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Coastal Resilience and Sustainability

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SADRŽAJ / CONTENTS

ORIGINAL SCIENTIFIC PAPERS

Josipa Perkov, Marijana Jerić

DATA STORYTELLING AS A TOOL FOR THE ACCEPTANCE OF
SUSTAINABLE FISHING PRACTICES IN SMALL-SCALE FISHERIES 5

University of Zadar, Department of Economics, Zadar, Croatia

Miguel Ángel Latorre Guillem, Marijana Jerić

GEOGRAPHICAL AND ECONOMIC DRIVERS OF GLOBAL
UNIVERSITY ESG SCORES 26

*Catholic University of Valencia "San Vicente Mártir", Valencia, Spain
University of Zadar, Department of Economics, Zadar, Croatia*

DATA STORYTELLING AS A TOOL FOR THE ACCEPTANCE OF SUSTAINABLE FISHING PRACTICES IN SMALL-SCALE FISHERIES

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ABSTRACT

Purpose: This study examines whether a brief data storytelling video is associated with pre-post differences in small-scale fishers' acceptance indicators for sustainable fishing (economic-benefit orientation and support for sustainability policies) and describes post-intervention self-reported behavioural intentions.

Approach/methodology/design: We conducted a mixed-methods, single-group pre-post pilot study with 16 small-scale fishers in northern Dalmatia. Participants completed a baseline questionnaire, watched a 3:46-minute data storytelling video designed using multimedia learning principles, and then completed a follow-up questionnaire with post-intervention open-ended items. Pre-post differences were examined using Wilcoxon signed-rank tests, and qualitative comments were analysed using reflexive thematic analysis.

Main findings: After watching the video, participants reported high motivation and strong self-reported behavioural intentions for practical actions (e.g., using selective gear and complying with regulations and

KEYWORDS:

behavioural intentions, data storytelling, fisheries management, local ecological knowledge, policy acceptance

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quotas). Intentions were weaker for measures perceived as more restrictive or collective (e.g., seasonal bans and broader conservation initiatives). In this pilot sample, post-intervention ratings were significantly higher for indicators of perceived long-term economic benefits, and support for sustainability-oriented policies.

Research limitations: The findings are exploratory due to the small sample, absence of a control group, and reliance on self-reported outcomes measured immediately after exposure. The study does not measure observed behaviour.

Practical implications: Brief, locally grounded video narratives can complement technical communication by translating evidence into understandable, locally relevant messages and addressing concerns about legitimacy and fairness.

Social implications: Communication interventions that integrate scientific evidence with fishers' perspectives may foster more inclusive, trust-based governance dialogues.

Originality/value: The study provides exploratory pilot evidence on data storytelling as a communication intervention for acceptance indicators in small-scale fisheries and links exploratory indicator patterns to fishers' evaluations of persuasive narrative elements.

1 INTRODUCTION

In many coastal communities, fishing supports livelihoods and local identity. Yet fisheries face increasing ecological and economic pressures (Golden et al. 2024; Pelage and Frédou 2023). This makes sustainability a central governance concern. Fisheries management is an inherently applied activity carried out under conditions of global change (Cooke et al. 2024). Policy success depends on whether local actors accept and follow rules, which is shaped by legitimacy, trust and communication. When stakeholders do not understand the rationale for measures, compliance weakens (Pita et al. 2025). Fishers' perceptions are therefore essential, as they reveal how resource users experience and judge governance (Powell and Ordonez-Gauger 2024).

Many scholars propose integrating scientific data with fishers' local ecological knowledge (LEK), especially in data-poor systems (Pelage and Frédou 2023). However, evidence shows that higher LEK does not necessarily co-vary with support for specific policies, such as marine protected areas (McClean and García-Quijano 2022). This suggests that knowledge integration alone may be insufficient and that communication barriers and information flow within socio-political networks also matter (McClean and García-Quijano 2022).

Data storytelling offers a plausible way to address these barriers. It combines evidence, visuals and narrative to make complex information easier to process (Segel and Heer 2010). In fisheries governance, such formats can explain not only what regulations require, but also why they matter. They may also support legitimacy by connecting scientific claims to local realities and concerns about fairness (Pita et al. 2025; Powell and Ordonez-Gauger 2024). Multimedia principles suggest design features that may support comprehension and engagement (Mayer 2024). Narrative elements can increase attention and perceived relevance, which may support deeper processing of evidence (Dahlstrom 2014).

Despite these arguments, direct evidence from intervention studies remain limited. Implementation science approaches that test how evidence is adopted in routine practice are uncommon in fisheries research (Cooke et al. 2024). Most of the literature describes perceptions and LEK, rather than evaluating specific communication tools. Researchers widely use

video for data collection, but they rarely use it to disseminate findings to the public or to shift intentions in practice-oriented settings (Walker and Boyer 2018). In addition, multimedia design principles mostly originate from domains such as educational psychology (Mayer 2024). Their value in the fisheries domain therefore remains an empirical question.

To address this gap, we conducted a mixed-method, single-group pre-post pilot study with small-scale fishers in northern Dalmatia. Our objective is to explore whether exposure to a data storytelling video is associated with pre-post differences in acceptance indicators (economic-benefit orientation and support for sustainability-oriented policies). We also describe post-intervention self-reported behavioural intentions regarding specific practices. Accordingly, we ask: (RQ1) What are small-scale fishers' baseline perceptions of and concerns about sustainable fishing? (RQ2) Do perceived long-term economic benefits and support for sustainability-oriented policies differ after the video intervention? (RQ3) Which practices show the highest post-intervention self-reported behavioural intentions and which narrative elements do small-scale fishers identify as most persuasive, and why?

This study provides exploratory pilot evidence on a brief, theory-informed communication intervention for small-scale fisheries. It links exploratory pre-post indicator patterns to fishers' post-intervention reflections on narrative elements. Methodologically, it combines survey measures with qualitative interpretation to clarify outcome patterns and fishers perceived persuasive features. Practically, it informs the design of stakeholder-facing communication tools and motivates larger controlled and longitudinal research to test durability and links to observable practice.

2 LITERATURE REVIEW

2.1 SUSTAINABILITY PERCEPTION

Fishers' understanding and definition of sustainability is often shaped by a combination of their own experience, generational knowledge, and socio-environmental conditions. Gaining insight into these perceptions is crucial for developing management strategies that are not only eco-

logically sound, but also socially acceptable. Several studies have investigated this topic, revealing common concerns, as well as differences in how sustainability is perceived across various fishing communities. For example, fishers often cite the decline of fish stocks and biodiversity as evidence that current practices are not sustainable (Pelage and Frédou 2023; Karnad and Karanth 2014). Although overfishing is the most frequently identified culprit, many also highlight other stressors such as pollution and climate-related changes in the oceans.

Some fishers feel excluded from decision-making, arguing that policies often ignore their experience and local knowledge (Pelage and Frédou 2023). Regulations are not always perceived as helpful. In some cases, they are perceived as too strict or not in line with actual conditions, leading to non-compliance (Karnad and Karanth 2014). This is particularly true when rules are perceived as threatening to their short-term livelihoods. These findings link acceptance to perceived fairness and feasibility, not only to awareness.

However, attitudes towards the conservation of marine resources improve when fishers see tangible benefits for their community. Factors such as education, environmental awareness and participation in decision-making are often associated with more positive perception of sustainability (Braga and Pardal 2017; McDonald and Vianna 2020; Buana and Barlian 2023). Traditional ecological knowledge also plays a significant role. This evidence suggests that local ecological knowledge does not always translate into support for specific conservation policies, highlighting the importance of governance legitimacy and communication.

Fishers who follow sustainable fishing practices, such as observing seasonal bans and using selective gear, often support conservation efforts (Audefroy and Sánchez 2017). Although local priorities differ across regions, fishers consistently express a desire to participate in policy-making, to have their knowledge respected, and to ensure the long-term sustainability of marine resources. This underscores the importance of involving fishers not only as stakeholders but also as collaborators in creating a sustainable fishing system. Combining scientific knowledge with the practical knowledge of local communities can offer the most effective way forward in achieving resilient and equitable management of marine

resources. At the same time, the literature suggests that the pathway from knowledge to acceptance is not automatic, which motivates testing communication interventions that explain policy rationales and address fairness concerns.

2.2 DATA STORYTELLING

Communicating complex data in ways that are understandable to diverse audiences has long been a challenge. This is especially true in fisheries management where decisions often rely on technical information such as stock assessment models, catch and effort statistics, biological reference points, and spatial management data. One technique that is increasingly used is data storytelling. Through visualisation and narration, data storytelling presents information in ways that are relatable and impactful, enabling audiences to understand insights and act on them. In this paper, data storytelling refers to narrative-driven communication that combines evidence with visual structure and a clear message. It is important when communicating information to decision makers, stakeholders and wider audiences.

This method was used to draw attention to discarded fish in the Fish Fight campaign which employed a mix of media platforms (Gambarato and Medvedev 2015). Stories do more than convey facts, they evoke emotion, empathy, and urgency. In the context of marine sustainability, narratives about declining fish stocks, habitat loss, or illegal practices can resonate strongly with audiences. When told effectively, these stories can foster a shared sense of responsibility. Emotional engagement can also make complex environmental challenges feel more personal, which in turn boosts public support for conservation (Funk 2024; Savoie 2022).

Beyond raising awareness, storytelling can encourage active engagement and participation. Initiatives that invite fishers, researchers, and policymakers to share experiences and insights through media - whether videos, interviews, or interactive tools - help build mutual understanding. Co-created narratives reflect a broader range of voices and encourage joint ownership of proposed solutions (Buana and Barlian 2023; Gercek and Malvarosa 2022).

Visual tools play a major role in this process: interactive maps, digital dashboards, and real-time monitoring systems are not just technical add-ons, they convert raw data into meaningful, actionable insights. Technologies such as geospatial mapping and IoT devices have already shown promise in tracking fishing patterns and identifying critical zones, making it easier to act before problems escalate (Amora and Cuizon 2024; Ribera-Altimir and Galimany 2023). However, despite growing interest in narrative and multimedia formats, there is limited intervention evidence on whether brief data-storytelling videos can shift acceptance indicators or behavioural intentions among small-scale fishers.

3 METHODOLOGY

3.1 RESEARCH DESIGN

This pilot study employs a mixed-methods, single-group within-subjects pre-post design to investigate whether exposure to a data storytelling intervention is associated with changes in self-reported acceptance indicators among small-scale fishers, including perceptions and behavioural intentions related to sustainable fishing practices. Quantitative and qualitative methods are combined to provide a comprehensive understanding of post-exposure change patterns and participants' interpretations. Participants first completed a baseline questionnaire, then viewed a context-specific data storytelling video, and subsequently completed a follow-up questionnaire. The quantitative component assessed pre-post changes in perceived economic benefits of sustainable fishing and support for related policies using non-parametric analysis. The qualitative component was informed by reflexive thematic analysis (Braun and Clarke 2019), which explored participants' post-intervention reflections and the meanings they attributed to the video. This pragmatic mixed-methods approach enabled the integration of quantitative findings with participants' qualitative insights, enhancing the interpretive depth of the results. Given the pilot design and absence of a control group, quantitative findings are interpreted as exploratory.

3.2 PARTICIPANTS

A total of 16 small-scale fishers from a northern Dalmatian coastal community participated in this pilot study. Participants were selected using purposive sampling, targeting individuals actively engaged in local small-scale fisheries who employed diverse fishing methods and had varying levels of experiences. This strategy aimed to ensure the inclusion of a range of perspectives relevant to the study's focus on sustainable fishing practices. All participants were male, with ages ranging from 38 to 72 years ($M = 51.3$, $SD = 9.2$). The majority had completed secondary education ($n = 10$, 62.5%), while the remainder held a university degree ($n = 6$, 37.5%). Participants were recruited through direct contact and in collaboration with local fisheries associations and cooperatives. Participation in the study was voluntary, and all individuals provided informed consent prior to data collection. Before participating, they were informed about the purpose of the study, the voluntary nature of participation, their right to withdraw without consequences and that the collected data would be used for research purposes and reported in anonymised, aggregated form. Ethical procedures were followed throughout the research, including the protection of participant confidentiality and the right to withdraw at any time. No personally identifiable information was recorded. Although limited in size, this sample was considered appropriate for the exploratory objectives of a pilot study, providing initial insights into the feasibility of the research and potential post-exposure changes in the measured indicators.

3.3 MATERIALS

Two self-administered questionnaires were developed for this study: a pre-intervention (baseline) questionnaire and a post-intervention (follow-up) questionnaire. Both instruments included closed-ended Likert-scale items, while open-ended items were included only in the post-intervention questionnaire. The baseline questionnaire assessed fishers' initial perceptions, policy support and self-reported behavioural intentions related to sustainable fishing practices. After

completing the baseline questionnaire, participants viewed a data storytelling video intervention. Immediately after viewing the video, participants completed the follow-up questionnaire. The post-intervention questionnaire included the same core closed-ended items to enable pre-post comparison plus additional items designed to capture post-exposure motivation and participants' reflections on the video content. The Likert-scale items ranged from 1 (strongly disagree) to 5 (strongly agree) or from 1 (never) to 5 (very often), depending on the question format. Open-ended items invited participants to describe which part of the video had the greatest impact on them and to offer any additional comments or suggestions. The questionnaire content was informed by relevant literature on fisheries sustainability, EU policy frameworks, and prior studies exploring fishers' perceptions and behavioural intentions.

The video intervention was designed in alignment with the Cognitive Theory of Multimedia Learning (CTML), as recently expanded by Mayer (2024). CTML posits that meaningful learning occurs when instructional materials foster appropriate cognitive, affective, and motivational processing. According to the theory's three guiding assumptions - dual channels, limited capacity, and active processing - people learn best when visual and auditory channels are used efficiently, cognitive load is minimised, and learners are actively engaged in selecting, organising, and integrating information. The 3:46-minute data storytelling video presented key concepts of sustainable fisheries and real-life examples within the Croatian context. It combined simplified data visualisations with explanations to illustrate trends in fish stock depletion and the ecological and economic consequences of overfishing. The video also addressed the role of regulatory measures, selective fishing gear, and spatial protection in supporting stock recovery. The content was evidence-based to support understanding, rather than to instruct participants on specific actions. The short video served as a data storytelling intervention and was carefully crafted to resonate with small-scale fishers who may be less accustomed to data-dense presentations. Drawing on Mayer's (2024) multimedia design principles, the intervention emphasised coherence, personalisation, signalling, and modality. The full video script and slide deck are available from the authors on request.

3.4 PROCEDURE

The pilot study was conducted as a pre-post pilot intervention in October 2024, targeting small-scale fishers in a northern Dalmatian coastal community. Data were collected remotely using a digital survey developed in Google Forms. Participants received an email invitation that included a brief explanation of the study and a direct link to the Google Form. Upon accessing the form, participants were presented with an informed consent page, followed by the pre-intervention questionnaire. Immediately after completing the baseline section, the participants were directed to watch a video-based data storytelling intervention. Following the video, participants were seamlessly directed to the post-intervention questionnaire. The entire process was self-administered and took approximately 15-20 minutes to complete. No compensation was offered, and participation was entirely voluntary and anonymous.

3.5 DATA ANALYSIS

Quantitative data were analysed using non-parametric statistical procedures appropriate for ordinal-level data and small sample sizes. Given the within-subjects, repeated-measures design in which the same participants completed pre- and post-intervention questionnaires, Wilcoxon Signed-Rank Tests were conducted to assess changes in key outcome variables. These included perceptions of the long-term economic benefits of sustainable fishing and support for sustainable fisheries policies. The Wilcoxon test was selected due to its suitability for analysing Likert-type data that do not meet the assumptions of parametric tests (Field 2024). Descriptive statistics, including the mean, median, standard deviation, and standard error, were computed to summarise central tendencies and variability. Effect sizes were calculated using rank-biserial correlation, providing a measure of the magnitude of change (Kerby 2014). Given the pilot design and small sample size, statistical inference is treated as exploratory.

Qualitative data from post-intervention open-ended questionnaire items were analysed using reflexive thematic analysis (RTA), following the

six-phase process outlined by Braun and Clarke (2019). This approach recognises the researcher’s active role in theme development and treats reflexivity as an integral part of the analytic process. The analysis was conducted inductively, with codes generated directly from the data and grouped into broader themes that reflected shared patterns of meaning. This iterative and reflective approach was used to identify and interpret fishers post-intervention reflections on sustainable fishing and the narrative elements they perceived as persuasive.

4 RESULTS

This section presents the results of a pilot study conducted among 16 small-scale fishers from a northern Dalmatian coastal community. Descriptive statistics summarise the participants’ fishing practices, awareness of sustainable fishing principles, and their responses following the video intervention. Subsequent inferential analyses explore whether pre-post differences are observed in participants’ perceptions and policy support, given the single-group pilot design and exploratory intent.

4.1 DESCRIPTIVE STATISTICS

Descriptive data were collected to contextualise participants’ baseline engagement with sustainable fishing practices and to report post-intervention levels of motivation and behavioural intention following the video intervention.

TABLE 1. Descriptive Fishing Practices and Training

Category	Frequency	Percentage
Use of Selective Fishing Gear		
Yes	11	68.8%
Not sure	4	25.0%
No	1	6.2%

Category	Frequency	Percentage
Adherence to Fishing Regulations		
Mostly	8	50.0%
Strictly	8	50.0%
Prior Training in Sustainable Practices		
No - not offered	10	62.5%
No - not needed	3	18.8%
Yes, applies it	2	12.5%
Yes, not applicable	1	6.2%

On average, participants rated the frequency of community discussions about sustainable fishing as 3.5 ($SD = 0.97$), on a scale from 1 to 5.

Following the video intervention, participants reported high levels of motivation and behavioural intentions to engage in sustainable fishing practices. On a scale from 1 (not at all) to 5 (very much), the average motivation score was 4.56 ($SD = 1.03$), indicating that most participants felt strongly motivated to apply what they had learnt. Similarly, the intention to use selective fishing gear was very high, with a mean of 4.75 ($SD = 0.45$), suggesting near-universal readiness to adopt more sustainable tools.

Intentions to comply with fishing regulations and quotas were also strong ($M = 4.56$, $SD = 1.03$), while slightly lower scores were observed for avoiding fishing during spawning periods ($M = 4.38$, $SD = 1.09$) and engaging in broader conservation initiatives ($M = 4.00$, $SD = 1.26$). Despite these small differences, all variables showed positively skewed distributions, with most responses clustered near the upper end of the scale. These results indicate high levels of self-reported motivation and behavioural intentions to adopt selected sustainability-oriented practices following the video intervention.

4.2 QUANTITATIVE ANALYSIS

To examine whether acceptance-related indicators differed before and after exposure to the video, Wilcoxon Signed-Rank Tests were conducted on two key dimensions: perceived long-term economic benefits of sustainable fishing and support for sustainable fisheries policies.

Results indicated a statistically significant increase in perceived economic benefits, $W = 12.5$, $p = .012$. The median score rose from 3.00 at baseline to 5.00 post-intervention, indicating higher post-intervention ratings in this pilot sample. The effect size, reported as a rank-biserial correlation, was -0.762 , indicating a large effect (see Table 2 and Table 3). This indicates a post-intervention increase in participants perceived understanding of the long-term economic benefits of sustainable fishing.

Similarly, support for sustainable fisheries policies showed a statistically significant increase, $W = 0.0$, $p = .021$. The median support score increased from 4.5 to 5.0, with a rank-biserial effect size of -1.000 , also indicating a large effect (see Tables 4 and 5). These results indicate higher post-intervention support for sustainability-oriented fisheries policies and regulatory measures. Given the pilot design ($N=16$) and the absence of a control group, these inferential results are interpreted as exploratory evidence of post-exposure change rather than causal effects.

TABLE 2. Wilcoxon Signed-Rank Test Results for Economic Benefits Understanding

Variable Pair	<i>W</i>	<i>p-value</i>	Effect Size (<i>r_rb</i>)
Understands_Econ_Benefits_pre vs BenefitToCommunity_post	12.5	.012	-0.762

TABLE 3. Descriptive Statistics for Economic Benefits Understanding

Variable	<i>N</i>	Mean	Median	<i>SD</i>	<i>SE</i>
Understands_Econ_Benefits_pre	16	3.06	3.00	0.854	0.213
BenefitToCommunity_post	16	4.44	5.00	1.094	0.273

TABLE 4. Wilcoxon Signed-Rank Test Results for Policy Support

Variable Pair	<i>W</i>	<i>p-value</i>	Effect Size (<i>r_rb</i>)
SustainablePolicy_Agree_pre vs Policy_Importance_post	0.0	.021	-1

TABLE 5. Descriptive Statistics for Policy Support

Variable	<i>N</i>	Mean	Median	<i>SD</i>	<i>SE</i>
SustainablePolicy_Agree_pre	16	4.00	4.5	1.211	0.303
Policy_Importance_post	16	4.75	5.0	0.775	0.194

4.3 QUALITATIVE ANALYSIS

Through reflexive thematic analysis, several rich, coherent themes were developed that reflect participants' diverse perceptions and motivations following the video intervention (see Figure 1 and Table 6).

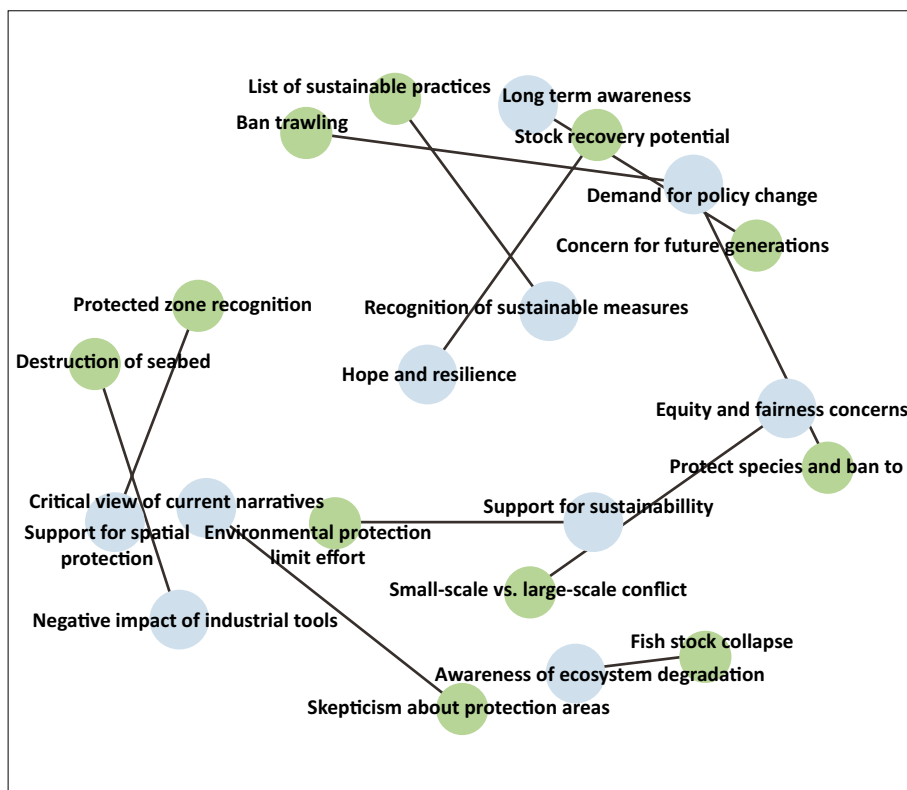


FIGURE 1. Thematic Map of Fishers' Reflections on Sustainable Fishing

A prominent theme, long-term awareness, reflected concern for future generations and the sustainability of marine resources. Demand for policy change emerged as a central theme, including calls for banning destructive practices such as bottom trawling. Other themes included the negative impacts of industrial tools, support for spatial protection, and hope and resilience, based on the perceived potential for fish stock recovery. Critical views of prevailing narratives were also noted, as some

participants questioned the emphasis on specific zones. Equity and fairness concerns surfaced, particularly highlighting the imbalance between small-scale and industrial fisheries. Participants demonstrated recognition of sustainable measures, listing concrete tools and practices. These themes reflect participants' perspectives on sustainable fishing and the meanings they attributed to the video content. Because open-ended responses were collected only post-intervention, qualitative findings are interpreted as participants' reflections after exposure rather than evidence of within-person change.

TABLE 6. Sample Codes and Themes from Open-Ended Responses

Quote (in Croatian language)	Code	Theme
Budući naraštaji	Concern for future generations	Long-term awareness
Dio koji pokazuje statistiku uništavanja morskog dna kočama...	Destruction of seabed	Negative impact of industrial tools
Koče treba skroz zabraniti!!	Ban trawling	Demand for policy change
No take zona Jabučne kotline	Protected zone recognition	Support for spatial protection
Dio o vrstama riba koje su bile pred kolapsom	Fish stock collapse	Awareness of ecosystem degradation
Objašnjenje obnove ribljeg fonda	Stock recovery potential	Hope and resilience
Nijedan, previše se hvalite Jabučnom kotlinom	Skepticism about protection areas	Critical view of current narratives
Zaštita staništa, selektivni alati, zabrana potegača	List of sustainable practices	Recognition of sustainable measures
Komentar o malim ribarima i kočama	Small-scale vs. large-scale conflict	Equity and fairness concerns
Očuvanje organizama i zabrana potegača	Protect species and ban tools	Demand for policy change
Zaštita okoliša i smanjenje ribara	Environmental protection; limit effort	Support for sustainability

5 DISCUSSION

The findings are interpreted in relation to the study objectives, with particular attention to how a data storytelling intervention is associated with differences in fishers' perceptions, attitudes, and self-reported behavioural intentions regarding sustainable fishing. Drawing on Mayer's Cognitive Theory of Multimedia Learning, the results suggest that the intervention was acceptable and engaging for participants. Addressing RQ1, the baseline findings indicate that small-scale fishers were already highly compliant with existing regulations and reported frequent use of selective fishing gear, despite limited access to formal training in sustainable fishing practices (see Table 1). This combination suggests that sustainability-oriented practices in the community studied are shaped less by formal education and more by experiential knowledge and regulatory exposure. At the same time, moderate levels of community discussion about sustainability point to gaps in structured communication and shared reflection, echoing previous research showing that compliance does not necessarily imply policy understanding or support (McClean and García-Quijano 2022; Powell and Ordonez-Gauger 2024).

Quantitative results showed significant pre-post differences of both perceived economic benefits of sustainable fishing ($p = .012$, $r_{rb} = -0.762$) and support for fisheries policies ($p = .021$, $r_{rb} = -1.000$), each with large effect sizes. In relation to RQ2, these findings suggest that exposure to the data storytelling video was associated with more favourable perceptions of the economic rationale for sustainability measures and stronger policy support. This is consistent with Gambarato and Medvedev's (2015) research on the potential role of storytelling strategies in increasing awareness of fishing policies. Importantly, participants also reported high post-intervention motivation, particularly in their intention to adopt selective gear, follow regulations, and avoid spawning periods. These results align with Mayer's (2024) emphasis on affective and motivational engagement in multimedia learning. Although these findings reflect self-reported behavioural intentions rather than observed behaviour, they indicate areas where data storytelling approaches may be particularly relevant for fostering engagement with complex fisheries governance issues.

The qualitative findings, analysed through reflexive thematic analysis, added context to the interpretation of these findings. Themes such as long-term awareness, demand for policy change, and hope for ecological recovery showed that participants were reflective and future oriented in their post-intervention accounts. In addition, expressions of fairness concerns and critical views of dominant narratives suggest that participants engaged critically with the content, rather than merely absorbing it passively. This active engagement of the participants aligns with Buana and Barlian's (2023) qualitative research on community engagement with sustainable small-scale fisheries. It also supports Braun and Clarke's (2019) view of meaning-making as an active, interpretive process, co-shaped by participants lived experiences. Addressing RQ3, the qualitative findings indicate that locally relevant examples and visual evidence of stock recovery were perceived as particularly persuasive. Because open-ended responses were collected only post-intervention, these qualitative themes are interpreted as reflections after exposure rather than evidence of within-person change.

The findings have several implications for designing of sustainability communication in fisheries management. First, they suggest that multimedia interventions tailored to the cultural and cognitive context of the audience (in this case small-scale fishers) can support understanding and self-reported changes in behavioural intention (Gambarato and Medvedev 2015). Second, integrating data storytelling and narrative framing offers a valuable complement to more technical or policy-heavy communication formats (Funk 2024). Finally, using accessible digital platforms, such as Google Forms, demonstrates the feasibility of implementing such interventions remotely, even in resource-limited contexts.

6 CONCLUSION

This study provides pilot empirical evidence that a data storytelling video may be a promising communication tool in small-scale fisheries contexts. The findings suggest that a short video adapted to the local fisheries context is associated with higher ratings on acceptance indicators, including perceived long-term economic benefits of sustainable fishing and support

for sustainability-oriented fisheries policies. Participants also reported high post-intervention self-reported behavioural intentions related to selected sustainable practices, indicating that narrative-based communication may support engagement with complex sustainability issues.

The study has several limitations that constrain interpretation. The sample size was small ($N = 16$) and drawn from a single coastal community which limits generalisability. The single-group pre-post design lacked a control or comparison group. Therefore, observed pre-post differences cannot be attributed solely to the intervention. Another limitation is that outcomes were self-reported and measured immediately after exposure, preventing assessment of longer-term persistence and observed behavioural change. Finally, open-ended responses were collected only post-intervention and therefore capture participants' reflections after exposure rather than qualitative within-person change.

Future studies should expand the sample size and include a control or comparison group to strengthen causal inference. There is also potential to explore longitudinal impacts by assessing whether changes in self-reported behavioural intentions persist and relate to observable practices over time. Finally, adapting the storytelling model for different stakeholder groups, including policymakers, young people, urban consumers, could broaden its application within the fisheries sector and beyond.

BIBLIOGRAPHY

- AMORA, E. N., and J. CUIZON. 2024. "Utilizing IOT and Geospatial Analytics for Sustainable Fisheries Management". *Recoletos Multidisciplinary Research Journal* 12 (1): 195–214. <https://doi.org/10.32871/rmrj2412.01.15>.
- AUDEFRY, J. F., and B. N. C. SÁNCHEZ. 2017. "Integrating Local Knowledge for Climate Change Adaptation in Yucatán, Mexico". *International Journal of Sustainable Built Environment* 6 (1): 228–37. <https://doi.org/10.1016/j.ijse.2017.03.007>.
- BRAGA, H. O., AZEITEIRO, U. M., OLIVEIRA, H. M., and M. A. PARDAL. 2017. "Evaluating Fishermen's Conservation Attitudes and Local Ecological Knowledge of the European Sardine (*Sardina Pilchardus*), Peniche, Portugal". *Journal of Ethnobiology and Ethnomedicine* 13: 1–12. <https://doi.org/10.1186/s13002-017-0154-y>.
- BRAUN, VIRGINIA, and VICTORIA CLARKE. 2019. "Reflecting on Reflexive Thematic Analysis". *Qualitative Research in Sport, Exercise and Health* 11 (4): 589–97. <https://doi.org/10.1080/2159676X.2019.1628806>.
- BUANA, Y., and E. BARLIAN. 2023. "Fostering Community Engagement towards Sustainability in Small-Scale Fisheries". 388: 04001. <https://doi.org/10.1051/e3sconf/202338804001>.
- COOKE, Steven J., Nathan YOUNG, Steven ALEXANDER, et al. 2024. *Embracing Implementation Science to Enhance Fisheries and Aquatic Management and Conservation*. 49: 475–85. <https://doi-org.ezproxy.nsk.hr/10.1002/fsh.11112>.
- DAHLSTROM, Michael F. 2014. "Using Narratives and Storytelling to Communicate Science with Nonexpert Audiences". *Proceedings of the National Academy of Sciences* 111 (supplement_4): 13614–20. <https://doi.org/10.1073/pnas.1320645111>.
- FIELD, Andy. 2024. *Discovering Statistics Using IBM SPSS Statistics*. SAGE Publications.
- FUNK, H.S. 2024. "Empowering Voices, Shaping Futures: Digital Storytelling for Sustainable Transformation". *International Journal of Science and Research Archive* 13: 1345–59. <https://doi.org/10.30574/ijrsra.2024.13.1.1827>.
- GAMBARATO, R. R., and S. A. MEDVEDEV. 2015. "Fish Fight: Transme-

- dia Storytelling Strategies for Food Policy Change". *International Journal of E-Politics (IJEP)* 6 (3): 43–59. <https://doi.org/10.4018/IJEP.2015070104>.
- GERCEK, E., GAMBINO, M., and L. MALVAROSA. 2022. "Understanding EU Fisheries Management Dynamics by Engaging Stakeholders through Online Group Model-Building". *Sustainability* 14 (23): 15862. <https://doi.org/10.3390/su142315862>.
- GOLDEN, Abigail S., MARISSA L. BASKETT, Dan HOLLAND, Arielle LEVINE, Kathy MILLS, and Timothy ESSINGTON. 2024. *Climate Adaptation Depends on Rebalancing Flexibility and Rigidity in US Fisheries Management*. 81: 252–59. <https://doi.org/10.1093/icesjms/fsad189>.
- KARNAD, D., GANGAL, M., and K. K. KARANTH. 2014. "Perceptions Matter: How Fishermen's Perceptions Affect Trends of Sustainability in Indian Fisheries". *Oryx* 48 (2): 218–27. <https://doi.org/10.1017/S0030605312001251>.
- KERBY, Dave S. 2014. "The Simple Difference Formula: An Approach to Teaching Nonparametric Correlation". *Comprehensive Psychology* 3 (January): 11.IT.3.1. <https://doi.org/10.2466/11.IT.3.1>.
- MAYER, Richard E. 2024. "The Past, Present, and Future of the Cognitive Theory of Multimedia Learning". *Educational Psychology Review* 36 (1): 8. <https://doi.org/10.1007/s10648-023-09842-1>.
- MCDONALD, G., WILSON, M., VERÍSSIMO, D., TWOHEY, R., CLEMENCE, M., APIS-TAR, D., ..., and G. VIANNA. 2020. "Catalyzing Sustainable Fisheries Management through Behavior Change Interventions". *Conservation Biology* 34 (5): 1176–89. <https://doi.org/10.1111/cobi.13475>.
- MCLEAN, E. L., FORRESTER, G. E., and C. G. GARCÍA-QUIJANO. 2022. "The Disconnect between Knowledge and Perceptions: A Study of Fishermen's Local Ecological Knowledge and Their Perception of the State of Fisheries and How These Are Managed in the Dominican Republic". *Human Ecology* 50 (2): 227–40. <https://doi.org/10.1007/s10745-022-00308-6>.
- PELAGE, L., BERTRAND, A., SIQUEIRA, S. C. W., ARAÚJO, A. C. A. P., AVELINO, K. V. A., da SILVA, C. L., and T. FRÉDOU. 2023. "Fishers' Perceptions of Global Change to Inform Coastal Planning in a Data-Poor Socio-Ecological System". *Marine Policy* 155: 105784. <https://doi.org/10.1016/j.marpol.2023.105784>.

- PITA, Pablo, Sean TRACEY, Robert ARLINGHAUS, et al. 2025. *Staying Hooked: Effective Science Engagement and Communication in Recreational Fisheries*. 12: 1589544. <https://doi.org/10.3389/fmars.2025.1589544>.
- POWELL, F., LEVINE, A., and L. ORDONEZ-GAUGER. 2024. "Fishermen's Perceptions of Management in the California Spiny Lobster and California Market Squid Fisheries". *Marine Policy* 161: 106015. <https://doi.org/10.1016/j.marpol.2024.106015>.
- RIBERA-ALTIMIR, J., LLORACH-TÓ, G., SALA-COROMINA, J., COMPANY, J. B., and E. GALIMANY. 2023. "Fisheries Data Management Systems in the NW Mediterranean: From Data Collection to Web Visualization". *Database* 2023: baad067. <https://doi.org/10.1093/database/baad067>.
- SAVOIE, G. 2022. "Turning the Tide: Crafting a Collective Narrative of the Ocean through Participatory Media". *Journal of Science Communication* 21 (2): Y01. <https://doi.org/10.22323/2.21020401>.
- SEGEL, Edward, and Jeffrey HEER. 2010. "Narrative Visualization: Telling Stories with Data". *IEEE Transactions on Visualization and Computer Graphics* 16 (6): 1139–48. [10.1109/TVCG.2010.179](https://doi.org/10.1109/TVCG.2010.179).
- WALKER, Erica B., and D. Matthew BOYER. 2018. "Research as Storytelling: The Use of Video for Mixed Methods Research". *Video Journal of Education and Pedagogy* 3 (1): 8. <https://doi.org/10.1186/s40990-018-0020-4>.

GEOGRAPHICAL AND ECONOMIC DRIVERS OF GLOBAL UNIVERSITY ESG SCORES

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ABSTRACT

Purpose: This study investigates the geographical and economic drivers shaping global university Environmental, Social, and Governance (ESG) performance.

Approach/methodology/design: Utilizing a comparative exploratory design, the research analyzes composite scores from the QS Sustainability ranking across diverse economic contexts by adapting a standardized ESG classification framework from the Refinitiv Eikon database alongside comparative descriptive statistics to effectively address sample heterogeneity and regional structural disparities.

Findings: The findings reveal that while higher education institutions in Advanced Economies consistently lead in Social and Governance dimensions, Environmental Research represents a universal strength across all economic tiers, including Emerging Market Economies. Conversely, campus operational sustainability and environmental education lag globally, uncovering a key disconnect between academic climate expertise and internal operational execution.

KEYWORDS:

ESG scores, Higher Education Institutions, macroeconomic drivers, QS rankings, university sustainability

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Data Availability: Data are available from the corresponding author upon reasonable request.

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Research limitations/implications: An acknowledged limitation of this research is its reliance on a single ranking system and descriptive methodology, which precludes establishing direct causal mechanisms.

Practical implications: Practically, these findings provide university administrators with a clear benchmarking tool to reallocate strategic resources from purely academic output toward campus decarbonization and comprehensive curriculum integration.

Social implications: Socially, the study emphasizes the urgent need for international rating agencies to develop context-specific metrics that account for national economic disparities, ensuring that localized sustainability efforts in developing regions are fairly evaluated against global standards.

Originality/value: The originality of this work lies in pioneering the application of corporate ESG classification models to higher education rankings, establishing a novel macro-level framework to map global sustainability performance across diverse socio-economic landscapes.

1 INTRODUCTION

The sustainable development of the global economy and society is increasingly dependent on the implementation of environmental, social, and governance (ESG) principles. While ESG factors have traditionally been analysed through the prism of corporate performance and investor relations (Fleming et al., 2013; Mardini, 2022), their relevance has expanded significantly into the higher education sector. Universities, as institutions responsible for the creation and dissemination of knowledge, are increasingly expected to align their operations with the efforts to combat climate change and with the broader Sustainable Development Goals (SDGs). Consequently, measuring and reporting levels of commitment to sustainability has become imperative for higher education institutions worldwide.

Despite the growing importance of university sustainability, the existing literature has predominantly focused on specific geographical areas or individual case studies. For example, recent studies have examined emergent ESG reporting in Chinese higher education institutions (Mo et al., 2023), the relevance of ESG education in Kazakhstani graduate programmes (Nurillayev, 2025), and the integration of the SDGs into the strategies of Spanish universities (Blasco et al., 2020). Other research has explored the conditions for integrating the ESG agenda into Russian educational activities (Akopyants et al., 2024) and the inclusion of ESG issues in the strategic plans of Italian public universities (Garlatti et al., 2025). Although these studies provide valuable insights, there remains a significant gap in understanding how university ESG performance varies on a global scale and which macro level factors drive these differences.

To address this gap, this study conducts a comprehensive global analysis of university sustainability scores, examining how geographical location and levels of economic development influence ESG performance. Specifically, it draws on the QS World University Rankings: Sustainability 2025 database, covering a sample of 1,735 universities from 104 countries across five continents. By categorising these countries according to the International Monetary Fund's (IMF) classification system advanced economies, emerging market economies, and low-income developing countries this study aims to provide a nuanced comparative perspective

that goes beyond descriptive benchmarking.

The primary objective of this study is to identify the geographical and economic drivers of global university ESG scores. To achieve this, the research is guided by the following specific research questions:

1. How do university ESG scores (overall, social, governance, and environmental) differ across continents?
2. To what extent does the economic development level of a country (advanced, emerging, or low-income) influence the ESG performance of its universities?
3. Which specific ESG dimensions (e.g., Environmental Research, Governance) demonstrate the strongest performance across different economic and geographical contexts?

By addressing these questions, this study makes a twofold contribution to the literature. Empirically, it provides the first global mapping of university ESG scores categorised by IMF economic groupings, offering a robust comparative analysis of 1,735 institutions. Theoretically and practically, it moves beyond descriptive statistics to highlight how macro-economic contexts shape sustainability priorities in higher education, offering valuable insights for policymakers, university managers, and stakeholders involved in designing sustainability metrics and strategic planning.

2 LITERATURE REVIEW: UNIVERSITY SUSTAINABILITY SCORE

The integration of ESG principles into higher education has received increasing academic attention, reflecting a shift from corporate-centric ESG research to a broader institutional focus. The literature on university sustainability can be broadly categorised into three main streams: the integration of ESG into educational and strategic frameworks, the role of collaboration and internationalisation, and the assessment of university sustainability through rankings and scores.

A significant portion of the literature emphasises the need to embed ESG principles into the core activities of universities. Akopyants et al. (2024)

highlight the specific conditions necessary for integrating the ESG agenda into the educational activities of Russian higher education institutions, stressing the importance of a holistic approach to all ESG criteria. Similarly, Verna et al. (2025) advocate the establishment of an “ESG culture” within higher education through an interdisciplinary approach that encompasses all educational processes. However, the practical implementation of these principles often reveals imbalances. Garlatti et al. (2025), in their analysis of the strategic plans of Italian public universities, found that institutions predominantly incorporate social performance measures while frequently omitting environmental and governance dimensions. This suggests that public management policies and pre-existing institutional agreements heavily mediate the extent of sustainability integration. To address such gaps, targeted educational initiatives are crucial. Chan et al. (2022) discuss the importance of professional training programmes on carbon emission reduction and C-ESG sustainable development strategies, while Sung et al. (2024) demonstrate that environmental and governance domains are of primary importance in the educational demand for ESG awareness among university faculty.

The achievement of ESG goals in universities is closely linked to external collaborations and institutional visibility. Puzzonia (2018) argues for the need for collaboration between universities, businesses, and public entities to promote innovation and local development, noting that technological evolution means companies to increasingly source R&D from universities. Furthermore, internationalisation plays a critical role in advancing a university’s sustainability agenda. Scott et al. (2006) and Gallego-Álvarez et al. (2011) regard internationalisation as essential for improving institutional image, requiring structural and cultural adaptations that make universities more visible and attractive to foreign students. Wright (2009) adds that universities attractive to international students often possess advanced structural organizations that positively affect their contribution to the SDGs. Financial resources also shape sustainability commitment. Blasco et al. (2020) found that Spanish universities receiving greater regional funding for sustainability goals demonstrate a stronger commitment to achieving the SDGs.

As universities recognize their global responsibility, the development of robust assessment systems has become imperative. Fabio et al. (2023)

conducted a content analysis of university sustainability reports, revealing how the perception and disclosure of ESG criteria affect university performance. To standardise these assessments, researchers increasingly rely on established rankings and databases. While corporate ESG studies frequently use databases such as Refinitiv (Duque-Grisales & Aguilera-Caracuel, 2021; Bodhanwala & Bodhanwala, 2022; Giannopoulos et al., 2022; Teti et al., 2023; Tong et al., 2024; Glova et al., 2025), university focused research has turned to specialised academic rankings. Blasco et al. (2020) and Pérez-Esparrells et al. (2018) used the Times Higher Education Impact Rankings. More recently, Zhutiaeva et al. (2023) provided a systematic overview of ESG ratings, proposing classifications to help universities integrate sustainable development principles more effectively. Despite these advances, existing studies have largely evaluated ESG scores within limited regional contexts or without accounting for the broader macroeconomic environment. This study addresses this limitation by employing the QS World University Rankings: Sustainability 2025 metric to evaluate ESG performance globally, and uniquely categorising institutions by IMF economic groupings to provide a comprehensive understanding of how geographical and economic drivers shape university sustainability.

3 SAMPLE AND METHODOLOGY

This section outlines the data collection process, sample characteristics, and the analytical framework used in this study. The methodology is designed to provide a comprehensive, exploratory comparative analysis of university sustainability scores across different geographical and economic contexts.

3.1 DATA SOURCES AND DATA HANDLING

To ensure a robust global analysis, this study integrates data from three primary sources: the QS World University Rankings: Sustainability 2025, the International Monetary Fund (IMF) World Economic Outlook database (October 2024), and the Refinitiv ESG scoring framework. The data

collection and preparation process followed a systematic, step-by-step approach:

Initial data extraction: The initial dataset was extracted from the QS World University Rankings: Sustainability 2025, which evaluates universities based on their environmental, social, and governance (ESG) commitments.

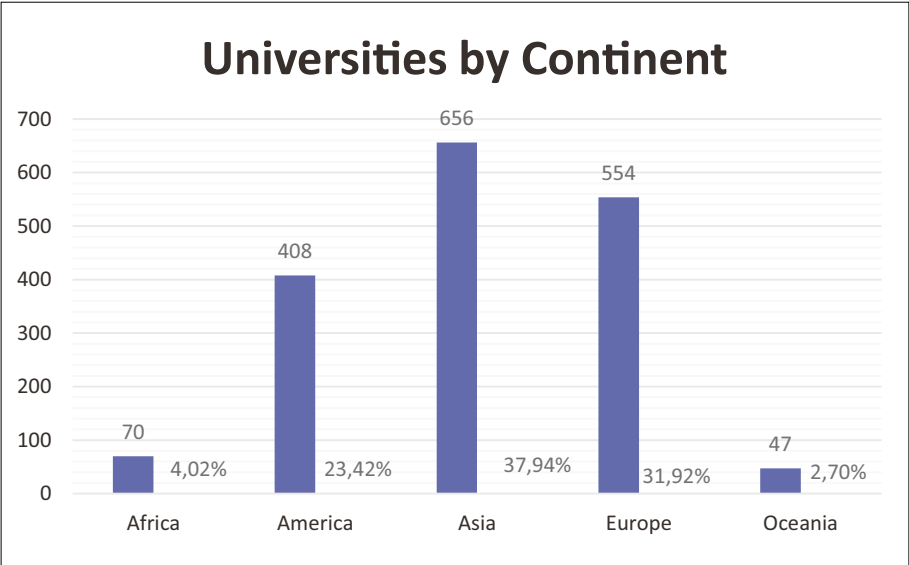
Data cleaning and inclusion criteria: To ensure comparability, only universities with complete data across all primary ESG dimensions (Social, Governance, Environmental, Environmental Sustainability, Environmental Education, and Environmental Research) were included. Institutions with missing values in any of these core metrics were excluded from the final sample.

Economic classification matching: Each university was mapped to its respective country. These countries were then cross-referenced with the IMF database to assign an economic grouping. Countries for which IMF economic classification data were unavailable (e.g., Cuba, Dominican Republic, Palestine, Syrian Arab Republic) were retained in the geographical analysis but excluded from the specific economic grouping comparisons.

3.2 SAMPLE CHARACTERISTICS

Following the data handling procedures, the final sample comprises of 1,735 universities from 104 countries across five continents. As shown in Graph 1, Asia has the highest representation, with 656 universities (37.94% of the total). Europe follows with 554 universities (31.92%), and the Americas with 408 universities (23.42%). Africa and Oceania have smaller representations, with 70 (4.02%) and 47 (2.70%) universities, respectively. Therefore, the continents with the highest concentration of universities in the sample are Asia, Europe and America.

In line with the object of study, a more detailed classification is presented to enable a comprehensive analysis of universities worldwide. The sample is therefore classified by continent, country, and Economy Groupings, in accordance with the International Monetary Fund's classification of countries by income level. Table 1 shows sample classification that differs from previous evidence in this type of study. According to the Inter-



GRAPH. 1 Sampling distribution across universities by continent (Source: Own elaboration based on QS World University Rankings: Sustainability 2025)

national Monetary Fund (October 2024), the classification of universities' countries' economies is as follows: advanced economies, emerging market economies, and low-income developing countries.

Table 1 is divided into different panels for the classification and study of the sample. Thus, Panel A presents 70 universities from 14 countries across the African continent, comprising the following countries: Algeria, Botswana, Egypt, Ethiopia, Ghana, Kenya, Morocco, Nigeria, Senegal, South Africa, Tanzania, Tunisia, Uganda, and Zimbabwe. Within this group of countries, Egypt stands out with 26 universities (37.14%) and South Africa with 13 universities (18.57%). Regarding classification by Economy Groupings, there are no universities in advanced economies, while 78.57% (55 universities on this economic group) correspond to universities in emerging market countries, and 21.43% are universities in low-income developing countries. Consequently, the present analysis indicates that a significant proportion of universities in Africa are located in nations that are classified as emerging markets and low-income developing countries.

Panel B presents 408 universities from 19 countries across the Ameri-

can continent,: Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Ecuador, the Dominican Republic, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Puerto Rico, the United States, Uruguay, and Venezuela. Within this group of countries, the United States stands out with 238 universities (58.33%) and Brazil with 42 universities (10.29%). This ranking shows a significant difference in the number of universities between the first and second countries. By economic group, 66.42% of universities are in advanced economies (271 in Canada, Puerto Rico and the United States), while 32.84% (134 universities on this economic group) correspond to universities in countries with emerging markets, and 0.25% are located in low-income developing countries. Therefore, most universities are concentrated in countries with advanced economies and emerging markets. There are two countries, Cuba and the Dominican Republic, for which this economic information is not available.

Panel C presents 656 universities from 37 economies across Asia, comprising the following countries: Azerbaijan, Bahrain, Bangladesh, Brunei Darussalam, China (Mainland), Cyprus, Hong Kong SAR China, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Macao SAR China, Malaysia, Nepal, Oman, Pakistan, Palestine, Philippines, Qatar, Republic of Korea, Saudi Arabia, Singapore, Sri Lanka, Syrian Arab Republic, Taiwan, Thailand, Türkiye, United Arab Emirates, Uzbekistan and Viet Nam. In this group of countries, China² stands out with 114 universities (17.38%) and India with 78 universities (11.89%). This ranking shows a significant difference because the number of universities is more evenly distributed across countries. In terms of classification by economic group, 23.48% of universities are in advanced economies (154 universities in this economic group), while 72.10% (473 universities in this economic group) correspond to universities in countries with emerging markets. A further 3.66% of universities are in low-income developing countries. Therefore, most universities are concentrated in countries with emerging markets. There are two countries, Palestine and the Syrian Arab Republic, for which this economic information is not available.

² The author respects the analysis carried out in a differentiated way on the Asian continent by the QS World University Rankings database of China, where Hong Kong SAR China and Macao SAR China are part of China.

Panel D presents 554 universities from 33 countries in Europe, comprising the following countries: Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine and the United Kingdom. Within this group of countries, the United Kingdom stands out with 96 universities (17.33%) and France with 60 universities (10.83%). This ranking shows a significant difference in the number of universities between the first and second countries. In terms of classification by economic group, 82.49% of universities are in advanced economies (457 universities in this economic group), while 17.51% (97 universities in this economic group) are in countries with emerging markets, and 0.00% are in low-income developing countries. Therefore, most universities are concentrated in countries with advanced economies and emerging markets. There are no countries for which economic information is not available.

Panel E presents 47 universities from three countries in Oceania: Australia, Fiji and New Zealand. Within this group of countries, Australia stands out with 38 universities (80.85%) followed by New Zealand with 8 universities (17.02%). Regarding classification by Economy Groupings, there are universities in advanced economies 97.87% (46 universities in Australia and New Zealand), while 2.13% (1 university in Fiji on this economic group) is in an emerging market country. There are no universities in low-income developing countries (0.00%). Therefore, most universities are concentrated in countries with advanced economies.

TABLE 1 Sample distribution across continents, countries, universities and Economy Groupings.

Panel A Continent in the Sample: Africa

Country	Universities	%	AE	%	EME	%	LIDE	%	n/d	%
Algeria	2	2.86%			2	4%				
Botswana	1	1.43%			1	2%				
Egypt	26	37.14%			26	47%				
Ethiopia	1	1.43%					1	7%		
Ghana	4	5.71%					4	27%		
Kenya	1	1.43%					1	7%		

Country	Universities	%	AE	%	EME	%	LIDE	%	n/d	%
Morocco	6	8.57%			6	11%				
Nigeria	5	7.14%					5	33%		
Senegal	1	1.43%					1	7%		
South Africa	13	18.57%			13	24%				
Tanzania	1	1.43%					1	7%		
Tunisia	7	10.00%			7	13%				
Uganda	1	1.43%					1	7%		
Zimbabwe	1	1.43%					1	7%		
Total	70	100%			55		15	100%	0	0%

Panel B Continent in the Sample: America

Country	Universities	%	AE	%	EME	%	LIDC	%	n/d	%
Argentina	11	2.70%			11	8%				
Brazil	42	10.29%			42	31%				
Canada	32	7.84%	32	12%						
Chile	21	5.15%			21	16%				
Colombia	14	3.43%			14	10%				
Costa Rica	1	0.25%			1	1%				
Cuba	1	0.25%							1	50%
Ecuador	9	2.21%			9	7%				
Dominican Republic	1	0.25%							1	50%
Honduras	1	0.25%								
Jamaica	1	0.25%			1	1%				
Mexico	19	4.66%			19	14%				
Panama	2	0.49%			2	1%				
Paraguay	1	0.25%			1	1%				
Peru	10	2.45%			10	7%				
Puerto Rico	1	0.25%	1	0.37%						
United States	238	58.33%	238	88%						

Country	Universities	%	AE	%	EME	%	LIDC	%	n/d	%
Uruguay	1	0.25%			1	1%				
Venezuela	2	0.49%			2	1%				
Total	408	100%	271	100%	134	100%	1	100%	2	100%

Panel C Continent in the Sample: Asia

Country	Universities	%	AE	%	EME	%	LIDE	%	n/d	%
Azerbaijan	7	1.07%			7	1%				
Bahrain	3	0.46%			3	1%				
Bangladesh	15	2.29%					15	1.00%		
Brunei Darussalam	2	0.30%			2	0%				
China (Mainland)	114	17.38%			114	24%				
Cyprus	3	0.46%	3	2%						
Hong Kong SAR. China	9	1.37%	9	6%						
India	78	11.89%			78	16%				
Indonesia	34	5.18%			34	7%				
Iran (Islamic Republic of)	15	2.29%			15	3%				
Iraq	8	1.22%			8	2%				
Israel	7	1.07%	7	5%						
Japan	44	6.71%	44	29%						
Jordan	11	1.68%			11	2%				
Kazakhstan	17	2.59%			17	4%				
Kuwait	3	0.46%			3	1%				
Kyrgyzstan	1	0.15%					1	4%		
Lebanon	7	1.07%			7	1%				
Macao SAR. China	2	0.30%	2	1%						
Malaysia	29	4.42%			29	6%				
Nepal	1	0.15%					1	4%		
Oman	3	0.46%			3	1%				

Country	Universities	%	AE	%	EME	%	LIDE	%	n/d	%
Pakistan	29	4.42%			29	6%				
Palestine	4	0.61%							4	80%
Philippines	5	0.76%			5	1%				
Qatar	2	0.30%			2	0%				
Republic of Korea	45	6.86%	45	29%						
Saudi Arabia	28	4.27%			28	6%				
Singapore	4	0.61%	4	3%						
Sri Lanka	4	0.61%			4	1%				
Syrian Arab Republic	1	0.15%							1	20%
Taiwan	40	6.10%	40	26%						
Thailand	18	2.74%			18	4%				
Türkiye	36	5.49%			36	8%				
United Arab Emirates	10	1.52%			10	2%				
Uzbekistan	7	1.07%					7	29%		
Viet Nam	10	1.52%			10	2%				
Total	656	100%	154	100%	473	100%	24	38%	5	100%

Panel D Continent in the Sample: Europe

Country	Universities	%	AE	%	EME	%	LIDC	%	n/d	%
Austria	12	2.17%	12	3%						
Belgium	10	1.81%	10	2%						
Bulgaria	2	0.36%			2	2%				
Croatia	3	0.54%	3	1%						
Czechia	12	2.17%	12	3%						
Denmark	6	1.08%	6	1%						
Estonia	4	0.72%	4	1%						
Finland	10	1.81%	10	2%						
France	60	10.83%	60	13%						
Germany	50	9.03%	50	11%						

Country	Universities	%	AE	%	EME	%	LIDC	%	n/d	%
Greece	10	1.81%	10	2%						
Hungary	12	2.17%			12	12%				
Iceland	1	0.18%	1	0%						
Ireland	9	1.62%	9	2%						
Italy	52	9.39%	52	11%						
Latvia	5	0.90%	5	1%						
Lithuania	6	1.08%	6	1%						
Luxem- bourg	1	0.18%	1	0%						
Malta	1	0.18%	1	0%						
Nether- lands	13	2.35%	13	3%						
Norway	7	1.26%	7	2%						
Poland	22	3.97%			22	23%				
Portugal	12	2.17%	12	3%						
Romania	10	1.81%			10	10%				
Russian Federation	32	5.78%			32	33%				
Serbia	2	0.36%			2	2%				
Slovakia	4	0.72%	4	1%						
Slovenia	2	0.36%	2	0.4%						
Spain	44	7.94%	44	10%						
Sweden	16	2.89%	16	4%						
Switzer- land	11	1.99%	11	2%						
Ukraine	17	3.07%			17	18%				
United Kingdom	96	17.33%	96	21%						
Total	554	100%	457	100%	97	100%	0	0%	0	0%

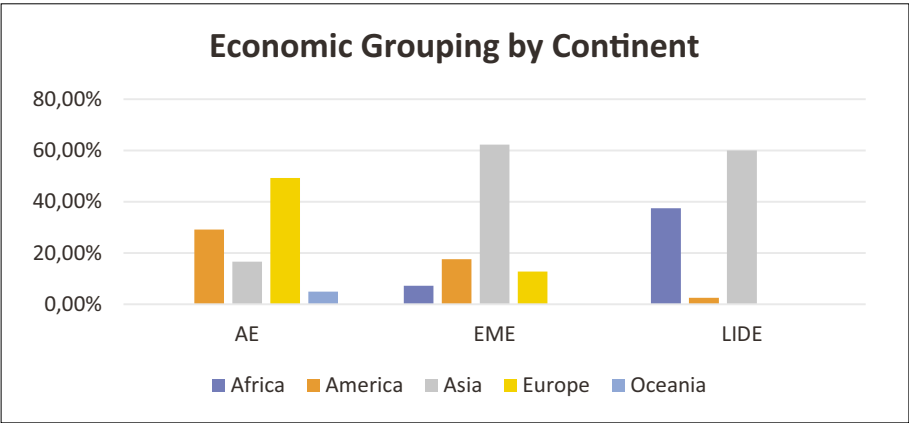
Panel E Continent in the Sample: Oceania

Country	Universities	%	AE	%	EME	%	LIDC	%	n/d	%
Australia	38	80.85%	38	83%						
Fiji	1	2.13%			1	100%				

Country	Universities	%	AE	%	EME	%	LIDC	%	n/d	%
New Zealand	8	17.02%	8	17%						
Total	47	100%	46	100%	1	100%	0		0	0%

As illustrated in Table 1, the number of universities in the sample is displayed, alongside their classification by continent and economic group. The acronyms AE, EME and LIDE are used to refer to advanced economies, emerging market economies and low-income developing economies, respectively. Source: Own elaboration based on QS World University Rankings: Sustainability 2025

As shown in Graph 2, the data is presented by economic grouping, categorised as follows: advanced economies (AE), emerging market economies (EME), and low-income developing economies (LIDE). These categories are identified by continent, namely Africa, America, Asia, Europe, and Oceania. It is evident that Europe has the highest number of universities in countries with advanced economies (49,25%). The second highest number of universities is found in America (29,20%), followed by Asia (16,59%) and Oceania (4,96%). The analysis indicates that Asia has the highest number of universities in countries classified as emerging market economies (62,24%). The second highest number of universities is found in America (17,63%), followed by Europe (12,76%) and Africa (7,24%), and Oceania accounts for 0,13%. Furthermore, the highest number of universities in low-income country economies is found in Asia (60%), followed by Africa (37,50%) and America (2,50%).



GRAPH. 2 Sampling distribution across Economic Grouping by continent (Source: Own elaboration based on QS World University Rankings: Sustainability 2025)

3.3 METHODOLOGY AND ANALYTICAL APPROACH

The QS Sustainability ranking provides a composite score ranging from 0 to 100, derived from specific weighted indicators across three main dimensions:

1. Environmental impact: Measures institutional commitment to environmental sustainability, environmental education, and environmental research.
2. Social impact: Evaluates efforts related to equality, knowledge exchange, educational impact, employability, and health/wellbeing.
3. Governance: Assesses the transparency, ethics, and inclusivity of the university's decision-making processes.

To interpret these scores systematically, this study adopts the established ESG score range classification frequently used in corporate ESG research via the Refinitiv Eikon database (Bodhanwala and Bodhanwala, 2022). The scores are divided into four distinct performance levels:

- Poor (0-25): Poor relative ESG performance and insufficient transparency.
- Satisfactory (26-50): Satisfactory relative ESG performance and moderate transparency.
- Good (51-75): Good relative ESG performance and above-average transparency.
- Excellent (76-100): Excellent relative ESG performance and a high degree of transparency.

Given the exploratory nature of this global mapping, the analytical approach relies on comparative descriptive statistics (mean, median, maximum, minimum, and standard deviation). As noted by Ariza and Gandini (2012), comparative descriptive analysis is well suited to describing diverse conditions across a large, heterogeneous sample where conventional inferential methods may be constrained by high variance and structural differences between regions. Although the absence of multivariate inferential analysis limits the ability to establish causal relationships, a limitation explicitly acknowledged in this study, the descriptive approach provides a founda-

tional benchmarking perspective that is essential for identifying macro-level geographical and economic patterns in university ESG performance.³

4 RESULTS AND DISCUSSION

This section presents the empirical findings of the global university ESG score analysis. To enhance clarity and focus on the most robust statistical measure, the analysis primarily reports the median scores across different geographical and economic groupings (Barber & Lyon, 1997; Rakrak, 2024). Following the results, a detailed discussion contextualises these findings within the existing literature and outlines the study’s limitations.

4.1 DESCRIPTIVE RESULTS AND GLOBAL PATTERNS

Table 2 presents summary statistics for the entire sample of 1,735 universities across all five continents, covering Advanced Economies (AE), Emerging Market Economies (EME), and Low-Income Developing Economies (LIDE).

TABLE 2 Summary statistics by ESG Score, universities and economy grouping by all continent
Panel F: AE+EME+LIDE

Score	Social	Environ- mental	Gover- nance	Environmental Sustainability	Environmental Education	Environmental Research
Mean	57.27	44.69	53.94	33.78	41.22	60.65
Median	54.60	40.50	54.60	33.20	38.60	64.00
Max.	100	100	100	100	100	100
Min.	15.6	4.6	8.2	1	1	1.2
Standard Deviation	19.38	19.70	27.07	22.62	25.58	23.42
N	1,735	1,735	1,735	1,735	1,735	1,735

This table displays the summary statistics for the key variables used in the analysis. Source: Own elaboration based on QS World University Rankings: Sustainability 2025 and International Monetary Fund (October 2024)

³ This study does not include the different indicators and weightings so as avoid overloading this paper, but they can be consulted on the QS World University website, in the section describing the categories, lenses and indicators mentioned in this paper, available at the link in the corresponding bibliographical reference.

Analysis of the full sample reveals that universities worldwide perform best in Environmental Research (median = 64.00), Social Impact (54.60), and Governance (54.60), all of which fall into the “Good” relative ESG performance range. Conversely, Environmental Sustainability (33.20) and Environmental Education (38.60) lag behind, falling into the “Satisfactory” range. This indicates a global trend in which universities prioritise research output and social initiatives over operational campus sustainability and dedicated environmental curricula, as further illustrated in Graph 3.

To provide a more nuanced understanding of how these scores vary by region and economic development, Table 3 presents the median ESG scores across all five continents and their respective economic groupings. This consolidated approach allows for direct cross-regional comparisons.

TABLE 3 Consolidated Median ESG Scores by Continent and Economic Grouping

Continent	Economic Grouping	Social	Environmental	Governance	Env. Sustainability	Env. Education	Env. Research
Africa	EME	43,60	36,20	47,70	27,10	37,70	54,60
	LIDE	45,20	34,70	26,30	22,00	34,70	45,30
America	AE	66,10	47,50	31,50	26,00	47,20	74,40
	EME	44,30	31,10	54,85	20,50	35,35	46,50
	LIDE	30,60	19,60	48,80	33,50	9,70	17,00
Asia	AE	52,85	46,80	75,45	42,95	43,20	66,55
	EME	45,40	33,90	52,15	33,20	26,40	55,75
	LIDE	40,60	28,80	39,20	33,20	18,50	45,15
Europe	AE	68,30	48,10	59,00	34,50	45,10	75,90
	EME	44,00	34,70	73,70	31,20	44,30	36,50
Oceania	AE	86,70	73,95	92,50	55,55	72,10	90,95
	EME	44,00	35,30	17,50	49,80	5,30	56,60

Source: Own elaboration based on QS World University Rankings: Sustainability 2025 and International Monetary Fund (October 2024)

Several distinct patterns emerge from Table 3. First, Advanced Economies (AE) consistently outperform Emerging Market Economies (EME) and Low-Income Developing Economies (LIDE) across almost all dimensions, particularly in Oceania, Europe, and the Americas. Oceania’s AE

universities demonstrate “Excellent” performance across the Social, Governance, and Environmental Research dimensions. Second, Environmental Research is a notable strength across diverse economic contexts. Even in EME regions in Africa (54.60) and Asia (55.75), Environmental Research scores reach the “Good” performance tier. This suggests that research output is a universally prioritised metric, regardless of a country’s overall economic wealth. Third, Governance scores exhibit significant regional variation. While AE universities in Oceania (92.50) and Asia (75.45) excel in governance transparency, AE universities in the Americas score surprisingly low (31.50). Conversely, EME universities in Europe (73.30) and the Americas (54.85) show robust governance frameworks, outperforming their AE counterparts in the Americas.

4.2 DISCUSSION

The findings of this study advance understanding of university sustainability by highlighting how macroeconomic and geographical factors shape ESG performance. The consistent outperformance of Advanced Economies (AE) in the Social and Governance dimensions aligns with the literature emphasising the role of financial resources and internationalisation. As Blasco et al. (2020) noted, greater financial support is highly relevant for achieving sustainability goals. AE universities are likely to possess the structural organization and capital required to implement comprehensive ESG reporting and attract international talent (Wright, 2009; Gallego-Álvarez et al., 2011).

However, the surprising strength of Emerging Market Economies (EME) in Environmental Research achieving “Good” scores in Africa and Asia suggests that research capacity is not exclusively tied to national wealth. This may be driven by targeted international grants, global research collaborations, or urgent regional climate challenges that necessitate localised environmental studies. This finding extends the observations of Mo et al. (2023) regarding the emergent, yet highly focused, ESG reporting in developing regions such as China.

Furthermore, the relatively low scores in Environmental Sustainability (campus operations) and Environmental Education across most regions, including many AEs, corroborate the findings of Garlatti et al. (2025).

Their study of Italian universities found a predominant focus on social measures while environmental dimensions were often omitted from strategic plans. The global findings suggest this is a widespread phenomenon: universities are adept at producing environmental research but struggle to integrate sustainability into their own campus operations and core curricula (Verna et al., 2025).

Taken together, these findings provide direct answers to the three research questions posed in this study. Regarding RQ1 (differences across continents), the results confirm that Oceania and Europe consistently achieve the highest ESG scores, while Africa and LIDE regions in Asia lag behind across most dimensions. Regarding RQ2 (influence of economic development), Advanced Economies systematically outperform EME and LIDE groupings in Social and Governance dimensions, although the gap narrows considerably in Environmental Research. Regarding RQ3 (strongest ESG dimensions), Environmental Research emerges as the universally strongest dimension across all economic and geographical contexts, while Environmental Sustainability and Environmental Education represent the most persistent global weaknesses.

5 CONCLUSIONS

This study set out to explore the geographical and economic drivers of global university ESG scores, using the QS World University Rankings: Sustainability 2025 and IMF economic classifications. The findings reveal a complex landscape in which macroeconomic development significantly influences sustainability performance yet does not determine it entirely. The most notable takeaway is the universal prioritisation of Environmental Research. Whether a university is in an Advanced Economy (AE) or a Low-Income Developing Economy (LIDE), research output remains the strongest pillar of ESG performance. However, this strength is often accompanied with a concerning weakness in Environmental Sustainability (campus operations) and Environmental Education. This discrepancy suggests that while universities excel at studying climate change, they struggle to implement sustainable practices within their own institutions

and curricula. Furthermore, the results highlight a clear “governance and social premium” associated with Advanced Economies, particularly in Oceania and Europe. These institutions leverage their financial and structural advantages to establish robust transparency and social impact frameworks. Conversely, Emerging Market Economies (EME) demonstrate surprising resilience, often outperforming expectations in specific dimensions, indicating that targeted sustainability strategies can yield significant results even in resource-constrained environments.

For university administrators and policymakers, these findings emphasize the need for a more holistic approach to ESG integration. Strategic investments must move beyond simply funding environmental research to actively decarbonising campus operations and embedding sustainability across all educational programmes. Additionally, international ranking agencies should take into account the structural disadvantages faced by LIDE universities and consider developing context-specific metrics that capture localised sustainability efforts rather than focusing solely on global research output.

While this study provides a foundational global mapping, several limitations must be acknowledged. Reliance on a single ranking system (QS Sustainability) means the results are subject to its specific methodological weightings. Furthermore, the analytical approach is fundamentally descriptive. Although appropriate for an exploratory overview, the absence of multivariate inferential statistics prevents the establishment of causal relationships. Finally, there is a potential bias in data availability, as universities in LIDE regions are under-represented in global rankings. Future research should employ inferential modelling to control for confounding variables such as national regulatory frameworks and cultural attitudes, to explore the specific institutional mechanisms driving ESG success across different economic contexts.

BIBLIOGRAPHY

- AKOPYANTS, I. M., K. Y. VARTANOVA, A. V. KISELEVA, I. N. MIKHAILOVSKAYA, and I. V. PATSORA. 2024. ESG Agenda in the Educational Process of a University. In *Ecological footprint of the modern economy and the ways to reduce it: The role of leading technologies and responsible innovations* (pp. 71-75). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-49711-7_13
- ARIZA, M., and L. GANDINI. 2012. El análisis comparativo cualitativo como estrategia metodológica. En M, Ariza y L. Velasco (Coord.). *Métodos cualitativos y su aplicación empírica* (pp. 497-537). México: Instituto de Investigaciones Sociales y Colegio de la Frontera Norte.
- BARBER, B.M., and J.D. LYON. 1997. "Detecting long-run abnormal stock returns: the empirical power and specification of test statistics." *Journal of Financial Economics*. 43: 341-372. [https://doi.org/10.1016/S0304-405X\(96\)00890-2](https://doi.org/10.1016/S0304-405X(96)00890-2)
- BLASCO, N., I. BRUSCA, and M. LABRADOR. 2020. "Drivers for universities' contribution to the sustainable development goals: An analysis of Spanish public universities." *Sustainability* 13(1): 89. <https://doi.org/10.3390/su13010089>
- BODHANWALA, S., and R. BODHANWALA. 2022. "Exploring relationship between sustainability and firm performance in travel and tourism industry: global evidence." *Social Responsibility Journal* 18(7): 1251-1269. <https://doi.org/10.1108/SRJ-09-2020-0360>
- CHAN, Y. K., and M. Y. HSIEH. 2022. "An empirical study on higher education C-ESG sustainable development strategy in lower-birth-rate era." *Sustainability* 14(19): 12629. <https://doi.org/10.3390/su141912629>
- DUQUE-GRISALES, E., and J. AGUILERA-CARACUEL. 2021. "Environmental, social and governance (ESG) scores and financial performance of multinationals: Moderating effects of geographic international diversification and financial slack." *Journal of Business Ethics* 168 (2): 315-334. <https://doi.org/10.1007/s10551-019-04177-w>
- FABIO, N., S. FEDERICO, S. MARIA, and G. SARA. 2023. "The impact of ESG perception on Universities." *Proceedings IFKAD*, 463-476. <https://iris.uniroma1.it/handle/11573/1703862.2>
- FLEMING, P., J. ROBERTS, and C. GARSTEN. 2013. In search of corporate so-

- cial responsibility: Introduction to special issue. *Organization*. 20 (3): 337–348. <https://doi.org/10.1177/13505084134795>
- GALLEGO-ÁLVAREZ, I., L. RODRÍGUEZ-DOMÍNGUEZ, and I. M. GARCÍA-SÁNCHEZ. 2011. "Information disclosed online by Spanish universities: Content and explanatory factors." *Online Inf. Rev* 35: 360–385. <https://doi.org/10.1108/14684521111151423>
- GARLATTI, A., S. IACUZZI, and P. FEDELE. 2025. "ESG performance measures in universities' strategic plans." *Economia pubblica* LII(1): 33-70. <https://doi.org/10.3280/EP2025-001002>
- GIANNOPOULOS, G., R. V. KIHLE FAGERNES, M. ELMARZOUKY, and K. A. B. M. AFZAL Hossain. 2022. "The ESG disclosure and the financial performance of Norwegian listed firms." *Journal of Risk Financial Management* 15(6): 237. <https://doi.org/10.3390/jrfm15060237>
- GLOVA, J., and M. PANKO. 2025. "The effects of environmental. social. and governance factors on financial performance and market valuation in the European automotive industry." *International Journal of Financial Studies* 13(2): 82. <https://doi.org/10.3390/ijfs13020082>
- INTERNATIONAL MONETARY FUND. October 2024. https://www.imf.org/external/datamapper/Metadata_Oct2024.xlsx.
- MARDINI, G. H. 2022. "ESG factors and corporate financial performance." *International Journal of Managerial and Financial Accounting* 14(3): 247-264. <https://doi.org/10.1504/IJMFA.2022.123895>
- Mo, F., and D. D. WANG. 2023. "Emerging ESG reporting of higher education institutions in China." *Heliyon* 9(11). <https://doi.org/10.1016/j.heliyon.2023.e22527>
- MUSTAPHA, RAKRAK. 2024. "Central tendency and data distribution: How to choose the right measure for accurate analysis." *International Journal of Literacy and Education*. <https://dx.doi.org/10.22271/27891607.2025.v5.i1b.253>
- NURILLAYEV, E. 2025. "Embedding ESG in finance education: the impact of ESG education within graduate finance programs on ESG-related problems." *International Journal of Sustainability in Higher Education* 26(8): 1914–1931, <https://doi.org/10.1108/IJSHE-06-2024-0388>
- PEREZ-ESPARRELLS, C., and E. ORDUNA-MALEA. 2018. "Do the technical universities exhibit distinct behaviour in global university rankings? A Times Higher Education (THE) case study." *J. Eng. Technol. Manag* 48: 97–108. <https://doi.org/10.1016/j.jengtecman.2018.04.007>

- PUZZONIA, M. 2018. "The impact of ESG investment. how company and university can collaborate to realize it with local innovation." *Journal of Intercultural Management* 10(3): 171-194. <https://www.cceol.com/search/article-detail?id=727039>
- QS WORLD UNIVERSITY RANKINGS: Sustainability. 2025. Available on: https://www.topuniversities.com/sustainability-rankings?sort_by=rank&order_by=asc.
- SCOTT, J. 2006. "The Mission of the University: Medieval to Postmodern Transformations." *J. High. Educ* 77: 1-39. <https://doi.org/10.1080/00221546.2006.11778917>.
- SUNG, H. J., and E. J. KIM. 2024. "Analysis of ESG importance and current level of educational needs of university faculty." *Library of Progress-Library Science. Information Technology & Computer* 44(2). <https://doi.org/10.48165/bapas.2024.44.2.1>
- TETI, E., and L. SPIGA. 2023. "The effect of environmental, social and governance score on operating performance after mergers and acquisitions." *Business Strategy and the Environment* 32(6): 3165-3177. <https://doi.org/10.1002/bse.3293>.
- TONG, L., and M. CHEN. 2024. "The Impact of Female Director Background on ESG Performance of Chinese Technology Firms: A Moderating Effect Based on Risk Appetite." *Sustainability* 16(23): 10753 <https://doi.org/10.3390/su162310753>
- VERNA, I., and A. D'ANDREAMATTEO. 2025. ESG Concerns and Teaching Processes in Higher Education, an Experimental Approach. In: Castellano, N., De Luca, F., D'Onza, G., Maffei, M., Melis, A. (eds) *Environmental, Social, Governance (ESG). SIDREA Series in Accounting and Business Administration*. Springer, Cham. https://doi.org/10.1007/978-3-031-76618-3_6.
- WRIGHT, T.S.A. 2009. "Sustainability, internationalization, and higher education." *New Dir. Teach. Learn* 118: 105-115. <https://doi.org/10.1002/tl.357>.
- ZHUTIAEVA, S.A., A.Y. USANOV, A.V. SELEZNEVA. 2023. ESG Rankings to Confirm the Commitment of Universities to the SDGs. In: Rumyantseva, A., Anyigba, H., Sintsova, E., Vasilenko, N. (eds) *Finance, Economics, and Industry for Sustainable Development. NCSDESG 2022*. Springer Proceedings in Business and Economics. Springer, Cham. https://doi.org/10.1007/978-3-031-30498-9_21.

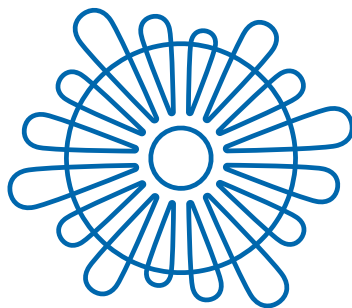


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