*Article*

# Sustainability Topics Integration in Supply Chain and Logistics Higher Education: Where Is the Middle East?

Maja Rosi 🆔 and Matevž Obrecht *🆔

Faculty of Logistics, University of Maribor, 3000 Celje, Slovenia
* Correspondence: matevz.obrecht@um.si

**Abstract:** The global logistics industry has grown significantly in the last decade and has become essential to global business activities. In addition, the logistics industry is vital in transportation, urbanization in the Middle East, and transshipment through the Middle East. Due to their increasing importance and size, there is an increasing demand for adequately qualified people capable of managing the logistics systems and supply chains holistically and sustainably to avoid problems caused by unsustainable practices in mobility, transport, and supply chains. However, it is unclear whether the logistic and supply chain education of future leaders, managers, and engineers will follow SDG goals, the rise of new trends, and green technologies or lag behind. This paper pioneered a systematic approach and analyzed Middle Eastern countries regarding their sustainability integration into higher education programs related to supply chain management and logistics studies. It revealed enormous differences among countries and a lack of sustainability topics in most studied countries. Some countries are also significantly more oriented toward partial logistics challenges such as transport efficiency instead of sustainable supply chains, which are becoming critical challenges for the near future and must be accompanied by formal and life-long learning on sustainability-related topics. The circular economy and corporate social responsibility are especially neglected. It was also revealed that sustainability integration in higher education does not correlate with sustainability scores and the ranking of countries within the sustainability index.

**Keywords:** sustainability integration; Middle East; supply chain management; responsible logistics; education for SDGs

## 1. Introduction

The global logistics industry is facing new infrastructure development, new technology adoption, high energy consumption, and political polarization recently accompanied by new challenges in environmental protection, social challenges, better collaboration, and managing supply disruptions sustainably. In the Middle East (ME), the logistics industry plays a vital role in transportation development and urbanization and will be a crucial player contributing to regional sustainability. Due to its significant size and fast development, there is an increasing demand for adequate qualified people capable of managing not just distribution and supply disruptions but holistically dealing with business, environmental, and social issues. Information on whether logistic education follows this expansion based on a sustainable development agenda or lags behind is unavailable. Therefore, this paper focused on sustainability integration into logistics and supply chain studies in selected ME countries [1–3].

The ME has undergone tremendous cultural, political, and economic growth over the past few years. The region is facing a fundamental change in the oil market, where new technologies are increasing the oil supply on the one hand and, on the other, raising concerns over the environment, forcing a move away from oil. In order to reduce their reliance on oil and become a more sustainable society, oil-exporting countries, including ME countries, are establishing and implementing new reforms to diversify their economies

with sustainable directives [1,2] and initiatives [3–5]. Similarly, new goals toward a more sustainable environment and green economy are set in the logistics industry, to become a transformative society [6]. Companies are encouraged to implement an environmentally sound approach and incentivize lowering their carbon footprint [7], and are challenged with the transition to a net-zero economy [8]. Alongside addressing environmental concerns, long-term value creation based on human capital development and good corporate governance is gaining importance [8].

The strategic location of the ME—at the junction of three continents and with the world's most critical natural resources, including over half of the world's proven oil reserves—has historically been a crossroads for trade, people, and a transition zone for political and cultural interaction [9,10]. The global logistics market is projected to grow by USD 71.96 billion by 2026 [11]. In terms of global competitiveness, the United Arab Emirates (UAE) was ranked among the top 20 countries in 2020 across 13 indexes related to transport [12]. The UEA is also considered one of the largest logistics hubs in the ME [13], and a large part of the country's economy is based on the logistics industry. Issues arising from this industry may significantly impact the business community, logistics organizations, and the overall economy of this region [14]. That proves that logistics is among the highly prioritized industries in those regions. According to Knight [15], oil-reliant economies need to maximize their attractiveness, diversify their economies, and improve their logistics industry competitiveness and industry performance as well as make their supply chains more sustainable [16].

Along with the growth of the logistics sector, there is also growing importance for adequately educated and skilled human resources, emphasizing a sustainable, green society [17]. This affects education providers, especially universities and colleges, by offering logistics-related programs and essential contributions to society and the economy. Since logistics is a growing topic, and industry demand for experts capable of sustainably managing logistics is expanding [18], logistics education can significantly influence the success of sustainability in the logistics sector. Integrating sustainability and embedding sustainable development in higher education is highly topical [19–21]. However, information about it is not yet available; our research focused on analyzing logistics-related higher education programs in selected ME countries and its integration of sustainability topics. The quality and adoptability of supply chain education are identified by adapting to local and global socio-political, environmental and economic challenges [22].

The analysis of ME study programs serves three purposes: first, it provides a database with novel findings. Second, it compares ME logistics-related study programs using various criteria focusing mainly on sustainability topics. Third, the results can be used as an orientation tool for the ME logistics sector, for other fast-growing economies and societies, to develop toward a more sustainable future. However, the study approach and method must first be developed to do that. Therefore, this study's innovative approach was also identified in the developed framework for analyzing study programs structured in three steps. Furthermore, the main aim of this study was to explore logistics and supply chain-related study programs in the ME in terms of their environmental sustainability integration. Particular emphasis was on identifying specific sustainable development priorities (e.g., sustainability, environment, eco/green, circularity, CSR). We also comparatively analyzed sustainability integration on three levels of logistics—(1) transportation, (2) logistics, and (3) supply chain management. In addition, we assumed that countries with more sustainability topics and better sustainability integration in their study programs also had better sustainability scores. Therefore, potential correlations with the sustainability score/index were also investigated and examined.

## 2. Review of Theoretical Background

As sustainable development is recognized as one of the biggest societal challenges nowadays, HEIs should incorporate sustainability values into their mission, curriculum, and practice to align with the global sustainability agenda [23,24]. HEIs must enable

sustainability-oriented education of future managers, experts, and other social stakeholders and raise their environmental awareness [25]. They have an important role in societal transformation by educating global citizens and delivering knowledge and innovation to society [26].

This also applies to HEIs in the ME that are also experiencing significant transformation, privatization, internationalization, and industry reforms [27]. Higher education institutions must adjust to these changes by reforming their study programs or adding new ones to meet the growing market needs. Along with this, the growth of the young population is estimated to be 65 million by 2030; education and qualified professionals are crucial elements for achieving sustained development and sustainable development goals (SDGs) [21,28]. Namely, higher education influences the development of production and sustainable management systems [29].

Regarding environmental issues, universities in the region need to comply with international and environmental requirements, including policies toward reducing the carbon footprint and integrating environmental management into daily business [30]. HEIs, directly and indirectly, impact sustainable development through all their activities, influencing society, the environment, and the economy [31]. It is challenging to integrate sustainable development and sustainability into their systems [23–25] with a particular focus on sustainability topic analysis and defining priorities such as circular economy, green transition, social responsibility, and other related topics.

Reviewing the literature, we found few studies about ME higher education, and a recent lack of scientific research on the integration of sustainability-related topics in ME higher education was noted.

Most publications on sustainability in HEIs focus on the Global North; little is known about the state of sustainability in HEIs in the Global South [32]. Similarly, Hassan et al. [33] noticed that no previous publications studied sustainability challenges in HEIs in the middle eastern region.

Romani [27] explored higher education issues as a critical political problem in the Arab ME. Education was also identified as a future challenge for the ME by Akkari [34]. Miller-Idriss and Hanauer [35] researched the landscape of transnational higher education in the ME, focusing on offshore educational institutions and programs that foreign institutions have set up in the region. Similarly, Rupp [36] focused on foreign universities and colleges in the ME. Alzyoud and Bani-Hani [37] discussed how universities in the ME could achieve development, sustainability, and competitiveness by applying University social responsibility concepts. Sherif [38] investigated a similar topic, emphasizing how corporate social responsibility (CSR) is implemented in universities in the ME. Another comprehensive survey was performed by Saab and coauthors [30] regarding the environmental content in school and university curricula across Arab countries, and Daneshjo proposed a new approach for teaching sustainability in Arab schools [39]. Keser [29] investigated the effects of higher education on global competitiveness in European countries and ME countries.

By reviewing publications and research studies related to sustainability issues in ME higher education, it was revealed that practically no findings of integrating sustainability topics in logistics and supply chain-related education in those countries could be found. It was found that even studies related to sectors other than logistics or other geographical areas did not cover an analysis of priority topics. So, which sustainability topics will be taught is of particular importance for the education of future leaders and experts in the field of green transition, circular economy, and sustainable supply chains.

## 3. Methods

This study identified sustainability-related topics integrated into logistics and supply chain management-related studies in the Middle East. The Middle East was selected as a niche area poorly examined from the sustainability perspective. Since the definitions of the ME countries vary, this study focus was on 15 countries: Turkey, Syria, Cyprus, Lebanon,

Israel, Jordan, Iraq, Iran, Kuwait, Saudi Arabia, Bahrain, Qatar, United Arab Emirates, Oman, and Yemen as proposed by the World population review [40].

To perform this research, a conceptual framework for analyzing and identifying relevant variables for exploring sustainability integration into the logistics and supply chain management-related study programs in the selected ME countries was first developed (Figure 1). Conceptual frameworks represent a way of thinking about a study, or ways of representing how complex things work the way they do [41].
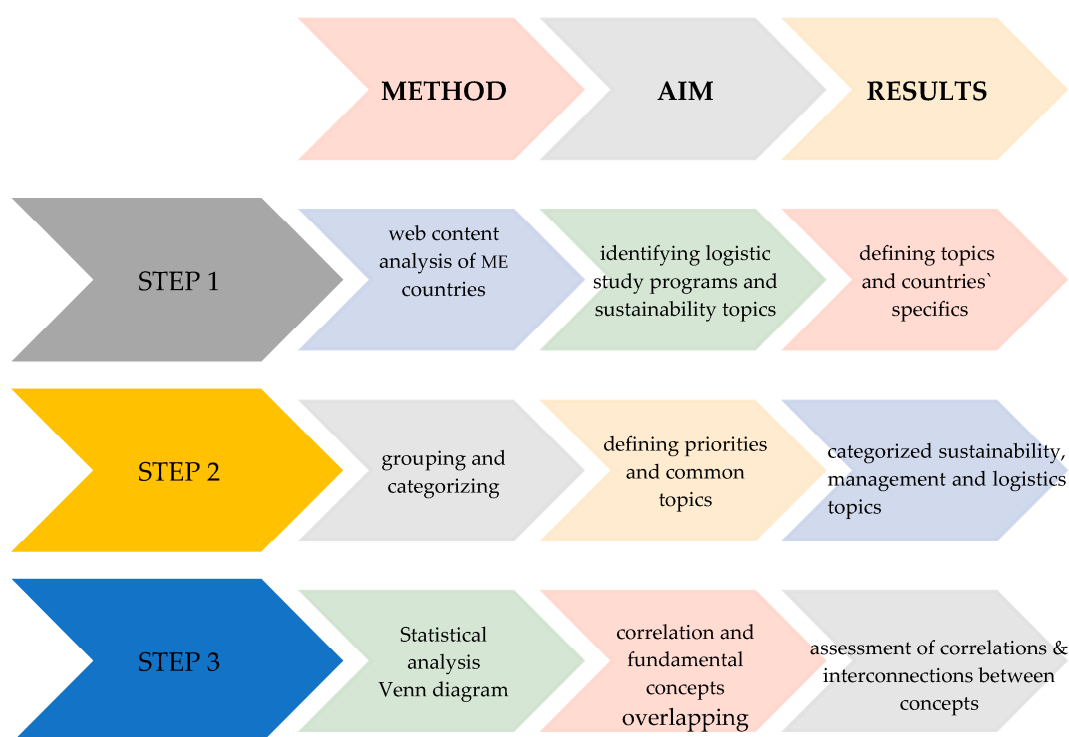


**Figure 1.** A developed conceptual framework for analyzing and identifying relevant variables and integrating sustainability topics into selected ME countries' logistics-related higher education.

We developed a conceptual framework in three steps, namely: (1) web content analysis of selected study programs, (2) grouping and categorizing analyzed topics, and (3) statistical analysis and cross-sections of included topics.

First, the web-content analysis was used as a qualitative descriptive approach. Content analysis is a systematic coding and categorizing approach used to analyze and explore much textual information [42,43]. Private and public higher institutions in chosen ME countries with English web pages were searched and listed to create a data sample. A comprehensive study of publicly available online data, accessible on each institution's web pages, identified logistic and supply chain management-related study programs at all study levels (graduate and postgraduate) and cross-compared country specifics on specific sustainability topics integration. These specific topics were also seen as study program priorities.

The second step was divided into (a) identifying common keywords and (b1) grouping and (b2) categorizing obtained data, following Jabareen's [44] conceptual framework analysis. (a) Obtained data from the first step revealed nine keywords that were commonly used in logistics-related study programs: *logistics, supply chain, mobility/transport (air, road, sea, rail, maritime, ship, etc.), management, corporate social responsibility (CSR), environmental, eco/green, waste/circular, sustainable and their synonyms (b1)*. We defined groups of keywords; the first group consisted of the most common logistic education-related keywords: "*logistics*", "*supply chain*", and "*transport/mobility*", as well as "*management*". According to our previous study of sustainability and environment-related higher education study pro-

grams [45], the second group of keywords referred to sustainability education: *"sustainable"*, *"environmental"*, *"eco/green"*, *"waste/circular"*, and *"corporate responsibility"*. The database listed programs related to the keywords (e.g., in the program's name, in curricula, and study outcomes) and was limited by programs accessible online and in English. Further, we categorized the keywords into logistics, management, and sustainability-related topics (b2), as presented in Table 1.

**Table 1.** Grouping logistics, management, and sustainability-related topics.

| | | Groups of Study Topics | |
|---|---|---|---|
| | Logistics Related | Management Related | Sustainability Related |
| Study topics | Supply chain<br>Logistics<br>Mobility/Transport | CSR<br>Management | Environment(al)<br>Sustainability<br>Waste/Circular<br>Eco/Green |

The second step provided a detailed analysis of the most and least common topics in specific countries and study cycles and defined the share of programs with specific topics included in their curricula. This information is of practical importance to see whether programs are following strategic goals of each country or group of countries. It enabled defining priorities of logistic-related study programs in investigated countries and exposing the potential for improvements.

The third step was identifying the correlations between the studied keywords. The study analyzed the correlation between obtained data with the SPSS software program and performed sequence analysis for different variables to find the correlation between sustainability integration and the sustainability index. The third step also included in-depth analysis by countries, study cycles, and sustainability-related topics in logistics and supply chain HEI. Last but not least, the Venn diagram method was used to understand the crucial correlations and fundamental concepts overlapping each other and identify interconnectivity among groups of sustainability-, logistics-, and management-related topics [46,47]. Examining the interconnectivity and overlap of these topics enabled us to identify logistics-, management-, and sustainability-related programs simultaneously. This combination was seen as the most prominent for managing sustainability-related challenges of the future in the logistics sector. Therefore, this framework could also be applied in other geographical areas/environments and add additional value to this research.

## 4. Results

This paper's dataset included 405 higher education programs (56% private, 43% public, and 1% with programs combined as public and private partnerships) in 15 ME countries. Program curricula were analyzed by nine study topics (keywords) to determine the integration of these topics into various study programs. The most significant share of study programs could be seen at the bachelor level (59%), followed by master's study programs (35%) and PhD study programs (6%). Most study programs were found in Israel.

Of all integrated topics, the highest share of programs were focused on management (50.1% of all programs included in the ME database), followed by sustainability, transport or logistics (31.6–34.8%), and finally, Eco/green and CSR (12.6–18.0%). Results indicate that only environment and mobility/transport study topics, not sustainability topics, were integrated to some degree in all researched ME countries. The share of study topics integrated into ME higher education programs can be observed in Figure 2.
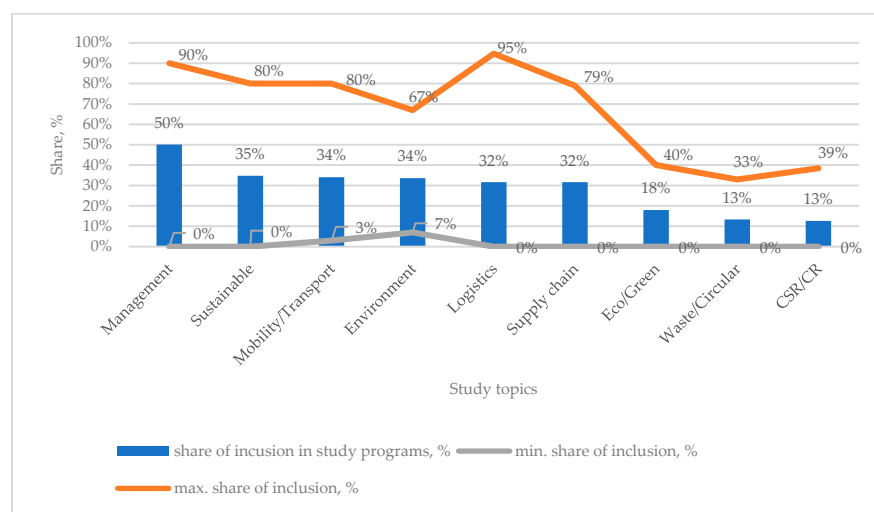
**Figure 2.** Share of study topics integrated into study programs in ME countries with minimal and maximal integration.

Further, study topics were grouped into study topics per study cycle. Figure 3 indicates that management was the study topic commanding the highest share of the curriculum in 53% of all bachelor-level and 49% of all master's programs. Interestingly, mobility/transport mainly included study topics in PhD programs.
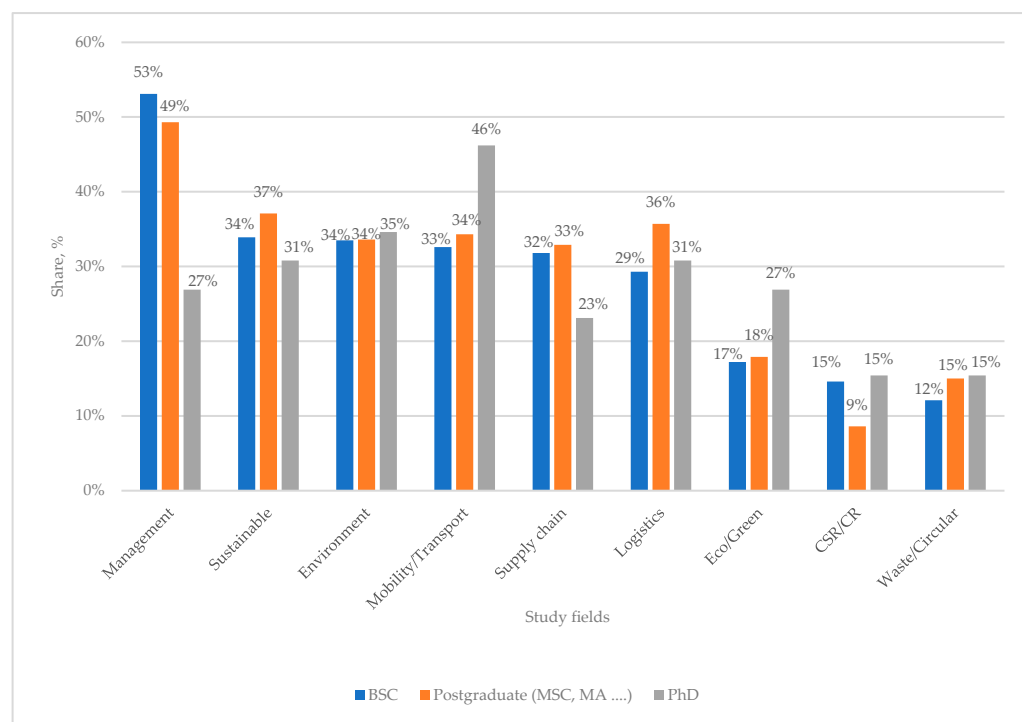


**Figure 3.** Share of study topics included in ME study programs per study level.

Detailed analysis revealed the level of integration of specific topics by country. As can be seen from Table 2, Jordan had the highest share of integrated logistics and management study topics. Turkey indicated high integration of logistics and management study topics but low integration of sustainability-related topics. No study programs were found for the UAE and Bahrain, including management study topics. Results varied depending on the country, although meager inclusion rates were observed for CSR study topics in all researched ME countries.

**Table 2.** Most and least included topics by country.

| Country | Priority Topics | Share of Program in % | Least Common Topic | Share of Program in % |
|---|---|---|---|---|
| Bahrain | Environment | 77% | CSR/CR | 0% |
| | | | Management | 0% |
| Cyprus | Mobility/Transport | 71% | Waste/circular | 0% |
| | Environmental | 65% | CSR/CR | 0% |
| Iran | Mobility/Transport | 66% | Waste/circular | 10% |
| | Supply chain | 55% | Eco/green | 10% |
| Iraq | Management | 77% | Logistics | 0% |
| | Mobility/Transport | 69% | Eco/green | 0% |
| Israel | Environment | 42% | Mobility/Transport | 12% |
| | Sustainable | 40% | Waste/circular | 12% |
| | Eco/green | 40% | | |
| Jordan | Sustainability | 90% | Supply chain | 8% |
| | Management | 90% | CSR/CR | 5% |
| Kuwait | Environmental | 70% | Supply chain | 0% |
| | | | Sustainable | 0% |
| | | | Logistics | 0% |
| | | | Eco/green | 0% |
| Lebanon | Management | 39% | CSR/CR | 0% |
| Oman | Supply chain | 67% | CSR/CR | 15% |
| Qatar | Environment | 43% | Waste/circular | 0% |
| | Management | 43% | | |
| Saudi Arabia | Environment | 58% | Eco/green | 6% |
| Syria | Mobility/Transport | 80% | CSR/CR | 20% |
| | Sustainability | 80% | Logistics | 20% |
| | Management | 80% | Supply chain | 20% |
| Turkey | Logistics | 95% | Sustainable | 0% |
| | Management | 82% | eco/green | 0% |
| | | | CSR/CR | 0% |
| UAE | Logistics | 93% | Management | 0% |
| Yemen | Management | 65% | Mobility/Transport | 3% |
| | | | CSR/CR | 3% |

To better understand the level of topic integration (nine keywords) by country, we analyzed obtained data with a spider diagram (Figure 4). Countries such as Cyprus, Iran, Syria, Turkey, and the UAE showed more robust integration of logistics-related study topics. Iraq, Jordan, and Syria focused on management in their study programs. Nevertheless, Bahrain, Kuwait, Jordan, Cyprus, and Israel focused more on sustainability than other countries. Kuwait's focus was on environmental study topics, and Turkey focused on management and logistics study topics.

Regarding the focus on specific study topics and locations, correlations between the researched countries were not observed. Only Iraq and Iran were neighboring countries with similar trends in high integration of management and mobility/transport study topics in study program curricula. Similarly, Cyprus and Israel indicated an emphatic focus on sustainability compared with other ME countries.

**Figure 4.** Share of study topics in study programs in ME countries.

By grouping keywords into three priority topics (management, logistics, and sustainability) and using a Venn diagram, the correlations (differences and similarities) between the three priority topics were analyzed. In Figure 5, aggregated results are presented for all ME countries, revealing a stronger focus on management and logistics study topics. This result strongly correlates with the paper results that revealed 57% of all analyzed study programs, including at least one topic of management group study topics, were less oriented toward integrating sustainability-related priorities.
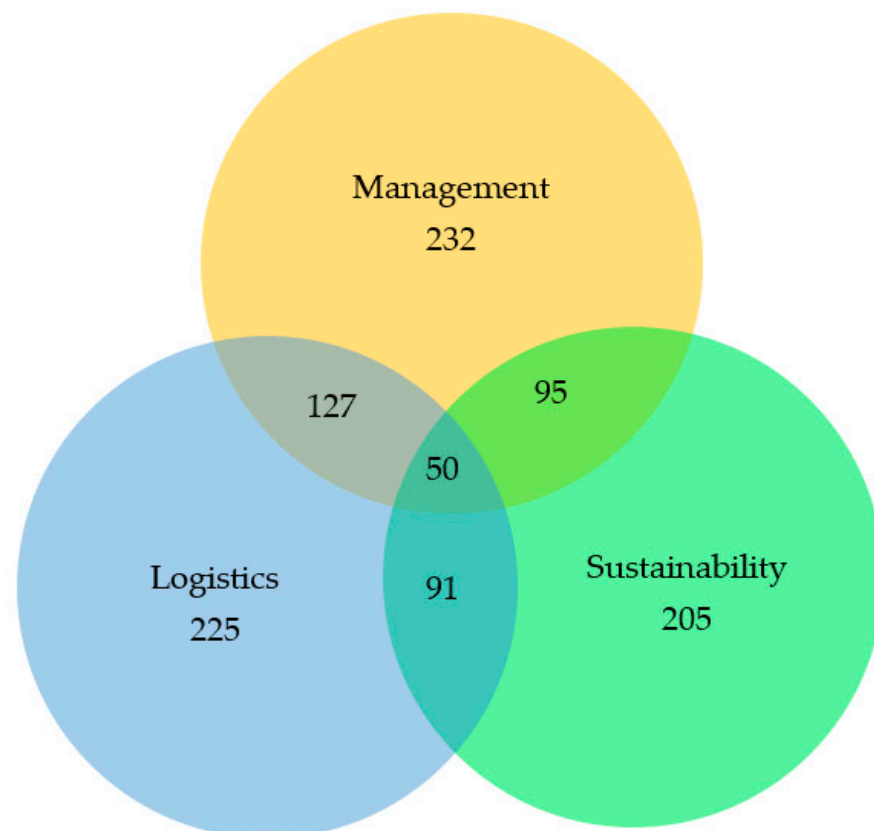


**Figure 5.** The number of study programs in grouped study topics.

The logistics group showed similar results. At least one logistics -related topic was included in 56% of all study programs in the ME database. The sustainability group indicated that approximately half of all study programs included one sustainability topic in their curricula. A strong connection was observed between the logistics and management groups. a 31% share of the researched study programs included management and logistics courses in their curricula. On the other hand, for logistics and sustainability, integration was significantly weaker (approx. 23%).

As spider diagrams (Figure 4) were designed logically, by setting up keywords related to a specific topic together, notable trends could be observed. By grouping the results by country in terms of the three priority topics, it could be seen (Figure 6) that Bahrain and Kuwait had the highest proportion of programs focusing on "*Sustainability*", whereas Turkey was the country with the lowest share of "*Sustainability*" topics. "Logistics" as a study topic group was evident in Turkey, Syria, and Iran. The "*Management*" study topic group showed strong integration in Yemen, Turkey, Jordan, and Qatar. Bahrain had an insignificant share of programs that included management topics in study program curricula.
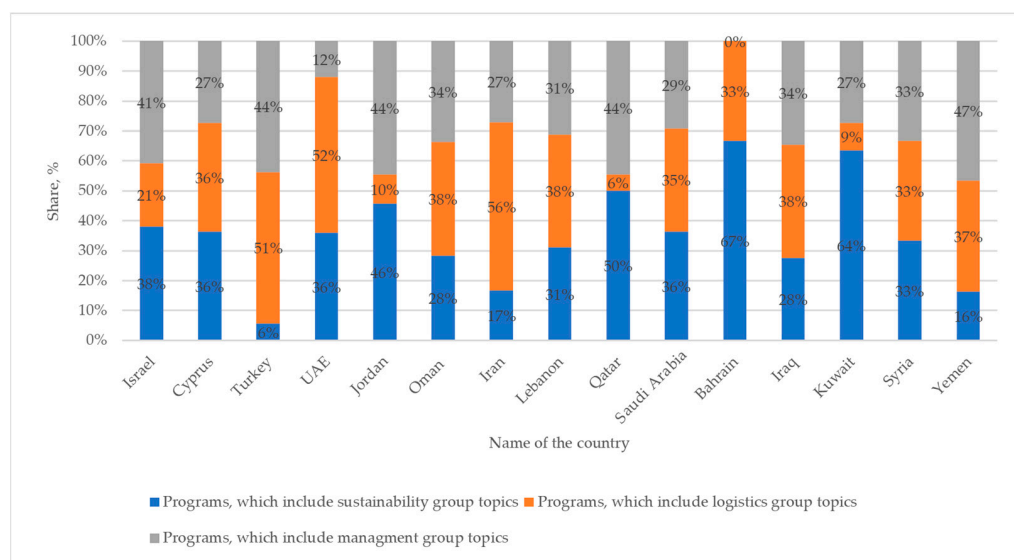
**Figure 6.** Share of sustainability, logistics, and management study topic groups per country.

Since higher education institutions are engaged in institutionalizing sustainable development, community, and engagement studies into their systems or operational practices, the research aimed to identify possible correlations with SDG sustainability scores per country and include sustainability topics in their curricula. Namely, adopting the SDGs represents a significant global challenge for higher education institutions. These goals force them to assess how they engage with these goals and how they address future societal challenges [48]. As shown in Figure 7, the highest sustainability scores were seen in Israel and Cyprus. Although the inclusion of environmental and sustainability study topics in Israel was high, this was not true for Cyprus. Additionally, Turkey's results indicated a high sustainability score (around 70%), but the inclusion of environmental and sustainability study topics was the lowest. The results showed no statistically significant correlation between sustainability scores per country and analyzed sustainability study topics integration. A correlation was also proven with the SPSS Pearson correlation test, which did not show any (zero relationships) between observed variables.
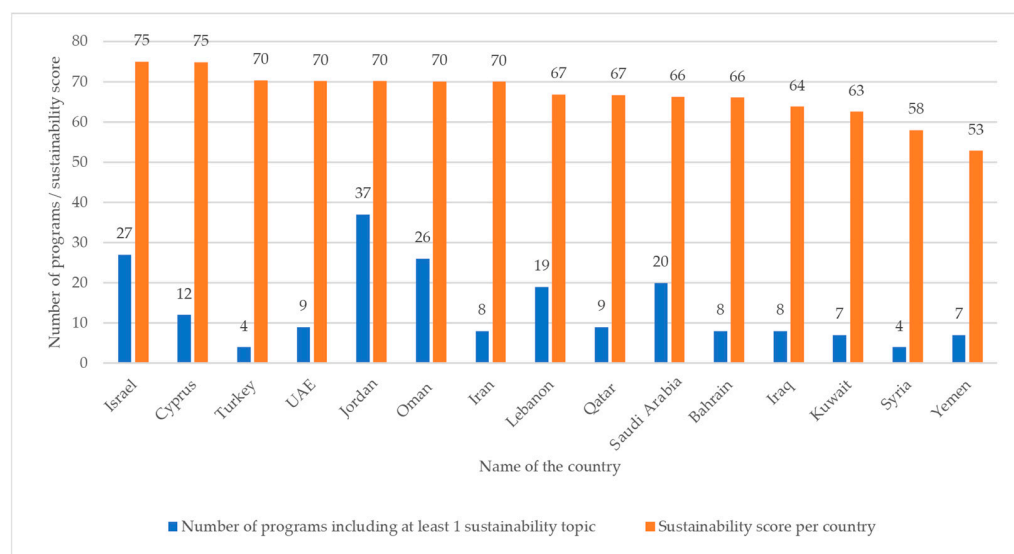


**Figure 7.** Sustainability score per country for 2021 [49] and found programs that include sustainability topics in their curricula.

Another essential aim of the study was to prove whether there is a relationship between the integration of logistics study topics in higher education curricula in a given country and the logistics performance index (LPI) specific to that country. According to Kabak et al. [50], higher education institutions are expected to enhance logistics performance. Namely, despite the increase in automation, logistics is still a human-centric business, and more competitive global economies have a higher demand for highly qualified logistics-related labor [50]. It is vital to invest in human capital to improve logistics performance. Namely, well-educated logistics managers will have more technical competence and problem-solving capability and, thus, be more efficient [51]. The logistics performance index (LPI) for selected ME countries was retrieved from the World Bank Organization (International LPI rankings for 2018) [52] and compared to our data regarding logistic study topics with the SPSS program. The Pearson correlation test was calculated, showing that correlations between observed variables did not exist (zero relationships).

## 5. Discussion

The importance of sustainability education in higher education institutions is also recognized within the United Nations SDGs. SDG 4 (quality education) target 4.7 states "that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and culture's contribution to sustainable development" [53]. Universities in Arab countries play an increasingly important role in achieving the SDGs through their academic programs and research activities [35]; however, no statistically significant correlation with their sustainability scores was detected in this research. It could be speculated that such dependency will appear in the long term or is more related to other fields and not so much to education. Detailed and continuous monitoring should be performed to obtain datasets for a more extended time that might enable better calculations.

The SDGs should solve many challenges through "inclusive" or "sustainable" economic growth, assuming that economic growth can be conveniently decoupled from resource consumption. However, the current hegemony of the "sustainability and growth" paradigm has increased inequalities and pressure on natural resources, exacerbating biodiversity loss, climate change, and additional social tensions. Therefore, the paradoxes of sustainable development need to be defined. Integration of sustainability in curricula should focus on various examples of alternative education (e.g., indigenous learning, ecopedagogy, eco-centric education for a steady-state and circular economy, empowerment, and liberation), emphasizing planetary ethics and degrowth, and should be holistic [54,55]. According to Wals [56], some higher education institutions see a new way of organizing and profiling sustainability. However, higher educational institutions (HEIs) must first be systematically analyzed to transform the education system, and this research revealed that, e.g., CSR and the circular economy are among the least advanced topics in ME higher education. This is surprisingly distant from international climate agreements and leading countries' progress in sustainable development. Koleva's [57] study indicates that the interpretation and integration of CSR topics could be slightly different due to the main religion and its beliefs in the ME. In addition, challenging gender equality might affect systematic avoidance of such topics, e.g., in more conservative Arab countries.

HEIs can implement sustainability concepts and translate them into practice through education, curricula, research, campus operations, community outreach, and management [58]. Increasing student internationalization could also increase the availability of sustainability education, especially for students from lower-income countries [59]. Still, it also demands that they fly frequently and consequently live less sustainably, which has changed recently with online studies. Even though the impact of staff was not a part of this study, some other studies revealed that a lack of staff interest in improvements might also be challenging [60].

Since higher education considerably influences its graduates regardless of the academic field, environmental and sustainability topics should be significant in higher education curriculums. The importance of the existence of those topics in a variety of academic fields is also notable by different authors—Mulder [61] is focused on engineering students, Boarin et al. [62] on architecture, Zoller [63] on chemistry and science literacy, Walshe [64] on geography, and Springett [65] on business studies.

Arab countries started taking note of education on sustainable development (ESD) in the early 1980s, and the emergence of ESD has provided a stimulus to reform environmental education. The Arab region is promising achievements in ESD activities on both the national and regional levels. Despite the apparent gap between the Arab region and other parts of the world regarding ESD, there are promising achievements in the Arab region toward ESD. For example, Jordan, Lebanon, Egypt, Qatar, and Oman include training on integrating ESD themes into their curricula, incorporating ESD into university courses, and funding ESD-related scholarships and programs. In Qatar, for instance, ESD is only included in selected courses [30].

On the other hand, this study revealed that most sustainability-related topics were integrated into logistics-related study programs in Bahrain, Kuwait, Jordan, Cyprus, and Israel. Cyprus and Israel emphasized sustainability compared with other ME countries, which could be related to the location and culture, since the countries are closer to Europe and more culturally related to the EU and the "western" lifestyle. There are also some specifics, e.g., in Israel, where higher education represents the highest share of study programs in the ME database. This might indicate that Israel focuses on international students more than other ME countries. The ME database included only the programs that had information about the included curriculum.

The small share (23%) of study programs that include logistics and sustainability topics in researched ME study programs indicate that logistics could be more related to sustainability topics, and future logistics program graduates might lack knowledge about sustainable logistics development. "*Management*", on the other hand, is significantly better integrated into ME study program curricula, since more than half (53%) of researched bachelor programs include management in their curricula. Specifically prioritized were Iraq, Jordan, and Syria. Surprisingly "*mobility/transport*" is most included in PhD programs, indicating that sustainability is still lagging even in research priorities. Logistics topics are also more visible in Turkey, Cyprus, Iran, Syria, and UAE.

When checking topic overlapping, only 11% of researched study programs included all three study topic groups (management, logistics, and sustainability). It was also seen that "*management*" and "*logistics*" were more connected and integrated than "*management*" in combination with "*sustainability*". Population growth, lower income than, e.g., in the north, and significant oil and mineral reserves might lead to a focus on economic and practical engineering issues and exploit natural reserves instead of sustainability since environmentalism is costly and usually related to the pragmatism of those lacking fossil fuel supplies.

Regarding the expected correlation of countries with a higher level of integration of sustainability topics into their study programs and sustainability score/index, no clear correlation was discovered between countries and their GDP or sustainability scores. Few countries with higher sustainability scores indicated higher inclusion of sustainability study topics in their study programs, but the proportional tendency was not observed (countries with lower sustainability scores did not show lower integration of sustainability topics in study programs). This might also be seen in the particular focus of this study on logistics and supply chain-related programs. Assessing a complete set of higher education programs might show a different picture. Therefore, assessments of logistics programs and analyses of their dependence on the LPI index were also performed. Similar results regarding the correlation between LPI and a higher level of integration of logistics topics into study programs of selected ME countries show that the correlation between observed variables was not visible. Assessing a complete set of all higher education programs might show a

different picture. The results of Ekici et al. [66] show that the greater the education of the logistics manager, the greater would be the manager's performance since their knowledge and skills are significantly influenced by the higher education and training offered by governments in different countries. Similarly, Yildiz [67] showed a positive correlation between logistics performance and education, but in this case, a weak correlation was identified in some countries.

The interconnection of sustainability, management, and logistics is clear. Logistics professionals need knowledge and skills from different areas. According to Tatham and Kovács [68], general management skills, functional logistic skills, problem-solving, and people management are relevant to logistics labor. The authors' previous research [45] revealed that another critical skill is sustainability-related knowledge, which is essential for managers in the modern global economy [69]. Management education prepares human capital for jobs in logistics and provides knowledge for optimizing resources and maximizing economic returns through business management knowledge and skills [70] as well as solving complex interdisciplinary problems [71]. Since logistics takes the lead in today's business administration fields, open development for professional managers is inevitable for the acquisition of logistics- and supply chain management-related higher education knowledge [72]. This knowledge will endow the professionals with more skills in subjects such as coaching, operations management, and crisis management by providing them with the opportunity to gain leadership ability and maintain it effectively [73] and to be better prepared for the future challenges of the sustainable paradigm demanded by the EU within the EU taxonomy as well as the recovery and resilience plan, which calls also for international cooperation that should be the focus of sustainability education [74].

On the other hand, these two topics interrelate with sustainability. Sustainability has received increasing attention in management education over the last few years [75]. Regarding the UN-supported initiative "Principles for Responsible Management Education" (PRME), there is an expectation that education institutions should lead thought and action on social responsibility and sustainability issues. Namely, they prepare current and future business professionals to engage in more responsible and sustainable practices [70]. Research ideas and results are especially applicable within the EU member states since the EU recovery and resilience plan demands boosting sustainability operations, formal education, lifelong learning, knowledge, and practices. In addition, further research should be promoted in detailed studies on teaching and including sustainability topics in individual processes within selected universities in individual countries. The three-step research concept could also be applied in other countries. Moreover, the EU taxonomy demands sustainable investments, which must be accompanied by experts from the field of sustainability within the EU or globally, since many investments are global and interconnected with organizations with headquarters within the EU. Further research implications could also be identified in the cross-border dissemination of progress toward sustainable education outside the EU, with particular emphasis on the Middle East as the geographical area with continuous population growth, an economic focus on fossil fuels, and the crossroads of international trade between Asian production and European consumers.

**Author Contributions:** Conceptualization, M.O.; methodology, M.O. and M.R.; validation, M.R.; formal analysis, M.R.; investigation, M.O. and M.R.; resources, M.O.; data curation, M.R.; writing—original draft preparation, M.O. and M.R.; visualization, M.R.; supervision, M.O.; project administration, M.O. and M.R.; funding acquisition, M.O. All authors have read and agreed to the published version of the manuscript.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

## References

1.   Mirzoev, M.T.N.; Zhu, L.; Yang, Y.; Zhang, M.T.; Roos, M.E.; Pescatori, M.A.; Matsumoto, M.A. *The Future of Oil and Fiscal Sustainability in the GCC Region*; International Monetary Fund: Washington, DC, USA, 2020.
2.   Ghanem, A.M.; Alamri, Y.A. The impact of the green Middle East initiative on sustainable development in the Kingdom of Saudi Arabia. *J. Saudi Soc. Agric. Sci.* **2023**, *22*, 35–46. [CrossRef]
3.   Filho, W.L.; Amaro, N.; Avila, L.V.; Brandli, L.; Damke, L.I.; Vasconcelos, C.R.; Hernandez-Diaz, P.M.; Frankenberger, F.; Fritzen, B.; Velazquez, L.; et al. Mapping sustainability initiatives in higher education institutions in Latin America. *J. Clean. Prod.* **2021**, *315*, 128093. [CrossRef]
4.   Maji, I.K.; Saudi, N.S.M.; Yusuf, M. An assessment of green logistics and environmental sustainability: Evidence from Bauchi. *Clean. Logist. Supply Chain* **2023**, *6*, 100097. [CrossRef]
5.   Daub, C.-H.; Hasler, M.; Verkuil, A.H.; Milow, U. Universities talk, students walk: Promoting innovative sustainability projects. *Int. J. Sustain. High. Educ.* **2020**, *21*, 97–111. [CrossRef]
6.   Wamsler, C. Education for sustainability: Fostering a more conscious society and transformation towards sustainability. *Int. J. Sustain. High. Educ.* **2020**, *21*, 112–130. [CrossRef]
7.   Menon, J. Paving a Greener Future. 2021. Available online: https://www.cbnme.com/expert-insight/paving-a-greener-future/ (accessed on 15 February 2022).
8.   University of Oxford. Net Zero Pledges Go Global, Now Action Needs to Follow Words-Oxford-ECIU Report. 2021. Available online: https://www.ox.ac.uk/news/2021-03-23-net-zero-pledges-go-global-now-action-needs-follow-words-oxford-eciu-report (accessed on 16 February 2022).
9.   Balat, M. The position of oil in the Middle East: Potential trends, future perspectives, market and trade. *Energy Sources Part A* **2006**, *28*, 821–828. [CrossRef]
10.  Kort, M. *The Handbook of the Middle East*; Twenty-First Century Books: Minneapolis, MN, USA, 2002.
11.  Technavio. Logistics Market Size to Grow by USD 71.96 Billion | Find Future Trends, Analysis, and Insights 11 May 2021. 2022. Available online: https://www.prnewswire.com/news-releases/logistics-market-size-to-grow-by-usd-71-96-billion-find-future-trends-analysis-and-insights--technavio-301544054.html (accessed on 15 February 2023).
12.  Sale, A. UAE Ranks among top 20 Countries in 13 Transport Indexes in 2020. Available online: https://wam.ae/en/details/1395302941443 (accessed on 15 December 2022).
13.  Albishri, D.Y.; Sundarakani, B.; Gomisek, B. An empirical study of relationships between goal alignment, centralised decision-making, commitment to networking and supply chain effectiveness using structural equation modelling. *Int. J. Logist. Res. Appl.* **2020**, *23*, 390–415. [CrossRef]
14.  Sullivan, F. UAE Logistics Market—Growth Insights and Forecast to 2023. 2018. Available online: https://store.frost.com/uae-logistics-market-growth-insights-and-forecast-to-2023.html (accessed on 12 February 2023).
15.  Frank, K. UAE Industrial Logistics Market Review. 2018. Available online: https://content.knightfrank.com/research/794/documents/en/uae-industrial-logistics-market-review-h1-2018-5658.pdf (accessed on 16 February 2023).
16.  Sharma, V.; Vijayaraghavan, T.; Ram, T.L.R. Resolving operational paradox of sustainable supply chain: A decision framework approach. *Socio-Econ. Plan. Sci.* **2023**, 101565. [CrossRef]
17.  Boca, G.D.; Saraçlı, S. Environmental education and student's perception, for sustainability. *Sustainability* **2019**, *11*, 1553. [CrossRef]
18.  Lancioni, R.; Forman, H.; Smith, M.F. Logistics and supply chain education: Roadblocks and challenges. *Int. J. Phys. Distrib. Logist. Manag.* **2001**, *31*, 733–745. [CrossRef]
19.  Leal Filho, W.; Shiel, C.; Paço, A.; Mifsud, M.; Ávila, L.V.; Brandli, L.L. Sustainable Development Goals and sustainability teaching at universities: Falling behind or getting ahead of the pack? *J. Clean. Prod.* **2019**, *232*, 285–294. [CrossRef]
20.  Lozano, R.; Ceulemans, K.; Alonso-Almeida, M.; Huisingh, D.; Lozano, F.J.; Waas, T.; Lambrechts, W.; Lukman, R.; Hugé, J. A review of commitment and implementation of sustainable development in higher education: Results from a worldwide survey. *J. Clean. Prod.* **2015**, *108*, 1–18. [CrossRef]
21.  Stough, T.; Ceulemans, K.; Lambrechts, W.; Cappuyns, V. Assessing sustainability in higher education curricula: A critical reflection on validity issues. *J. Clean. Prod.* **2018**, *172*, 4456–4466. [CrossRef]
22.  Yazdani, M.; Pamucar, D.; Erdmann, A.; Toro-Dupouy, L. Resilient sustainable investment in digital education technology: A stakeholder-centric decision support model under uncertainty. *Technol. Forecast. Soc. Chang.* **2023**, *188*, 122282. [CrossRef]
23.  Franco, I.; Saito, O.; Vaughter, P.; Whereat, J.; Kanie, N.; Takemoto, K. Higher education for sustainable development: Actioning the global goals in policy, curriculum and practice. *Sustain. Sci.* **2019**, *14*, 1621–1642. [CrossRef]

24. Ramísio, P.J.; Pinto, L.M.C.; Gouveia, N.; Costa, H.; Arezes, D. Sustainability Strategy in Higher Education Institutions: Lessons learned from a nine-year case study. *J. Clean. Prod.* **2019**, *222*, 300–309. [CrossRef]

25. Kopnina, H. Education for the future? Critical evaluation of education for sustainable development goals. *J. Environ. Educ.* **2020**, *51*, 280–291. [CrossRef]

26. Purcell, W.M.; Henriksen, H.; Spengler, J.D. Universities as the engine of transformational sustainability toward delivering the sustainable development goals:"Living labs" for sustainability. *Int. J. Sustain. High. Educ.* **2019**, *20*, 1343–1357. [CrossRef]

27. Romani, V. *The Politics of Higher Education in the Middle East: Problems and Prospects*; Middle East Brief, Brandeis University Crown Center for Middle East Studies: Waltham, MA, USA, 2009; Volume 36, pp. 3–8.

28. PWC. The GCC Post-Pandemic: Massive and Fast Transformation. Tomorrow Starts Today. 2021. Available online: https://www.pwc.com/m1/en/publications/gcc-post-pandemic-massive-fast-transformation.html (accessed on 20 May 2022).

29. Keser, H.Y. *Effects of Higher Education on Global Competitiveness: Reviews in Relation with European Countries and the Middle East Countries*; Economy Series; Annals of 'Constantin Brancusi' University of Targu-Jiu: Târgu Jiu, Romania, 2015; Volume 1.

30. AFED. Environmental Education for Sustainable Development in Arab Countries. In *Annual Report of Arab Forum for Environment and Development*; Saab, N., Badran, A., Sadek, A.-K., Eds.; AFED: Beirut, Lebanon, 2019.

31. Findler, F.; Schoenherr, N.; Lozano, R.; Reider, D.; Martinuzzi, A. The impacts of higher education institutions on sustainable development: A review and conceptualization. *Int. J. Sustain. High. Educ.* **2019**, *20*, 23–38. [CrossRef]

32. Ulmer, N.; Wydra, K. Sustainability in african higher education institutions (HEIs) shifting the focus from researching the gaps to existing activities. *Int. J. Sustain. High. Educ.* **2020**, *21*, 18–33. [CrossRef]

33. Hassan, H.S.H.; Abdelkader, M.A.; Abdelkader, A.A.M. Literature review of the challenges of sustainable higher education institutions in the Middle East: Categorisation of challenges and proposed remedies. *Acad. Strateg. Manag. J.* **2021**, *20*, 1–14.

34. Akkari, A. Education in the Middle East and North Africa: The current situation and future challenges. *Int. Educ. J.* **2004**, *5*, 144–153.

35. Miller-Idriss, C.; Hanauer, E. Transnational higher education: Offshore campuses in the Middle East. *Comp. Educ.* **2011**, *47*, 181–207. [CrossRef]

36. Rupp, R. Higher education in the Middle East: Opportunities and challenges for US universities and Middle East partners. *Glob. Media J.* **2009**, *8*. Available online: https://www.globalmediajournal.com/open-access/higher-education-in-the-middle-eastopportunities-and-challenges-for-us-universities-and-middle-east-partners.php?aid=35190 (accessed on 20 April 2022).

37. Alzyoud, S.A.; Bani-Hani, K. Social responsibility in higher education institutions: Application case from the Middle East. *Eur. Sci. J.* **2015**, *11*, 122–129.

38. Sherif, S.F. The role of higher education institutions in propagating corporate social responsibility case study: Universities in the Middle East. *Int. J. Educ. Res.* **2015**, *3*, 217–226.

39. Daneshjoo, K.; Motevalli Haghighi, H.; Talaei, M. Community Space and the School Ground A 3D Book for the Concepts of Sustainable Development. *MANZAR Sci. J. Landsc.* **2019**, *11*, 38–47.

40. Review, W.P. Middle East Countries 2021. 2021. Available online: https://worldpopulationreview.com/country-rankings/middle-east-countries (accessed on 6 January 2022).

41. Greene, J.C.; Caracelli, V.J.; Graham, W.F. Toward a conceptual framework for mixed-method evaluation designs. *Educ. Eval. Policy Anal.* **1989**, *11*, 255–274. [CrossRef]

42. Grbich, C. *Qualitative Data Analysis: An Introduction*; Sage: London, UK, 2012.

43. Mayring, P. Qualitative content analysis. *A Companion Qual. Res.* **2004**, *1*, 159–176.

44. Jabareen, Y. Building a conceptual framework: Philosophy, definitions, and procedure. *Int. J. Qual. Methods* **2009**, *8*, 49–62. [CrossRef]

45. Obrecht, M.; Feodorova, Z.; Rosi, M. Assessment of environmental sustainability integration into higher education for future experts and leaders. *J. Environ. Manag.* **2022**, *316*, 115223. [CrossRef] [PubMed]

46. Cai, H.; Chen, H.; Yi, T.; Daimon, C.M.; Boyle, J.P.; Peers, C.; Maudsley, S.; Martin, B. VennPlex–a novel Venn diagram program for comparing and visualizing datasets with differentially regulated datapoints. *PLoS ONE* **2013**, *8*, e53388. [CrossRef] [PubMed]

47. Ho, S.Y.; Tan, S.; Sze, C.C.; Wong, L.; Goh, W.W.B. What can Venn diagrams teach us about doing data science better? *Int. J. Data Sci. Anal.* **2021**, *11*, 1–10. [CrossRef]

48. Calderon, A. How Can Universities Ensure Progress towards the UN SDGs. *University World News*. 2021. Available online: https://www.universityworldnews.com/post.php?story=20210422155552481 (accessed on 20 April 2022).

49. Sachs, J.; Kroll, C.; Lafortune, G.; Fuller, G.; Woelm, F. *The Decade of Action for the Sustainable Development Goals: Includes the SDG Index and Dashboards*; Cambridge University Press: Cambridge, UK, 2021.

50. Kabak, Ö.; Ekici, Ş.Ö.; Ülengin, F. Analyzing two-way interaction between the competitiveness and logistics performance of countries. *Transp. Policy* **2020**, *98*, 238–246. [CrossRef]

51. Myers, M.B.; Griffith, D.A.; Daugherty, P.J.; Lusch, R.F. Maximizing the human capital equation in logistics: Education, experience, and skills. *J. Bus. Logist.* **2004**, *25*, 211–232. [CrossRef]

52. Bank, T.W. Global Rankings 2018. Available online: https://lpi.worldbank.org/international/global/2018.%202019 (accessed on 14 April 2022).

53. Nations, U. Sustainable Development Goals. 2015. Available online: https://www.un.org/sustainabledevelopment/energy/ (accessed on 10 September 2021).

54. Filho, W.L.; Salvia, A.L.; Eustachio, J.H.P.P. An overview of the engagement of higher education institutions in the implementation of the UN sustainable development goals. *J. Clean. Prod.* **2022**, *386*, 135694. [CrossRef]
55. Priyadarshini, P.; Abhilash, P.C. From piecemeal to holistic: Introducing sustainability science in Indian Universities to attain UN-Sustainable Development Goals. *J. Clean. Prod.* **2020**, *247*, 119133. [CrossRef]
56. Wals, A.E. Sustainability in higher education in the context of the UN DESD: A review of learning and institutionalization processes. *J. Clean. Prod.* **2014**, *62*, 8–15. [CrossRef]
57. Koleva, P. Towards the development of an empirical model for Islamic corporate social responsibility: Evidence from the Middle East. *J. Bus. Ethics* **2021**, *171*, 789–813. [CrossRef]
58. UNESCO. Education for Sustainable Development and the Bonn Declaration. 2009. Available online: https://unesdoc.unesco.org/ark:/48223/pf0000188805 (accessed on 15 May 2022).
59. Bell, K.; Cash, B.; Boetto, H.; Thampi, K. International study abroad programmes: Exploring global south student perspectives, reciprocity and sustainability. *Soc. Work. Educ.* **2021**, *40*, 492–504. [CrossRef]
60. Eppinga, M.B.; Lozano-Cosme, J.; de Scisciolo, T.; Arens, P.; Santos, M.J.; Mijts, E.N. Putting sustainability research into practice on the university campus: An example from a Caribbean small island state. *Int. J. Sustain. High. Educ.* **2020**, *21*, 54–75. [CrossRef]
61. Mulder, K.F. Strategic competences for concrete action towards sustainability: An oxymoron? Engineering education for a sustainable future. *Renew. Sustain. Energy Rev.* **2017**, *68*, 1106–1111. [CrossRef]
62. Boarin, P.; Martinez-Molina, A.; Juan-Ferruses, I. Understanding students' perception of sustainability in architecture education: A comparison among universities in three different continents. *J. Clean. Prod.* **2020**, *248*, 119237. [CrossRef]
63. Zoller, U. Research-Based Transformative Science/STEM/STES/STESEP Education for "Sustainability Thinking": From Teaching to "Know" to Learning to "Think". *Sustainability* **2015**, *7*, 4474–4491. [CrossRef]
64. Walshe, N. An interdisciplinary approach to environmental and sustainability education: Developing geography students' understandings of sustainable development using poetry. *Environ. Educ. Res.* **2017**, *23*, 1130–1149. [CrossRef]
65. Springett, D. 'Education for sustainability'in the business studies curriculum: A call for a critical agenda. *Bus. Strategy Environ.* **2005**, *14*, 146–159. [CrossRef]
66. Ekici, Ş.Ö.; Kabak, Ö.; Ülengin, F. Improving logistics performance by reforming the pillars of Global Competitiveness Index. *Transp. Policy* **2019**, *81*, 197–207. [CrossRef]
67. Yildiz, T. An empirical study on the relationship between logistics performance and education. *Bus. Manag. Educ.* **2015**, *13*, 249–275. [CrossRef]
68. Kovács, G.; Tatham, P. What is special about a humanitarian logistician? A survey of logistic skills and performance. *Supply Chain Forum Int. J.* **2010**, *11*, 32–41. [CrossRef]
69. Roos, N.; Guenther, E. Sustainability management control systems in higher education institutions from measurement to management. *Int. J. Sustain. High. Educ.* **2020**, *21*, 144–160. [CrossRef]
70. Sharma, R.R. *A competency model for management education for sustainability*; SaGe Publications Sage India: New Delhi, India, 2017; pp. x–xv.
71. Lukman, R.K.; Omahne, V.; el Sheikh, L.T.; Glavič, P. Integrating Sustainability into Logistics Oriented Education in Europe. *Sustainability* **2021**, *13*, 1667. [CrossRef]
72. Hay, R.; Eagle, L. Impact of integrated sustainability content into undergraduate business education. *Int. J. Sustain. High. Educ.* **2020**, *21*, 131–143. [CrossRef]
73. Erturgut, R.; Soysekerci, S. Professional manager education on logistics and supply chain management. *Procedia-Soc. Behav. Sci.* **2011**, *15*, 2771–2775. [CrossRef]
74. Fokdal, J.; Čolić, R.; Milovanović Rodić, D. Integrating sustainability in higher planning education through international cooperation: Assessment of a pedagogical model and learning outcomes from the students' perspective. *Int. J. Sustain. High. Educ.* **2020**, *21*, 1–17. [CrossRef]
75. Figueiró, P.S.; Rauflet, E. Sustainability in higher education: A systematic review with focus on management education. *J. Clean. Prod.* **2015**, *106*, 22–33. [CrossRef]