and adopting a more long-term framework, rather than prioritizing short-term goals. Additionally, it is strategic for sustainability awareness to enhance investment allocation in the education field, aiming to raise awareness and cultivate sustainable information (Benito *et al*., 2025). Benito *et al.* (2025) study, based on embedded Culture, is essential for the development and monitoring of sustainable practices.

Proceeding with the literature, it is essential to examine also the TLBMC, as the model was used to combine quantitative data within the qualitative labels of the framework. The concept of the business model as a theory is not recent (Drucker, 1955); nevertheless, business model exploration has seen different evolution steps to this day. Meanwhile, the term business evolved into a new framework developed by different management and economics authors. Firstly, Osterwalder and Pigneur (2010) developed the Business Model Canvas (BMC) framework. This model is based purely on business items, with the limitation of not considering exogenous variables.

Nowadays, sustainability is playing an important role in achieving business outcomes (Boons *et al*., 2013). A practical method to embed sustainability within global strategies of enterprises is to switch from the traditional BMC approach to the novel TLBMC. This new model was developed on the BMC structure by Joyce & Paquin (2016). Its structure is formed by three single BMC covering economic, social, and environmental sides (García-Muiña, 2020).

Uncovering the three single BMCs, it is composed of nine different layers - key partners, key activities, key resources, value proposition, customer relationships, customer segments, channels, cost structure, and revenue streams - from the Economic perspective (Osterwalder & Pigneur, 2010). The Environmental layer shows other 9 different key areas - supplies and outsourcing, production, functional value, end of life, use phase, distribution, environmental impacts, and environmental benefits. Lastly, the last 9 layers of the Social section - local communities, governance, employees, social value, value, societal Culture, scale of outreach, end user, social impacts, and social benefits - (Osterwalder & Pigneur, 2010).

The framework is essentially simple and clear, helping stakeholders and shareholders in the representation, creation, and validation (Joyce & Paquin, 2016). Moreover, it is based on a novel framework based on the triple bottom line (TBL) perspective, as proposed by Joyce & Paquin (2016). TBL is a widely used framework for exploring an organization's economic, environmental, and social aspects, providing an innovative approach to support sustainable business model projects (Joyce & Paquin, 2016). This model permits professionals, entrepreneurs, and academics to define and visualize easily the business project key items, supporting sustainable evolution (Joyce & Paquin, 2016). The TLBMC evolutions saw a static and implementable opportunity only from a business's view, switching over the years, to a more dynamic perspective considered by different academics (Wirtz *et al*., 2016). This is the reason that led the authors to use it for a possible explanation of cultural background as a driver in the Sustainable topic, in the following thesis.

3.1. RESEARCH GAPS

A deep exploration and understanding of how Culture can impact sustainability is required by the literature, as studies are currently scarce (Chaoqun, 2020), and there is an urgent need for more research. Moreover, it is unclear how Culture influences the achievement of the SDGs, as indicated in the existing literature (Kagan *et al*., 2018; Rayman-Bacchus & Radavoi, 2020; Sabatini, 2019).

Most previous studies have treated Culture as a single item, isolated from economic and environmental considerations (Benito *et al*., 2025). Moreover, detailed research is required, implementing Culture not as a static or singular category (Benito *et al*., 2025), because a possible consequence is the erosion of Culture, without any advantages in terms of interdisciplinary studies (Proctor, 1998). Additionally, literature may be able to develop a new approach, combining a transdisciplinary project with various disciplines (Benito *et al*., 2025). To address this gap, Culture was viewed as a bundle of values, beliefs, languages, and social structures (Demastus *et al*., 2025). Additionally, there is a need to move beyond festivals and events as cultural items and provide policymakers and companies with a more strategic view of Culture (Benito *et al.,* 2025). Different limitations prevent current analyses and evidence on the relationship between Culture and sustainable development from providing how these connections vary across different SDGs and cultural traits, even though they still provide insightful information (Zheng *et al*., 2021).

4. METHODOLOGY

4.1. DESIGN

This chapter outlines the approach implemented in the research to address the research questions, hypotheses, and analyses. Moreover, a research philosophy is included, trying to go beyond the simple explanation of the methodology approach.

For the strengths of the research and the analysis technique, the paper followed the '*Research Onion*' framework developed by Saunders *et al*. (2019). The data were collected using a survey technique over a one-month period (June 2025). The survey's structure was based on grounded theory (see Chapter 3) and allowed a mixed-method approach, where most of the analyses were quantitative.

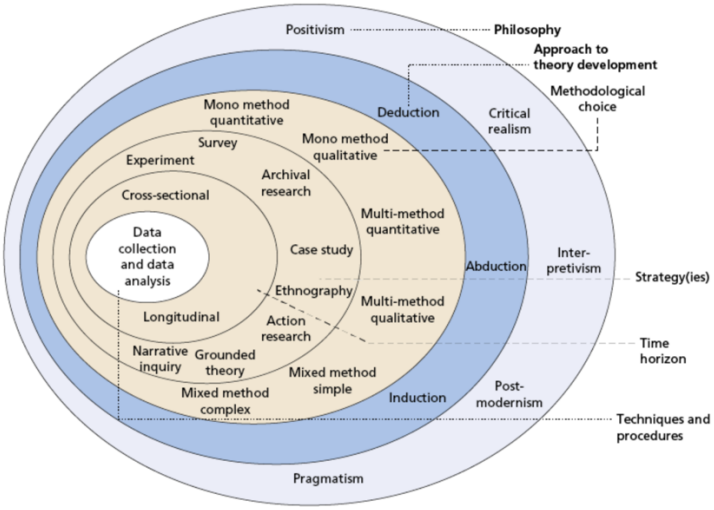


Figure 2: Research onion structure (Saunders *et al*., 2019).

A deductive research approach was adopted, grounded in the theoretical framework proposed by Benito *et al*. (2025) and Osterwalder & Pigneur (2010). The researcher decided to proceed with this approach, as it may help to reduce ambiguity during the research process (Yin, 2016). This method began with a review exploration, allowing the researcher to compare findings with empirical evidence (Dudovskiy, 2016). Moreover, the framework mentioned above was implemented in the research hypothesis to validate or not the theoretical assumptions. Subsequently, a pragmatist approach was implemented as the findings tried to emphasize a real-world relevance, trying to interpret cross-cultural student perceptions. Moreover, the thesis design is based on the works done by Benito *et al*. (2025). The thesis took as its reference the paper, as

the authors had already observed quantitative relationships between sustainability and Culture. The substantial difference is how the latter was conceived in this work, namely as an aspect embedded within that of sustainability.

4.2. RESEARCH QUESTION AND HYPOTHESES

The primary research question is (**RQ**1): *Does scholars' nationality, as a cultural variable, influence their choices from a sustainable perspective?* The objective is to contribute to the literature by providing a new methodological approach based on TLBMC. Using the three different layers of the model, economic – social - environmental, the research tried to categorize the impact of NATIONALITY - UNISTUDY and identification of MAIN CONCERN - MAIN WORD – BARRIERS - FIELD - SDG - BUSINESS - COLLABORATION. Building on Demastus *et al*. (2025) research, which highlighted a possible influence of Culture, as expenditures related to a positive effect on SDGs achievements, the research defined the first hypothesis:
H1: *Culture, as a National Identity, has a positive impact on SDG selection and awareness*.

The sub-research question, based on Benito *et al*. (2025) study, aimed to determine whether a university background might be a driver of choices during the compilation of the online format, and thus a possible cultural influence. The question is (**RQ**2): *Does a university background potentially bias scholars' views on sustainability?* Combining the Demastus *et al*. (2025) study, the holistic definition of Culture given in the Dessein *et al.* (2015) paper, and Benito *et al.* (2025) research, we developed a second hypothesis. **H**2: *Different university programme backgrounds highlight different perspectives on sustainability*.

4.3. RESEARCH APPROACH

The following research tried to define more specifically the cultural influences, using a set of variables. The thesis used a deductive theory-driven and hypothesis-informed method approach.

Firstly, a survey was conducted for the implementation of statistical analyses. Subsequently, a combination of TLBMC and statistical results was used to structure a new framework. For more specific details about the survey, please refer to Annex 2. SAS Studio was used to develop the statistical analysis, as it is one of the most widely used statistical software programs, and the researcher had already utilized it in their previous MSc research. The structure of interpretation

and exploration is articulated through a series of interconnected stages, beginning with the statistical analysis presented in the 'Analysis' chapters and ending with interpretative insights discussed in the 'Conclusion'. The research approach followed prior studies related to the sustainability field (Mutiarani & Siswantoro, 2020; Ortíz-Rodríguez *et al*., 2018; Park *et al*., 2007; Zheng *et al*., 2021).

4.4. ETHICS AND PHILOSOPHY

The survey administration adhered to established ethical standards, in compliance with the three main ethics pillars: *respect for persons, beneficence,* and *justice* (Belmont, 2008). In particular, individuals under the age of 18 were excluded from participation to ensure compliance with ethical guidelines regarding the protection of minors. Before accessing the questionnaire, all participants were informed about the purpose and final use of the collected data. These data were collected over a one-year period and were implemented solely for the purpose of the following research, without any further sharing.

Lastly, following the different research philosophies paths, the researcher thought that the one that fits more is the Positivist, as it is based on the hypothetico-deductive method. It involves testing predefined hypotheses, typically expressed in quantitative terms, to identify possible relationships between causal or explanatory variables and outcomes (Ponterotto, 2005).

4.5. DATA AND LIMITS

The thesis implemented a survey with 15 demands related to the sustainability concept and TLBMC awareness. Eighty-five (85) replies were obtained, with no dropouts during compilation and no incomplete responses. With the obtained replies, two different group analyses were conducted, using the SAS Statistics Platform. Firstly, linear and multiple regression analyses were conducted to explore all estimated parameters, including scatter plots and residual distributions. In these explorations, one dependent variable (^{y}) was always used, and two or more regressors (^{x}). Despite this, the outcomes were presented for each section and analyzed in terms of patterns, divergences, and possible implications they revealed. Subsequently, a variable clustering technique based on oblique principal components, implemented through the '*varculus*' procedure

in SAS, was used. Clusters were formed by recursively splitting groups of variables when the second eigenvalue exceeded a specified threshold.

Limitations were identified during the model's execution. The variable's nature is one of the trickiest elements in this research. Most of the time, variables were categorical, non-numerical, and ordinal — subsequently, this needed, most of the time, a dummy reclassification. The second important constraint was about the sample dimension. According to Mutiarani & Siswantoro (2020), the size of a region may also directly impact the capacity of an environment in terms of a sustainable setting. In this case, the 85 replies underscored the need for a more in-depth and detailed investigation.

4.6. SAMPLE

The sample is made of 85 replies from scholars enrolled in a University program in Italy and Ireland. Its composition is made up of both male and female genders, with a cluster age from 18 to 31+. Additionally, the composition comprises individuals from diverse nationalities worldwide. See Chapter 5.1 for a deeper explanation.

5. ANALYSIS AND FINDING

5.1. DESCRIPTIVE OUTCOMES

The sample analysis is made by 85 replies collected from a highly scholarly population. The participants are students enrolled in a university programme (e.g., BSc, MSc taught/research, PhD) settled in Italy or Ireland.

The first important reflection is based on the geographic clusters; the exploration yielded three distinct areas: America, Asia, and Europe (*Fig*. 3). The first cluster classified the respondents in *Brazil, Mexico, Chile, Bolivia*, and the *USA* into the 'America' cluster, identifying eleven students from this area.

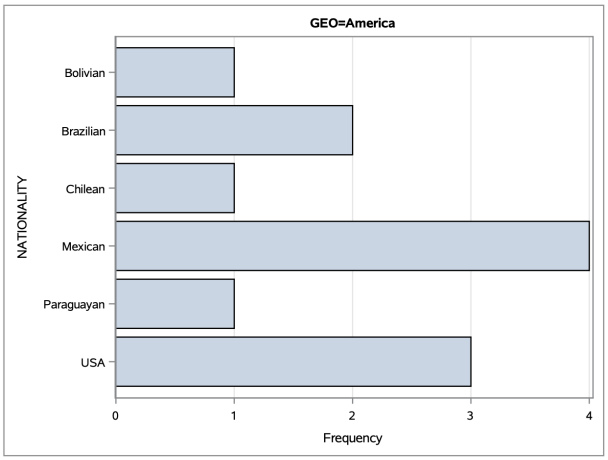


Figure 3: America area countries (Personal Elaboration, 2025).

In the second area, denominated 'Asia', the analysis collected data from students coming from the following countries: *India, Kazakhstan, Malaysian, Russia,* and *Swaziland*.
The last cluster is related to European respondents, and it is based on eight different nationalities: *British, French, German, Irish, Italian, Norwegian, Spanish,* and *Turkish*.

An assumption was made, clustering Swaziland's nationality, officially known as the Kingdom of Eswatini, located in South Africa, in the Asia group.

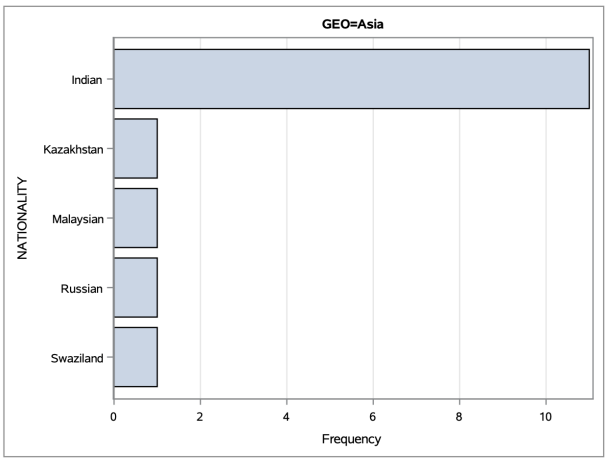


Figure 4: Asia area countries (Personal Elaboration, 2025).

Also, in this case, we made some assumptions: a) British nationality is treated as European, although the Country is not in the EU; b) Turkish nationality, which is classified as an Asia country, geographically proximate to Europe, bringing the paper to see it as a European country.

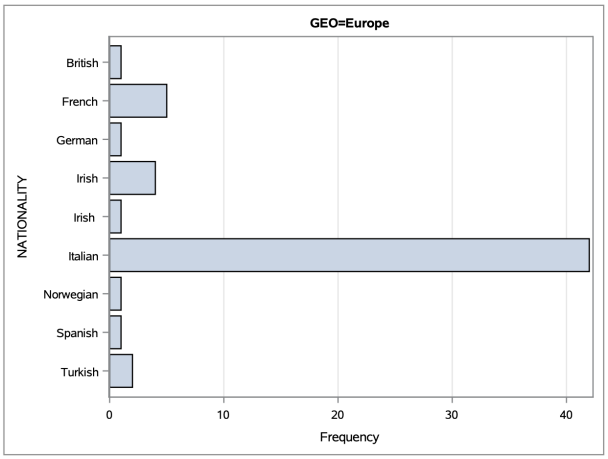


Figure 5: European countries (Personal Elaboration, 2025).

As the study was conducted between Italian and Irish Universities, it is paramount to highlight their frequency. In this case, most of the replies came from Italian universities, located in the Bergamo area, while the others were from Irish universities located in Dublin County.

From the higher education schools, the questionnaire received 41 replies from Irish Universities = 1, and 44 from Italian Universities = 2 (*Fig.* 6).

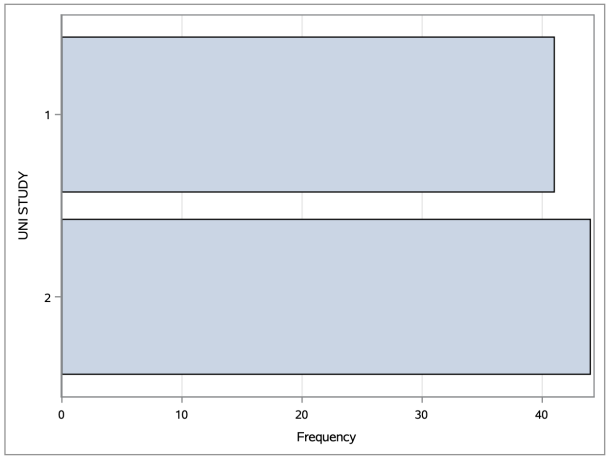


Figure 6: Number of participants from two Universities (Personal Elaboration, 2025).

Moving forward with the analysis, it is essential to gain a deeper understanding of the candidates' identities, particularly their ages and genders. *Fig*. 7 shows the age composition of three different clusters, linked to the entire population screened, without splitting among Irish, Italian, and International students. The most populated cluster is the 18-24 age group (> no. 60), followed by the 25 -30 age group (< no. 20), and the last is the 31+ age group.

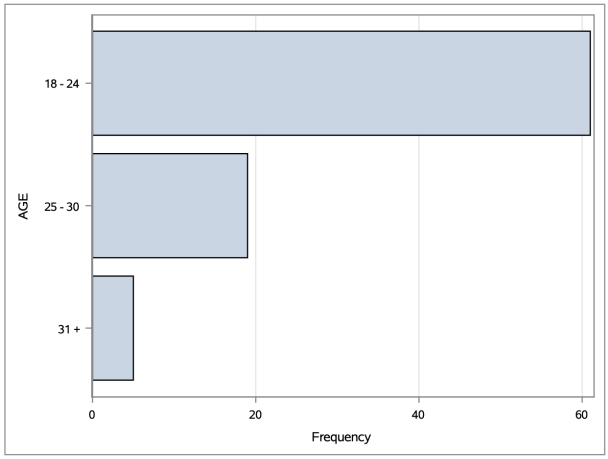


Figure 7: Age classification (Personal Elaboration, 2025).

As FIELD is one of the main determinants, it is important to explore all the different options. Most scholars are enrolled in the *Economics & Business* area. The *Humanities* faculty secured the second position in terms of student numbers, with the *Engineering* department taking the last spot on the podium. All the other categories are shown in *Fig*. 8.

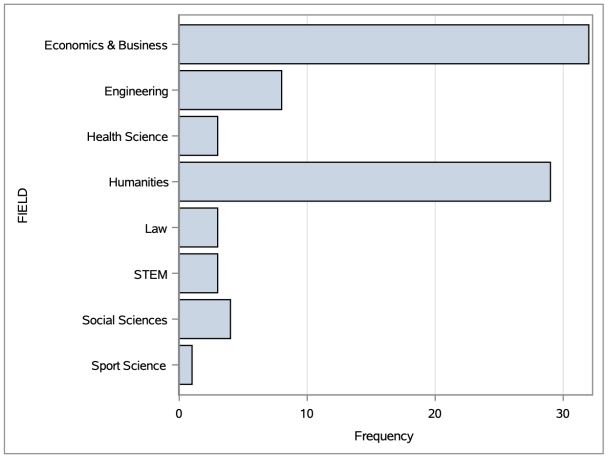


Figure 8: University fields (Personal Elaboration, 2025).

The gender application indicated that 53 students identified themselves as '*Female = 2'* and the other 32 identified themselves as '*Male =1' (Fig*. 9).

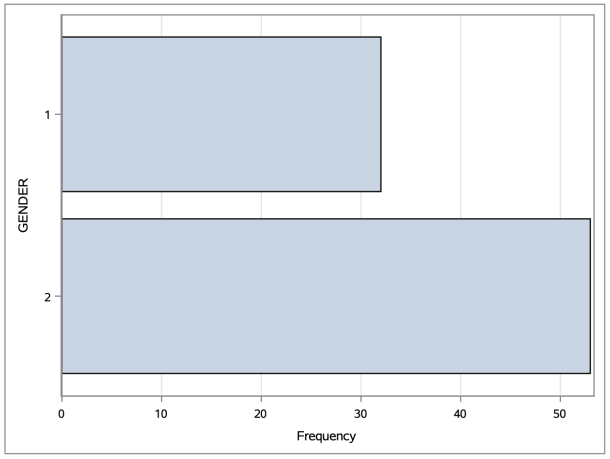


Figure 9: Pool gender composition (Personal Elaboration, 2025).

5.2. WORD CONCERN – REGRESSION ANALYSIS

The first regression analysis is based on the variable, namely WORD CONCERN, as Y, and FIELD, GENDER, NATIONALITY, and UNI STUDY as X. *Tab.* 1-2-3 shows all the estimated parameters among all the variables analyzed. Although the model explains 44.53% of the variance in the dependent variable (WORD CONCERN), the overall model is not statistically significant at the conventional α level of 0.05.

Parameter	DF	Estimate	Standard Error	t Value	Pr > |t|
NATIONALITY Spanish	1	-0.929838	0.966208	-0.96	0.3401
NATIONALITY Swaziland	1	0.702125	0.922351	0.76	0.4498
NATIONALITY Turkish	1	0.491709	0.788466	0.62	0.5354
NATIONALITY USA	1	-1.683330	0.700895	-2.40	0.0197
UNI STUDY Irish Universities	1	-0.140324	0.523428	-0.27	0.7896

Table 1: Regression Analysis – WORD CONCERN (Personal Elaboration, 2024).

Suggestion defined how independent variables do not provide a strong and reliable prediction of WORD CONCERN.

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	2.968218	0.524751	5.66	<.0001
FIELD 1	1	-0.530019	0.500483	-1.06	0.2942
FIELD 2	1	-0.695422	0.592622	-1.17	0.2457
FIELD 3	1	0.154355	0.780864	0.20	0.8440
FIELD 4	1	-0.401029	0.525592	-0.76	0.4487
FIELD 5	1	-0.109187	0.719521	-0.15	0.8799
FIELD 6	1	0.310338	0.764630	0.41	0.6864
FIELD 7	1	0.031782	0.923078	0.03	0.9727

Table 2: Regression Analysis – WORD CONCERN (Personal Elaboration, 2024).

Despite the lack of statistical significance, individual parameters estimated reveal that the ‘French’ ($p^{F} = 0.0285$) and ‘United States of America’ ($p^{USA} = 0.0197$) nationalities show a statistically significant relationship with WORD CONCERN. Otherwise, ‘British’ and ‘German’ nationalities are significant marginally ($p^{BG} = 0.0567$), suggesting that differences in WORD CONCERN may exist across specific nationalities compared to the reference group.

GENDER Female	1	-0.052411	0.233837	-0.22	0.8235
NATIONALITY Bolivian	1	0.867528	0.976293	0.89	0.3781
NATIONALITY Brazilian	1	-1.162762	0.779410	-1.49	0.1415
NATIONALITY British	1	-1.514778	0.778086	-1.95	0.0567
NATIONALITY Chilean	1	-1.297875	0.922351	-1.41	0.1650
NATIONALITY French	1	-1.287065	0.572261	-2.25	0.0285
NATIONALITY German	1	-1.514778	0.778086	-1.95	0.0567
NATIONALITY Indian	1	0.016280	0.578568	0.03	0.9777
NATIONALITY Irish	1	-0.141215	0.699499	-0.20	0.8408
NATIONALITY Kazakhstan	1	-0.245464	0.942027	-0.26	0.7954
NATIONALITY Malaysian	1	0.867528	0.976293	0.89	0.3781
NATIONALITY Mexican	1	-0.377968	0.677925	-0.56	0.5794
NATIONALITY Norwegian	1	-1.226145	0.961644	-1.28	0.2077
NATIONALITY Paraguayan	1	-0.245464	0.942027	-0.26	0.7954
NATIONALITY Russian	1	-0.245464	0.942027	-0.26	0.7954

Table 3: Regression Analysis – WORD CONCERN (Personal Elaboration, 2024).

5.3. MAIN CONCERN – REGRESSION ANALYSIS

Second exploration is based on the analysis among MAIN CONCERN as the dependent factor, and FIELD, GENDER, NATIONALITY, and UNI STUDY, as regressors. SAS's outputs show the weakest results compared to the previous exploration. The model presents an R-squared value of 0.1765, indicating that only 17.65% of the dependent variable is explained by the other determinants. This highlights an unaccounted portion of the model's variability. That said, the R-adjusted value is also weaker, at 0.0524. It serves as a strategic indicator, showing that the inclusion of additional variables does not enhance the model's overall fit. Moreover, the model's F-value (1.42) with a p-value (Pr > F) of 0.1815 indicated that the model was not statistically significant using $\alpha = 0.05$. Most of the individual levels of the regressors do not exhibit any particular statistical significance. Moreover, dots' distribution inside the Scatter-Plot shows deviations from the straight line, in particular at the tails.

In this particular case, we reclassified the regressors into a categorical variable, identifying as a reference MAIN CONCERN no. 13 and WORD CONCERN no.3 as references. This approach does not influence the overall model's results but was essential for outcomes estimation. Research chose no.13 as the three variables were selected in alphabetical order. Instead, no. 3 because it was the most appropriate variable for a direct comparison to BARRIERS.

The Ordinary Least Squares (OLS) regression included 85 observations, with the following statistical results. The first paramount item is the R^2, with a value of 0.2421. This highlights the model's weakness, indicating that only 24% of the dependent variable is explained by the model. This confirms weak statistical significance, also supported by the F-statistic (1.32), which is higher than the 0.05 α value.

For a holistic perspective, it is paramount to analyze all the graphs inside the Fit Diagnostic Table. The first graph is based on the connection between *Residual and Predicted Value (1)*. The purpose in this case was to understand the homoscedasticity, with the residuals fanning out downward. In this case, homoscedasticity was likely violated.

The second graph, related to *Studentized Residual and Predicted Value (2)*, is a standardized version of *Plot* 1, which more clearly detects outliers, confirming the previous interpretation with a strong indication of non-constant variance. *Studentized Residual and Leverage (3)* identified the high-influence observations, with a points distribution in the left area of the plot, between ±2 values.

Normal Q-Q Plot (4), it tried to test if residuals follow a normal distribution. In this case, the points mostly follow the diagonal line, with a slight curve at both ends. In this case, there is a mild non-normality, acceptable. Moreover, the model exhibits weak performance, and the study explains this through the *Observed and Predicted (5)*. The points are widely scattered; several values hit the upper-level boundary = 8. *Cook's Distance Plot (6)*, all Cook's values are < 0.08, and no single observation overly affects the model fit.

The last two graphs are *Histogram of Residual (7)* and *Fit Mins Mean (8)*. The former shows a slightly left-skewed histogram, with peaks at -1.5 and 0, showing a weak normal distribution of the values. Both *Fig*. 7 & 8 show two S-shaped curves, slightly symmetrical, with the intention of a weak fit. Lastly, the *Cumulative distribution of Residuals (9)* shows a non-uniform S-curve. This might be a possible bias or misspecification.

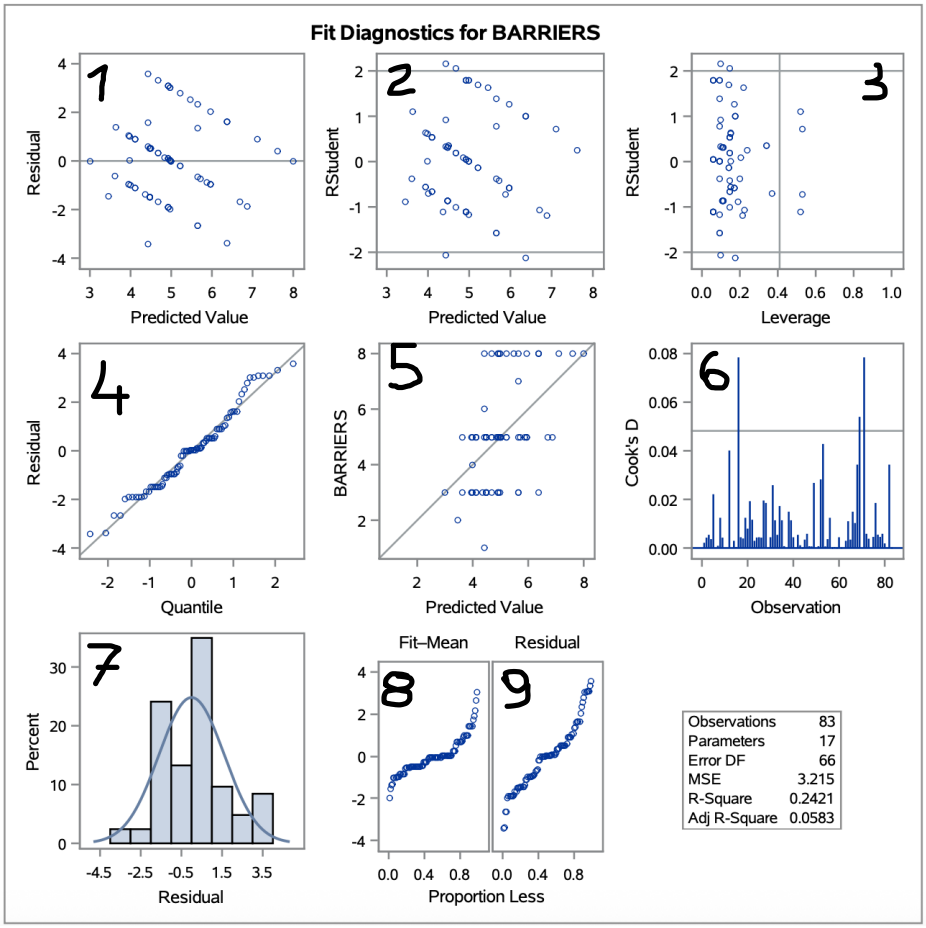


Figure 10: Fit diagnostics for BARRIERS regression analysis (Personal Elaboration, 2025).

5.4. BARRIERS REGRESSION ANALYSIS

Moving forward with the analysis is significant to understand how the BARRIERS selected might be biased, as stated in **H**1 and **H**2. The researcher decided to address the RQs by implementing a new multiple linear regression analysis, using as regressors NATIONALITY, FIELD, and GENDER.

The FIELD residuals appear scattered randomly, showing strong vertical clustering or trend. No FIELD level stands out with extreme positive or negative residuals. The meanings, in this case, highlight no clear pattern and no substantial evidence that FIELD explains the BARRIERS variation. Moving forward with the analysis, the study focused on the NATIONALITY residuals distribution, trying to define a possible connection with the dependent variable.

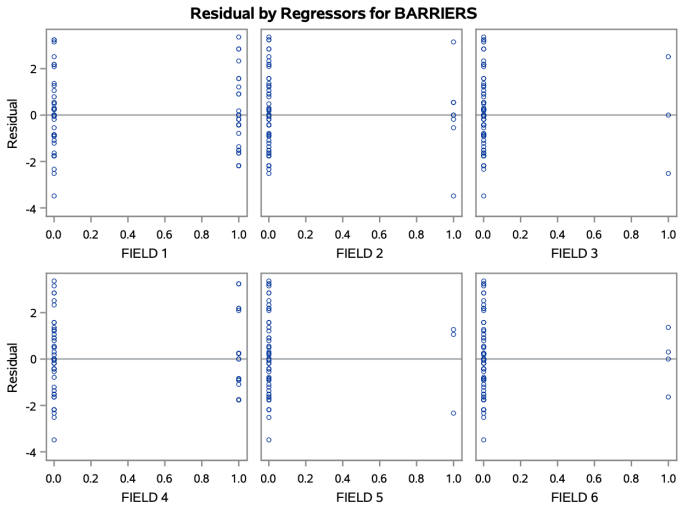


Figure 11: Residual by Regression plot (Personal Elaboration, 2025).

Fig. 11 shows the distribution of residual errors, and the research analyzed all positions for each nationality to determine whether there is a possible connection with the dependent variable.

The study identified three clusters. The first group comprises *Paraguay*, *Chile*, *Bolivia*, *Russia*, *Brazil*, *France*, *Germany*, *Italy*, and *Norway*. Those countries present residuals skewed above zero, indicating that participants selected higher barrier levels than the model predicted. This occurred due to hypothetical cultural or contextual factors that influenced the perceived barriers in this group.

A second cluster comprises *Malaysia*, *Turkey*, and *Kazakhstan*. These countries consistently yield harmful residuals, often below -1, indicating that scholars reported fewer barriers than the model predicted to be present. A possible interpretation of this is a potential bias or misfit.

The *USA*, *Spain*, *Swaziland*, *India*, the *UK*, *Mexico*, and *Ireland* are the countries in the last cluster. In this specific clusterization, the residual distribution is symmetrical and balanced around zero, showing that the model performed as expected.

All the findings appear to be biased and ambiguous in terms of their outcomes. However, the first group has skewed right residuals, rather than the second cluster with left-skewed residuals. These patterns suggest that nationality systematically affects model errors, which the model is unable to fully capture. In conclusion, the model indicates that there are no significant connections or relationships with the dependent variable and suggests exploring further interaction effects between the two variables through a linear regression analysis.

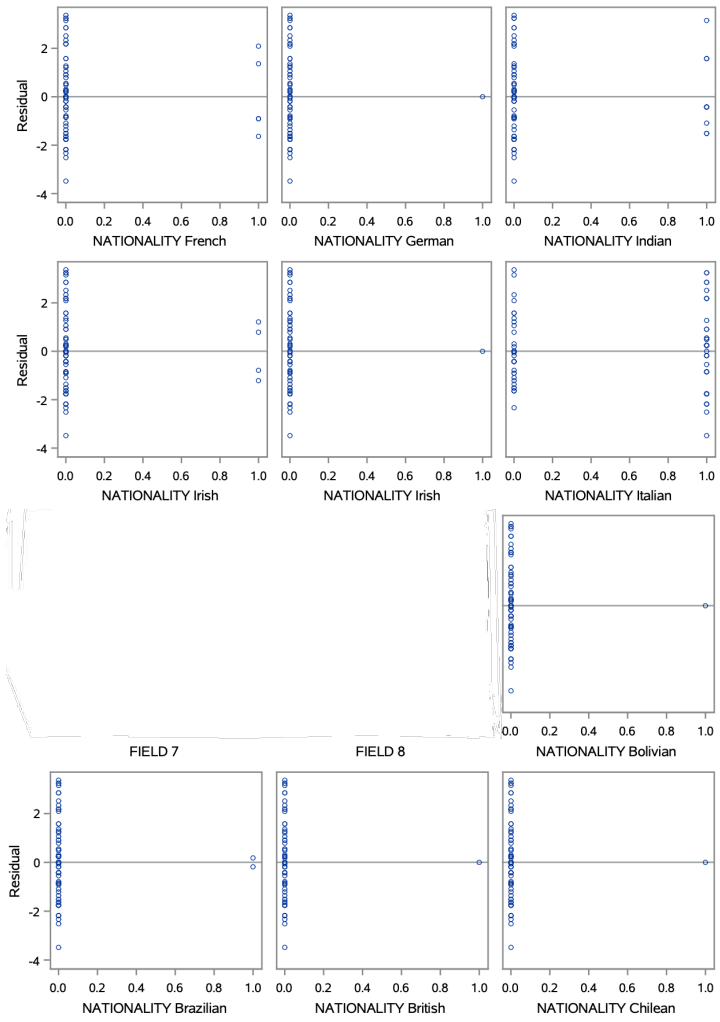
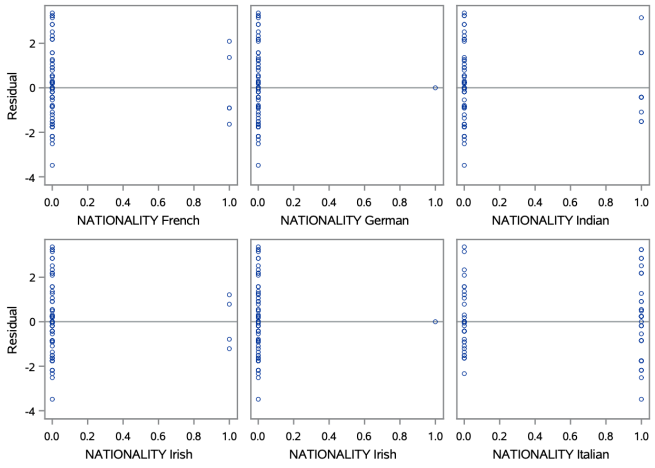


Figure 12: Nationality residual distribution (Personal Elaboration, 2025).



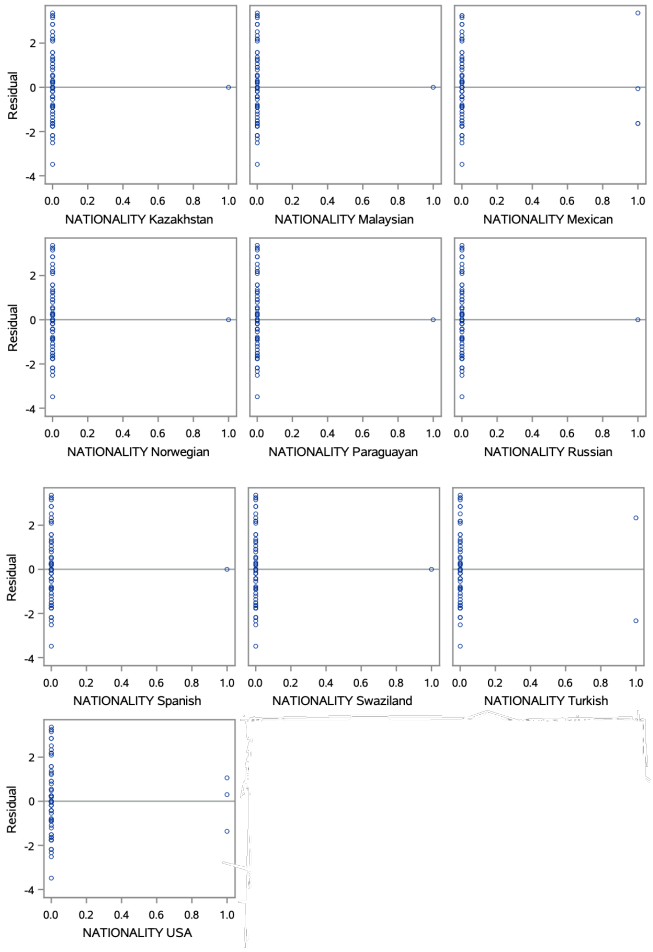


Figure 13: Nationality residual distribution (Personal Elaboration, 2025).

5.5. FIELD CLUSTERS AND BARRIERS

Lastly, for the benefit of this section and the research questions, the paper developed a cluster analysis model. The first step was to reclassify the variables FIELD and BARRIERS into dummy variables with values of 1 and 0, and then run the model for each BARRIERS. Moreover, the BARRIER items were classified into 3 possibilities, linked to the three possible options, and one variable called 'Others', which collects all remaining categories.

5.4.1. HIGH-COST VARIABLE

The results show two insights: when the '*High Cost*' BARRIER is present (= 1) or not (= 0). Firstly, value 0 is studied. 60 was the number of observations, allowing for a strong cluster analysis, rather than 25 selections for value = 1, which is too weak for good clusterization.

The analysis identified two different clusters. The first one grouped *Engineering*, *Health Science*, *Law*, *Social Science*, *Sport Science*, and *STEM* fields. The first field emerged as the dominant variable, with an $R^2 = 0.7734$, and a negative loading (- 0.879), indicating how it drives the model as the weight is higher compared to other variables. On the other hand, *Health Science*, *Law*, and *Sport Science* exhibit minimal shared variance, with an R-squared value of less than 0.002, indicating a weak relationship and a limited contribution to the model.

2 Clusters		R-squared with			
Cluster	Variable	Own Cluster	Next Closest	1-R**2 Ratio	Variable Label
Cluster 1	Engineering	0.7734	0.0005	0.2267	Engineering
	Health Science	0.0183	0.0001	0.9819	Health Science
	Law	0.0183	0.0001	0.9819	Law
	Social Science	0.1468	0.0003	0.8534	Social Science
	Sport Science	0.0059	0.0001	0.9942	Sport Science
	STEM	0.1468	0.0003	0.8534	STEM
Cluster 2	Economics	0.7491	0.0010	0.2512	Economics
	Humanities	0.7491	0.0014	0.2513	Humanities

Figure 14: High Costs clusters indices (Personal Elaboration, 2025).

Lastly, an R^2 of almost 0.14 indicates a weak to moderate relationship. Overall, Cluster 1 is centered around *Engineering*. Cluster 2 is composed of *Economics* and *Humanities* fields, presenting a strong squared multiple correlation within their cluster (0.07491), and with a standardized scoring efficiency of 0.5777, underlining the contribution power of the variables. Moreover, there is a polarized relationship between the factors, as evidenced by the loading results of 0.865 for Economics and 0.865 for Humanities. This contrast might reflect perceptions or experiences with barriers between social science students and humanities students.

On the contrary, for the second cluster analysis, based on a value of 1 for '*High Cost'*, it is not possible to display the dendrogram graph, as the number of participants is too low. In addition, most of the statistical indices present a value close to 0, meaning that there is no clusterization. In this case, the results appear to be ambiguous for all values close to 0, underscoring the need to increase the number of scholars who completed the online questionnaire.

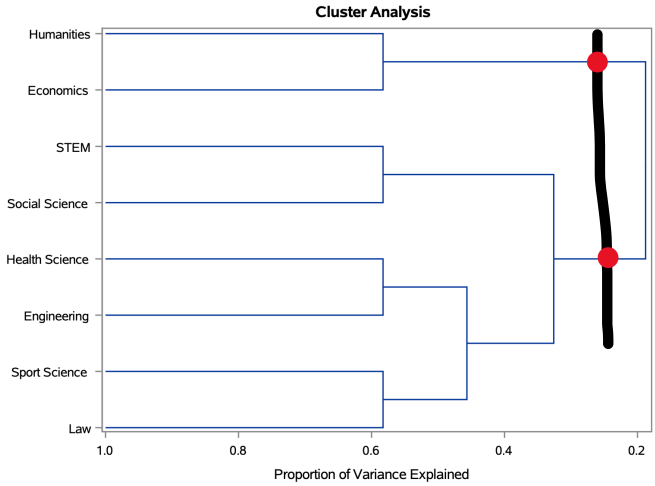


Figure 15: Cluster analysis '*High Cost*' linked to FIELD (Personal Elaboration, 2025).

5.4.2. LACK OF SUPPORT VARIABLE

Moving forward with the clusters, the second is related to the '*Lack of Support'* variable, presenting dummy values (1 – 0). When the variable is 0, *Fig*. 16 shows two possible clusters linked to the FIELD. Cluster 1 included *Engineering* and *Law*, both with a moderate fit value (R^2 = 0.5389) and a 1-R^2 of 0.46, indicating that all the variables fit well with the model. The Second cluster contained more items compared to the previous one. The two most important variables, as explained by the model, are *Economics* and *Humanities*, with their own cluster R^2 scores of 0.8449 and 0.6686, respectively. Despite this, fields do not present a substantial value in terms of fits with the overall model, as the closest fields are *Social Science* (0.9904), *STEM* (0.9904), and *Health Science* (0.9838). Consequently, only *Economics* and *Humanities* have a good fit with the model, whereas all the other variables show a weak fit, based on the R^2 and 1-R^2 values.

2 Clusters		R-squared with			
Cluster	Variable	Own Cluster	Next Closest	1-R**2 Ratio	Variable Label
Cluster 1	Engineering	0.5389	0.0022	0.4621	Engineering
	Law	0.5389	0.0016	0.4618	Law
Cluster 2	Economics	0.8449	0.0007	0.1552	Economics
	Health Science	0.0163	0.0001	0.9838	Health Science
	Humanities	0.6686	0.0003	0.3315	Humanities
	Social Science	0.0097	0.0000	0.9904	Social Science
	STEM	0.0097	0.0000	0.9904	STEM

Figure 16: Lack of support = 0 - cluster indices (Personal Elaboration, 2025).

On the other hand, when the determinant equals 1, *Fig*. 17 illustrates the possible cluster outcomes. Cluster 1 is made up of *Engineering* and *STEM*, with a medium-weak coefficient. A $R^2 = 0.5517$ and $1\text{-}R^2 = 0.4489$, which indicates how the items' fit is moderate in the model, and the relationship with their own cluster is slightly positive.

2 Clusters		R-squared with			
Cluster	Variable	Own Cluster	Next Closest	1-R**2 Ratio	Variable Label
Cluster 1	Engineering	0.5517	0.0019	0.4491	Engineering
	STEM	0.5517	0.0014	0.4489	STEM
Cluster 2	Economics	0.7422	0.0005	0.2579	Economics
	Humanities	0.8176	0.0009	0.1826	Humanities
	Social Science	0.0084	0.0001	0.9917	Social Science
	Sport Science	0.0036	0.0000	0.9964	Sport Science

Figure 17: Lack of support = 1 - cluster indices (Personal Elaboration, 2025).

5.4.3. RESISTANCE VARIABLE

The third cluster is structured with FIELD = '*Resistance*'. In Cluster 1, the *Resistance* is equal to 0. *Engineering*, *Health Science*, *Law*, *Social Science*, *Sport Science*, and *STEM* are the fields of the first group. It is paramount to observe the results of R^2 and $1\text{-}R^2$, which reveal the weakness of the first model, except for the *Engineering* field, which exhibits a strong connection to its cluster and generally good fit with the model. On the other hand, Cluster 2 exhibits good outcomes in terms of fit and explanation, with all values being close to 0 and 1, as a good model should be.

2 Clusters		R-squared with			
Cluster	Variable	Own Cluster	Next Closest	1-R**2 Ratio	Variable Label
Cluster 1	Engineering	0.7134	0.0003	0.2867	Engineering
	Health Science	0.0201	0.0001	0.9799	Health Science
	Law	0.0201	0.0001	0.9799	Law
	Social Science	0.0201	0.0001	0.9799	Social Science
	Sport Science	0.0059	0.0000	0.9942	Sport Science
	STEM	0.3030	0.0002	0.6971	STEM
Cluster 2	Economics	0.7970	0.0010	0.2032	Economics
	Humanities	0.7970	0.0008	0.2032	Humanities

Figure 18: Resistance cluster indices (Personal Elaboration, 2025).

In this case, the paper presents the dendrogram output, showing four possible clusters. Cutting the diagram at 0.6 variance explained, the research identified four different groups. The first one, based on the *Humanities* and *Economics* sciences. Consequently, the other three groups are *Social + Law Science*, *Sport + Health Science*, and *STEM + Engineering Science*. Whether the researcher decided to cut the dendrogram at a lower variance level (0.4), it shows three main clusters: a) *Humanities* and *Economics*, b) *Social* and *Law* sciences, c) *Sport*, *Health*, *STEM*, and *Engineering* sciences.

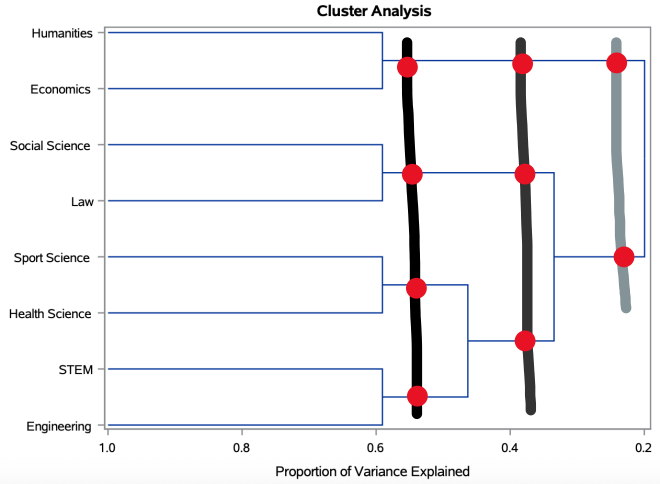


Figure 19: '*Resistance*' cluster analysis - FIELD (Personal Elaboration, 2025).

Lastly, as presented before, whether the graph is cut at 0.2 variance explained value, two clusters are presented: a) *Humanities* and *Economics, b)* All the other programmes.

5.4.4. OTHER VARIABLE

The last outcome is related to '*Other*' as an option, whereas scholars selected and wrote a different type of barriers compared to the three suggested by the survey. The study presents 85 observations, where only 5 participants had values = 1.

First findings were based on '*Other'* = 0. The first cluster is based on two different groups: *Engineering*, *Health Science*, *Law*, *Social Science*, *Sport Science*, and *STEM*. While the second is made by the *Economics* and *Humanities*. However, the percentage of variation explained is lower compared to all the other groups, with a value of 19.80%, indicating a weak explanatory power of the model.

Number of Clusters	Total Variation Explained by Clusters	Proportion of Variation Explained by Clusters	Minimum Proportion Explained by a Cluster	Maximum Second Eigenvalue in a Cluster	Minimum R-squared for a Variable	Maximum 1-R**2 Ratio for a Variable
1	1.584216	0.1980	0.1980	1.203965	0.0000	
2	2.667594	0.3334	0.1806	1.058914	0.0029	0.9971
3	3.704049	0.4630	0.2652	1.025641	0.0466	0.9534
4	4.710939	0.5889	0.5090	0.981984	0.5090	0.4911

Figure 20: '*Others*' = 0 cluster outcomes (Personal Elaboration, 2025).

Moreover, the R^2 and 1-R^2 show a value approximately equal to 0. This is a clear example of an unacceptable model.

In Cluster no. 2, the study discovered three different groups. The first one made by: *Engineering*, *Health Science*, *Law*, and *Sport Science*. *Economics* and *Humanities* as second, lastly, *Social Science* and *STEM* as third. These groups show a higher percentage of explained variation, with 33.34%. That said, $R^2 = 0.0029$ provides research confirmation of the weakness, which is also confirmed by the 1-$R^2 = 0.9971$. The conclusion showed that the cluster is not accountable, although it is stronger compared to the previous one.

Health and *Sport Science – Economics* and *Humanities – Social Science* and *STEM* – and *Engineering* and *Law* are the four groups for the third Cluster. In this case, the percentage of the variance is considerably high, with a value of 46.30%. Highlighting how almost half of the model is explained by all the variables inside. Despite this, the value related to the R^2 is too low for a good fit of the cluster's factors. Although this might be a reasonable starting point for a better exploration and understanding of the connections, it is still too weak for a significant statistical analysis. All the single countries form the last cluster (No. 4). Consequently, the variables appear to be positive and yield better results because the model analyzed single countries in isolation. For this specific study, the fourth output is not taken into consideration.

When '*Other'* = 1, suggested clusters were only two. *Economics* and *Engineering* as Cluster 1, and *Health Science* and *Law* in Cluster 2. This finding is weak and ambiguous, given the small sample size.

2 Clusters		R-squared with		1-R**2 Ratio	Variable Label
Cluster	Variable	Own Cluster	Next Closest		
Cluster 1	**Economics**	0.7041	0.0000	0.2959	Economics
	Engineering	0.7041	0.0000	0.2959	Engineering
Cluster 2	**Health Science**	0.6250	0.0089	0.3784	Health Science
	Law	0.6250	0.0089	0.3784	Law

Figure 21: '*Others*' = 1 cluster outcomes (Personal Elaboration, 2025).

5.5. SDGs – FIELD, GENDER, UNISTUDY

This section is based on the definition and exploration of Sustainable Development Goals, defining possible associations among factors. The survey's question no. 11 (see Annex 2) gave seven options, and participants must select a minimum of two SDGs. That said, the paper reclassified variables with two different parameters.

The first reclassification was made on all replies, classified in 39 different groups, assigning a value from 1 to 39 to each possible arrangement. Secondly, using the Culture closest SDGs as drivers, based on the Yildirim *et al*. (2019) paper, a dummy reclassification was conducted. The authors suggested that the most culturally relevant SDGs were numbers 4,5,8,10,11,16, and 17. The limit for the following analyses was the obtained drivers based on the following SDGs: 7, 6, 13, 12, and 11. In this specific case, since none of the SDGs identified in the survey align with those deemed most culturally relevant, the most plausible classification was to select them based on their position as the first available options.

Meanwhile, dummy analyses were run using Excel, with the following formula: =IF(AND(M2 > x, M2 <= y), 1, 0). Where M2 is the column with the classification of the 39 replies, and x|y are the numbers that should drive the formula for the final reclassification. They were assigned 1 and 0 values. This approach was implemented for all clusters, except for the first one, where it was not necessary to define a maximum and minimum, but only an above and a below value [=IF(M2 <= x, 1, 0)]. Subsequently, the study defined a combination in terms of bonds, along with other variables in the model.

SDG driver	No. replies	SDGs in the cluster
7	1 > 11	7 - 11 - 12 - 13 - 14
6	12 > 28	6 - 7 - 11 - 12 - 13 -14 -15
13	29 > 30	13 - 14
12	31 > 34	12 - 13 - 14
11	35 > 39	11 - 12 - 13 -14

Figure 22: Five SDGs' clusters (Personal Elaboration, 2025).

An analysis was conducted using this data, involving two multiple regression analyses. The former tries to uncover whether there is a possible influence related to the choice of the SDGs, based on FIELD. It was based on delving into the SDGs with only the first re-classification step, without considering any dummy level. Unfortunately, no type of connection was discovered, with the primary variable showing an R^2 of 0.0044 and an R-adjusted of -0.0198.

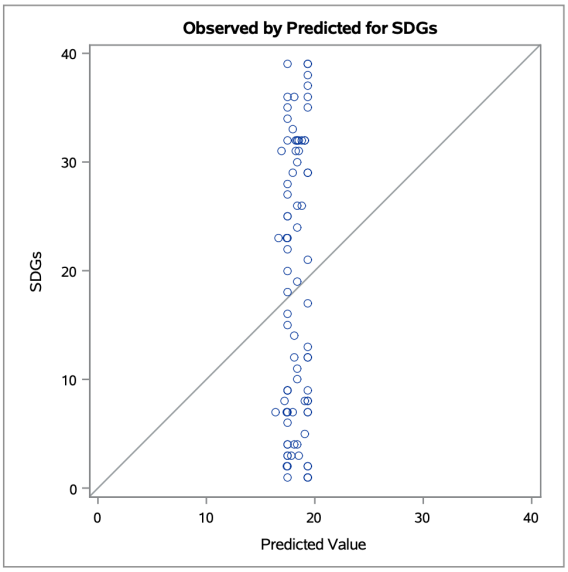


Figure 23: Scatter-Plot multiple regression analysis (Personal Elaboration, 2025).

Additionally, the distribution of the points in *Fig.* 23 confirms the absence of a strong connection among the variables.

The study is unable to state how a university background might influence the SDG items. Consequently, it is not possible to obtain a clear reply to **RQ**1 for the specific section.

Based on the previous outcomes, the research also attempted to incorporate various regressors from the dataset to provide evidence of stronger interconnections. The exploration inquired about variables related to GENDER and the differences between affiliation to an Italian or Irish University (UNISTUDY). Additionally, this analysis reveals an absent and negative connection.

Parameter Estimates						
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	17.79270	6.28994	2.83	0.0059
GENDER	GENDER	1	1.47198	2.84015	0.52	0.6057
UNI STUDY	UNI STUDY	1	-1.25979	2.75383	-0.46	0.6485

Figure 24: Parameter estimates multiple regression analysis (Personal Elaboration, 2025).

Furthermore, the p-values are higher compared to the α (0.05), highlighting a non-statistical significant model. Therefore, the model is also unable to define strong and specific outcomes for the previous regression. *Fig.* 24 confirms the weak and negative affinity with the regressors. The latter assessment was implemented by analyzing all five dummy clusters. The evidence obtained demonstrated that correlations are absent in both procedures.

5.6. SDGs – MAIN CONCERN, WORD CONCERN

For a holistic perspective, the last SDGs' investigation underlines the possible influences of MAIN CONCERN and WORD CONCERN. The model's weakness is confirmed, as before, by the R^2 (0.0198), R-adjusted (-0.0042), and further by the p-values of 0.2888 and 0.5986, which are higher than the $\alpha = 0.05$ threshold. *Fig*. 25 interpretation proposes that the impact of a 1-unit increase in the two regressors is slightly positive for the former (0.35705) and negative for the latter (-0.87628).

Parameter Estimates						
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	18.12481	4.68183	3.87	0.0002
MAIN CONCERN	MAIN CONCERN	1	0.35705	0.33441	1.07	0.2888
WORD CONCERN	WORD CONCERN	1	-0.87628	1.65828	-0.53	0.5986

Figure 25: Parameter estimates multiple regression analysis (Personal Elaboration, 2025).

The paper's recommendations draw attention to the absence of a direct influence on the SDGs selection, highlighting the possible influences defined by **RQ**1. *Fig*. 25 clearly shows the absence of any molds among the factors.

5.7. BUSINESS AND GEO INFLUENCES

In this section, the study aims to investigate whether a cultural background derived from geographic location may introduce bias in business. The study focuses on the geographical combo among the three different areas: America, Europe, and Asia.

As done before, a reclassification step was also necessary for the cluster analyses. As a categorical variable, a numerical re-classification was first conducted, assigning a value from 1 to 4 based on the selection scholars made. Secondly, four different columns (namely *ClusterBu1, ClusterBu2, ClusterBu3, and ClusterBu4*) were assigned a value of 0 (replies absent) and 1 (replies present) for the dummy classification. Furthermore, each cluster was assigned the role of '*variable to cluster*', while nationality was run as '*group analysis by*' in the SAS platform.
The survey presents the following question:

Survey's question:
Do you think businesses will naturally integrate sustainability, or will they require strict regulations to do so?

Options:
1. Businesses will naturally adapt to sustainability for long-term success;
2. Strict regulations will be necessary to ensure compliance;
3. A mix of both - some businesses will lead, others will need enforcement;
4. I do not think businesses will ever fully embrace sustainability.

America was the first geographic area under examination (*Brazil, Bolivia, Chile, Mexico,* and the *USA)*. It presents two different groups: *ClusterBu2* - *ClusterBu3* and the solitary *ClusterBu4*. Indices for Cluster 1 are positive, with an $R^2 = 0.9226$ and a ratio of 0.0828 for *ClusterBu2*, while *ClusterBu3* has an $R^2 = 0.9226$ and a $1\text{-}R^2 = 0.0852$. The limit is on *ClusterBu4*, albeit the variable is connected with itself, showing 1 as R^2 and 0 as the difference $1\text{-}R^2$. Paramount is how *ClusterBu1* is empty in terms of replies, meaning that participants from the American area never selected *businesses, will naturally adapt to sustainability for long-term success*.

2 Clusters		R-squared with		1-R**2 Ratio	Variable Label
Cluster	Variable	Own Cluster	Next Closest		
Cluster 1	ClusterBu2	0.9226	0.0649	0.0828	ClusterBu2
	ClusterBu3	0.9226	0.0909	0.0852	ClusterBu3
Cluster 2	ClusterBu4	1.0000	0.0006	0.0000	ClusterBu4

Figure 26: America cluster indices (Personal Elaboration, 2025).

Europe has 58 observations, grouped in two main Clusters, namely Cluster 1 and Cluster 2. The former has *ClusterBu2* and *ClusterBu3,* the latter *ClusterBu1* and *ClusterBu4*. The main difference, compared to the above analysis, is that all the possible options are present inside the grouping.

2 Clusters		R-squared with		1-R**2 Ratio	Variable Label
Cluster	Variable	Own Cluster	Next Closest		
Cluster 1	ClusterBu2	0.8240	0.0078	0.1773	ClusterBu2
	ClusterBu3	0.8240	0.0161	0.1788	ClusterBu3
Cluster 2	ClusterBu1	0.5500	0.0014	0.4506	ClusterBu1
	ClusterBu4	0.5500	0.0049	0.4522	ClusterBu4

Figure 27: Europe cluster indices (Personal Elaboration, 2025).

Moreover, the overall model fits better among the variables, showing a medium-high R^2 and consequently a low level of 1-R^2. A high number of available data points enabled the creation of a dendrogram (*Fig*. 27), which helps the researcher gain valuable insights. Thanks to the tool, it is possible to define two possible cutting strategies. The first one is related to the four single clusters, whether the cutting is made below 0.7 of the explained variance proportion. The second selection arrived from a cutting done above a 0.7 value of variance explained, as it decreases.

Asia (*India, Kazakhstan, Malaysia, Russia,* and *Swaziland*) does not show any cluster indices; the dataset is not varied enough to indicate multiple distinct clusters. 15 are the observations, all concentrated in *ClusterBu2* and *ClusterBu3*. Applying 'Principal Component-Based Variable Clustering', outcomes do not present any strategic insights. The study also tried to apply the K-means method, despite no clusters being found.

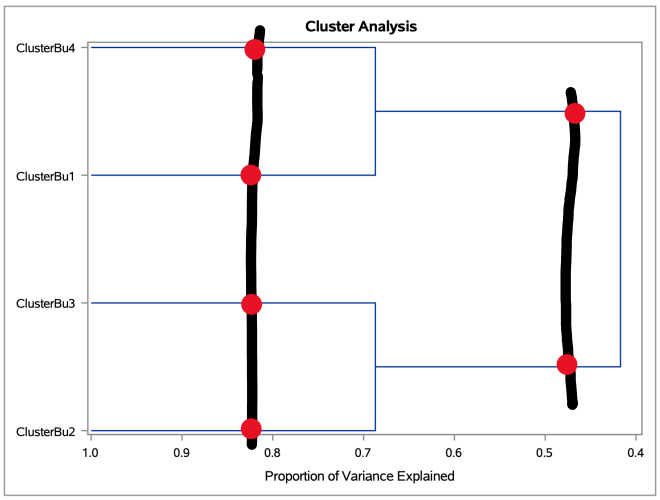


Figure 28: Europe dendrogram clusters (Personal Elaboration, 2025).

As the quantitative analysis did not report any insights, the researcher decided to implement the study with data from 'The Culture Factor | GROUP (2025)'. Only the first four countries were considered, whereas *Swaziland* is not included in the index. The dataset offers six different parameters standardized (0 – 100): 1) *Power Distance,* 2) *Individualism,* 3) *Achievement & Success,* 4) *Uncertainty Avoidance,* 5) *Long Term Orientation,* and 6) *Indulgence.* Countries' individualism displays a low level between 20 and 27 for *India, Kazakhstan*, and *Malaysia*. Rather than *Russia*, with a value of 46, meaning that the population is slightly more individualist. The last pertinent variable is number 3, germane to how motivation led people to achieve success. Again, the first free countries obtained roughly the same values (from 50 to 56), instead of *Russia*. It has 36 points, emphasizing the importance of caring for others' lives over one's success. These results may suggest a possible interdependency with the replies obtained; however, the analysis does not clarify how this is possible. Refer to the discussion chapter for a more detailed elaboration.

5.8. COLLABORATION AND GEO INFLUENCES

In the following section, the study aims to illustrate whether the cultural background is associated with the GEO variable. The first step was to categorize the four different options provided by the survey, ranging from categorical to numerical variables. Secondly, four new columns were introduced with dummy values (0 - 1), indicating whether the selection was present or not. This enables the cluster assessment. The focus is on the geographical combo among the three different

areas: America, Europe, and Asia. The survey presents the following questions, and no scholars selected option no. 4; consequently, it was deleted from the cluster inspection.

Survey's question:

Do you think achieving global sustainability is more dependent on government policies or corporate initiatives?

Options:

1. Government policies and regulations;
2. Corporate initiatives and private sector innovation;
3. A balance of both;
4. Neither government policies nor corporate initiatives.

America has 12 observations and two main groups: Cluster 1 and Cluster 2. The table below presents the statistical indices, which depict a very high R^2 value of 0.9999 for Cluster 1 (*ClusterCo1* + *ClusterCo2*), with a corresponding positive consequence for 1-R^2 (0.1121 – 0.0946). The meaning is that variables fit very well with the model. Instead, Cluster 2 (*ClusterCo2*), being a single variable clusterized with itself, presents $R^2 = 1$ and 1-$R^2 = 0$.
Scholars from GEO in America mostly believe that a Collaborative strategy is needed to reach a more sustainable environment, with the engagement of both stakeholders (government & private sector). Moreover, more than 25% of the selected observations indicated that government policies and regulations alone might be insufficient for a sustainable environment.

2 Clusters		R-squared with		1-R**2 Ratio	Variable Label
Cluster	Variable	Own Cluster	Next Closest		
Cluster 1	ClusterCo1	0.9082	0.1818	0.1121	ClusterCo1
	ClusterCo3	0.9082	0.0303	0.0946	ClusterCo3
Cluster 2	ClusterCo2	1.0000	0.0175	0.0000	ClusterCo2

Figure 29: America cluster indices (Personal Elaboration, 2025).

GEO = Asia, reports two main Clusters made by: *ClusterCo1*, *ClusterCo3,* and *ClusterCo2.* Cluster 1 shows the highest number of participants, indicating that people tend to believe in a balance between corporate and private initiatives.

2 Clusters		R-squared with		1-R**2 Ratio	Variable Label
Cluster	Variable	Own Cluster	Next Closest		
Cluster 1	ClusterCo1	0.9146	0.1964	0.1063	ClusterCo1
	ClusterCo3	0.9146	0.0179	0.0870	ClusterCo3
Cluster 2	ClusterCo2	1.0000	0.0262	0.0000	ClusterCo2

Figure 30: Asia cluster indices (Personal Elaboration, 2025).

GEO = Europe insights, demonstrating equal results in terms of clusterization.

All three geographical areas showed an increase in the proportion of total variation when moving from one to two clusters. Despite this, the last assessment, related to **RQ**1, was unable to provide any valuable recommendations regarding a possible geographic influence.

2 Clusters		R-squared with		1-R**2 Ratio	Variable Label
Cluster	Variable	Own Cluster	Next Closest		
Cluster 1	ClusterCo1	0.9438	0.1036	0.0627	ClusterCo1
	ClusterCo3	0.9438	0.0226	0.0575	ClusterCo3
Cluster 2	ClusterCo2	1.0000	0.0078	0.0000	ClusterCo2

Figure 31: Europe cluster indices (Personal Elaboration, 2025).

In all three outcomes, Cluster 2 is alone, showing a consequent R^2 pair of 1 and $1 – R^2 = 0$, indicating that the variable fits perfectly. This is a model bias and a limitation that must be addressed in future research by exploring new options or by gaining a deeper understanding of what survey participants think behind their selections. Also, it is important to increase scholars number.

5.9. TRIPLE LAYERED BUSINESS MODEL CANVAS

A targeted qualitative analysis was conducted by applying the TLBMC framework (Joyce & Paquin, 2016) to interpret the statistical findings. This approach enabled a structured exploration of how sustainability dimensions manifest differently across economic, environmental, and social layers.

As an initial outcome, the Economic layer provided only three items, out of 9, that demonstrated analytical relevance. Firstly, the *Value Proposition* was reinterpreted beyond its conventional business meaning, referring instead to the type of value scholars attributed to sustainability. The findings suggest that quantitative analyses reflect variations in how sustainability is perceived among different nationalities, providing partial support for **H**1. *Customer Segments* were also reinterpreted in the context of this field, reflecting the survey's sample composition. Instead of highlighting the market-oriented categories, it refers to the diverse scholarly group, differentiated by both geographical and disciplinary backgrounds. This section supports **H**1, emphasizing the importance of having a mixed cultural sample to investigate variations in sustainability perceptions.

Economic	
TLBMC Item	**Application Based on Results**
Value Proposition	Sustainability integration is perceived differently by regions and disciplines.
Customer Segments	Target segments vary across geographic and disciplinary backgrounds. Students in social sciences show more critical concern for sustainability strategies.
Channels	Educational platforms and institutional frameworks are essential to communicate sustainable topic, especially in *high power-distance* countries.
Customer Relationships	-
Revenue Streams	-
Key Resources	-
Key Activities	-
Key Partnerships	-
Cost Structure	-

Figure 32*:* TLBMC Economic layer (Personal Elaboration, 2025).

Lastly, the *Channels* element introduced a hybrid approach, where the paper assumed a partial role, with its conventional interpretation in the literature. According to Alshammary & Alhalafawy (2023), the determinant supports the findings of researchers, but also introduces a new element related to Hofstede's (2001) parameter.

The second analytical layer added in the study aimed to interpret the statistical findings through an Environmental lens. Understanding of how sustainability is linked to behaviours and perceptions aligns with the ecological dimensions of TLBMC. The *Functional Level* highlighted how sustainability is perceived (Osterwalder & Pigneur, 2010), revealing patterns that exist today

and may be useful for policymakers to consider when developing their strategies. However, no type of confirmation was reached regarding **H**1 and **H**2. *Production* is defined as the way participants believe sustainability is implemented in practice (Osterwalder & Pigneur, 2010). Specifically, in this part, it was analyzed how institutions and private enterprises can support a more sustainable context. In this case, the quantitative analyses did not reveal a specific relationship or influence among the variables, and consequently, the *support for **H**1 and **H**2 remains ambiguous.*

Environmental	
TLBMC Element	**Application Based on Results**
Functional Value	The discovering of patterns that might be able to developed new strtategies more coherent to new generation.
Materials	-
Production	Strategies should be aware about the differences regulatories context.
Distribution	Geographical clusters with higher SDG awareness (e.g., Europe). Also the study does not found interesting patterns.
Use Phase	-
End-of-Life	-
Environmental Impacts	-
Environmental Benefits	-

Figure 33: TLBMC Environmental layer (Personal Elaboration, 2025).

Last domain, *Distribution*, according to the authors Osterwalder & Pigneur (2010), is related to the distribution responsibility. The study does not find any particular findings or specific patterns in the area, and all other elements have a substantial theoretical mismatch.

The final section of the framework is the Social layer, which emerged as the most salient and contextually aligned with the sustainability concept.

Social Value reflects the collective ethical and societal significance that scholars relate to sustainability. The study can state that the sustainability topic is not defined in the same way by all the participants. However, it is not entirely clear how exogenous cultural determinants can impact the sustainable perspective.

Societal Culture is related to the deeply rooted cultural norms. This allowed the study to add Hofstede's (2001) variables. Meanwhile, the social layer suggests that a possible top-down

strategy might be more effective for countries with high *power distance* values, rather than those with low *collectivist Culture* scores.

Stakeholder Involvement, thanks to survey responses, the study can conclude that most scholars believe in a collaborative environment between governance and private actors.

The *Scale of Outreach* is based on how broad scholars' perception of responsibility is. While data does not conclusively identify regional distrust in corporate initiatives, American respondents might suggest fragmented outreach or varying degrees of institutional trust. *End-user involvement*, as indicated by survey results, suggests significant regional variation. European students, shaped by cultural and educational frameworks, show stronger responsibility and engagement. Asian students are aware but more institutionally dependent, while American views vary between trust in governance and shared models. These results highlight how cultural and educational systems can shape the perceived and actual involvement in sustainability initiatives. *Social Impact* emerged as a culturally contingent element in the analysis. European participants linked sustainability to tangible societal improvements. Asian, more with social benefits and institutional responsibility, while Americans are more polarized. *Social Benefits* have a multifaceted but irregularly distributed perception across the surveyed regions. European participants identified sustainability as a collective source, rather than Asians, who seem to use a more pragmatic lens, emphasizing the institutional or economic side rather than broader societal equality. Again, Americans reflect on inconsistencies in how sustainability is communicated and embedded.

Social	
TLBMC Element	**Application Based on Results**
Social Value	Sustainability is not universlly definied, it's social value si slighlty shape by the cultural dimensions. Despite this, literature needs further researches.
Employee Practices	-
Societal Culture	High power distance and collectivist cultures (e.g., India, Malaysia) may require top-down approaches to foster sustainability.
Stakeholder Involvement	The research confirms that a collaborative governance model (business + government) resonates more across all regions.
Scale of Outreach	Institutional support must vary by country context: stronger regulation might be need in regions with limited corporate trust (e.g., Latin America).
End-User Involvement	Perceived efficacy of business in sustainability is weak in some regions - trust building and participatory models are needed.
Social Impacts	Cultural bias in interpreting sustainability necessitates tailored interventions that resonate with specific national values.
Social Benefits	SDG visibility and framing need to be aligned with what is culturally perceived as success, duty, or collective progress.

Figure 34: TLBMC Social layer (Personal Elaboration, 2025).

6. DISCUSSION

The discussion section aims to determine whether the previous exploration supports or refutes the two main hypotheses defined during the literature review. Culture was the specific variable hypothesized as a driver that might influence the sustainability perspective; despite this, some control variables were also added to run a more comprehensive model.

6.1 REGRESSIONS

As a first regression, the paper presents the following determinants:

$$\text{WORD CONCERN} = y$$

$$\text{FIELD, GENDER, NATIONALITY, and UNISTUDY} = x^{1,2,3,4.}$$

Results obtained showed how factors as NATIONALITY and UNISTUDY do not show any particular connection with the independent determinants. However, some differences emerged, suggesting that participants from certain countries - the USA, France, the UK, and Germany - may interpret or prioritize sustainability language differently. This highlights the possibility that NATIONALITY and cultural context play a subtle role.

Overall, the first regression cannot strongly confirm **H**1 and **H**2, but it might be a first milestone for further explorations. In addition, the specific role of the other control variables, which are also conceptually linked to cultural background, is ambiguous regarding how they can affect the sustainability language. Limitations are related to the high number of regressors inside the model, which might negatively influence the outcomes and also pose a potential violation of key assumptions, including non-normal residuals and homoscedasticity issues. For further research, we suggest reducing the variable in the model and running linear regression with specific items linked to the Culture concept.

The second regression structure:

$$\text{MAIN CONCERN} = y$$

$$\text{FIELD, GENDER, NATIONALITY, and UNISTUDY} = x^{1,2,3,4.}$$

In this case, the outcome reinforced the idea that basic demographic and educational variables may be insufficient to explain individual concern levels about sustainability, and that a more targeted set of psychological, experimental, or value-driven variables might be necessary to develop a clear

understanding. The weakness of the model also indicates how MAIN CONCERN is likely influenced by other, more context-specific factors not captured in the analyses. Studying the data related to the **RQ**s is essential for this section to highlight an ambiguous and weak relationship, making it impossible to confirm the hypotheses **H**1 and **H**2.

The third regression was done with:

$$\text{BARRIERS} = y$$

$$\text{NATIONALITY, FIELD, GENDER} = x^{1,2,3.}$$

The model does not exhibit a particular connection among the variables that can explain a possible influence. Despite this, the residual analysis reveals systematic patterns across nationalities, highlighting that cultural or contextual factors might still influence participants' responses in ways not fully captured by the current model. Again, these patterns suggest that nationality systematically affects model errors, but the model is unable to capture this effect fully.

The benefits are related to the fact that it was able to capture how NATIONALITY might play a crucial but ambiguous role, which is not addressed in the pattern. This is the first step in exploring a better connection with other variables in future research, suggesting how they might benefit from interaction terms or adopting a multilevel modeling approach. Otherwise, the frame replied positively to **H**1, partially confirming the stated information. On the other hand, **H**2 was explored with the FIELD regressor, but it was not confirmed to influence BARRIERS. This underlines a lack of systematic influence of academic discipline on perceived sustainability barriers, meaning that different university programme backgrounds do not significantly explain variation. In conclusion, we are unable to confirm or reject **H**2, suggesting that future studies should use more specific variables. Lastly, GENDER was seen as part of Culture, and it is represented within the model as an explanatory variable. No connections were found, underlining how gender as a cultural element does not influence any choices in the survey.

6.2. FIELD CLUSTERS

The first cluster exploration was based on; BARRIERS variable, namely '*High Cost*' (see Annex 1), which defined new patterns that might support **H**1 and **H**2.

The identification of two main Clusters suggests that disciplinary background plays a notable role in shaping how students perceive obstacles to engaging a more sustainable business environment.

The dominance of *Engineering* (Cluster 1) is strategic, as it may suggest how scholars from the technical field can experience or perceive fewer financial limitations. A possible explanation can be attributed to a more effective way to allocate resources and greater exposure to applied problem-solving, which may normalize sustainability as part of their academic and professional development. *Health Science*, *Sport Science*, and *Law*, in contrast, suggested a more heterogeneous perception of cost barriers, without making a significant contribution to the model.
Cluster 2 presents a polarized perspective, with high and opposite factor loadings. *Economics* may be closer to the concept of efficiency and rationality, while the *Humanities* may employ a more ethical approach in evaluation. In this case, the divergence supports **H**2, confirming that different university programmes contribute to different sustainability perspectives.
When the '*High Cost*' variable = 1, a specific reply was stored in the database as a barrier. These insights may suggest that perceptions are more contextual or individually shaped rather than structurally embedded within disciplines. However, the small sample size limits statistical inference, and further data collection is necessary.

Secondly, the '*Lack of support*' assessment partially supports **H**2. *Economics* and *Humanities* demonstrate a more cohesive understanding of institutional barriers, such as '*lack of support*', perhaps due to their exposure to theoretical and societal discussions surrounding sustainability. Conversely, *STEM* and *Engineering* suggest that the reply distribution is less uniform. This implies that an academic background shapes how students interpret and experience systemic challenges to sustainability engagement, thereby validating the hypothesis, albeit not universally across all fields. Concerning **H**1, these specific findings offer indirect insights. The absence of strong clusters when the barrier is present (values = 1) might suggest that fields alone are insufficient to explain the perceived lack of support. This allowed cultural or contextual factors to play a complementary role in shaping student perceptions.

The last possible option was '*Resistance'*. The dendrogram-based hierarchical clustering offered an additional layer of interpretation, reinforcing the presence of consistent patterns at varying thresholds of variance explained. Overall, the findings in the analysis section demonstrated support for **H**2, indicating that university programme background influences students' perceptions of sustainability barriers. Moreover, the stable clustering of specific disciplines across multiple

analytical thresholds strengthens the argument for field-specific strategies in addressing perceived institutional resistance to sustainable practices and policies within higher education.

Findings from the previous section attempt to conceptualize how FIELD might influence the BARRIERS. Although the clusters were reclassified as dummy factors, it is possible that the definition of insights was affected. In conclusion, these insights suggested targeted interventions tailored to the disciplinary context. Efforts to foster sustainability engagement should avoid a '*one-size-fits-all*' approach and instead consider how different academic environments foster distinct narratives and levels of responsiveness. All things considered, when the variable's value is 0, the outputs highlighted in the study FIELD seem to introduce a systematic bias in the visualization and interpretation of BARRIERS.

6.3. SDG REGRESSION

SDG regressions highlight a substantial lack of statistically significant relationships between Sustainable Development Goals and all the other independent determinants: FIELD, GENDER, UNISTUDY, MAIN CONCERN, and WORD CONCERN. One of the limits was related to the reclassification activities into dummy variables. Although necessary for the regression analysis, this process may have oversimplified the complex individual motivation behind SDGs preferences. Additionally, the order of the SDGs presented in the survey may have introduced a significant bias, as respondents appeared to select the first few listed options more frequently, regardless of their cultural or academic relevance. This procedure increases the likelihood of hindering the model's ability to detect patterns. This thesis demonstrates an absence of influences on any choice in terms of SDGs selection by the UNISTUDY, GENDER, FIELD, MAIN CONCERN, and WORD CONCERN.

6.4. BUSINESS AND GEO CLUSTER

Clustering analysis across geographic regions reveals potential cultural biases in perceptions of sustainability. Firstly, American respondents never selected the first option in the survey, while European respondents were more evenly distributed, allowing a stronger model explanation. The first diversity might be attributed to Europe's more mature sustainability discourse and legal regulatory environment. Unfortunately, in Asia, the limited and homogeneous dataset restricted

any meaningful clustering, underscoring the importance of larger and more balanced samples in cross-cultural research.

6.5. COLLABORATION AND GEO CLUSTER

The geographical analysis, clustering by the GEO variable, revealed regional variations in perceptions regarding the drivers of global sustainability. In all three regions, Cluster 1 was the most selected. Isolated single-variable clusters, on the other hand, point to a lack of diverse responses and a structural bias in the cluster model, which is probably caused by an uneven sample size and few unique responses.

The study uses the 'The Culture Factor Group | 2025' index to make sense of these patterns. Asian countries are characterized by high *Power Distance* and *Low Individualism*, which means that people are more likely to support state-led or collaborative sustainability strategies. This is because they are more prone to support collective responsibility and hierarchical governance. European countries may also have more nuanced views, accepting both new ideas and rules. The American cluster is the only one that seems to be different, with higher levels of achievement and individualism. This could explain the slight preference. Only the American cluster seems to be in contrast, with higher individual and achievement levels, which might explain the slight preference for government over collaborative or private solutions.

For the last section, findings related to **H**1 and **H**2 provide only partial support for both hypotheses. Based on **H**1, statistical models are insufficient to confirm a direct or significant causal relationship. Similarly, **H**2 defined limited evidence of apparent cultural influence. Despite a visible tendency across all regions to prefer collaboration between governments and business, the high R^2 values for single-variable clusters and low response variability constrain the model's explanatory power.

7. CONCLUSION

This thesis aimed to investigate the potential influence of cultural elements on perceptions of sustainability and SDG prioritization. Although analyses revealed some regional and disciplinary patterns, they do not provide sufficient evidence to fully support the hypothesized relationships (**H**1–**H**2).

Overall, the study provides only partial support for **H**1 and **H**2, and partial responses to **RQ**1 and **RQ**2. It reveals that while cultural and academic backgrounds may shape general perceptions of sustainability, they do not have a statistically significant influence on prioritizing SDGs or concerns about sustainability. Some contextual and disciplinary patterns are revealed by clustering and regression analyses; however, the strength of this conclusion is limited by sample size, data structure, and model sensitivity limitations. However, the study highlights the intricacy of sustainability engagement by indicating that, even in cases where the difference is not statistically significant, cultural factors may marginally influence attitudes. In addition, the methodological approach, which included regression and cluster assessments, provided a structured means of exploring these dynamics, albeit with limitations in sample size.

Based on TLBMC, two layers defined limited analytical alignment, while the *Social* level highlighted important enhancements in viewing the framework from a sustainable side. *Economic* and *Environmental* layers, partially supported hypotheses, showing an empirical lack and a mismatch between the model and available data. The *Economic* TLBMC layer shows a misalignment across most of the parameters. These elements fall outside the analytical scope and do not contribute significantly to the interpretation through the TLBMC framework.
However, *the Social* layer offered a valuable lens for exploring sustainability more effectively, combining data collected and qualitative assumptions. Otherwise, the model may require further exploration to achieve a stronger match among layers, defining not only horizontal coherence (between items' layers) but also vertical coherence (Marcovecchio & Kawuma, 2017).

7.1. RECOMMENDATIONS

Based on the findings of this study, several recommendations are made for different actors around environmental policies and education. Educational institutions, as universities and secondary

schools, are encouraged to develop innovative pedagogical approaches for integrating the TLBMC into entrepreneurship and sustainability curricula. This integration can foster a holistic understanding, giving scholars a new critical perspective. Moreover, academic stakeholders are advised to extend the scope of research on this topic by employing larger, more diverse sample populations and adopting a mixed-methods approach. Lastly, policymakers should consider the development of regionally contextualized case studies that reflect local and social dynamism.

7.2. FUTURE WORKS

For further research might be helpful to integrate different cultural indices, for instance, Schwartz Cultural Model (2004), with Hofstede's (2001) research. To enhance the outcomes is suggested to increase the sample size for stronger results, and also define the research structure on the dataset that already exists, related to Culture and sustainability, to avoid numerical re-classification.

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9. APPENDIX

ANNEX 1 – VARIABLE NAMES & RECLASSIFICATION

In the following Annex, all the possible thesis acronymous are presented in alphabetical order.

BARRIERS: underlines possible barriers to achieving a sustainable environment.
Options:

- *High-Cost*: High cost of sustainable solutions;
- *Lack of Support*: Lack of government support;
- *Resistance*: Resistance from the business.

COLLABORATION: showcases the best option for collaboration between the private and public sectors.

FIELD: highlights different university programmes.

GENDER: show sex identification of participants.

MAIN CONCERN: which is the Sustainability aspect that concerns you most.

NATIONALITY: nationality of participants.

SDG: demonstrated what is/are the most challenging European Union Sustainable Development Goals, for participants.

UNISTUDY: defined two possible options: Italian Universities or Irish Universities.

WORD CONCERN: depicted the most representative word linked to sustainability.

ANNEX 2 INVITATION LETTER – SURVEY

In the following Annex, the survey used for the study is attached. Below the Google Survey's link:https://docs.google.com/forms/d/1yfCCBeDxRxiiM4ODoHyKmm0dkDqiOyzZoWyMp5Vx02s/edit