

# Global Country Classification of Sustainable Startups Levels

## Globalna klasyfikacja krajów w kategorii zrównoważonych start-upów

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### Abstract

In today's world, the pursuit of sustainable development has become a global priority. However, the integration of sustainability practices in entrepreneurial ventures, particularly in new startups, lags behind. This article aims to bridge the gap between sustainable development and entrepreneurship by examining the role of sustainability in the formation of sustainable startups. Through the use of cluster analysis, this study classifies countries based on their environmental and social objectives in the context of sustainable startups. The analysis reveals distinct clusters of countries with varying degrees of emphasis on environmental and social considerations. The results of the analysis provide valuable insights into the distribution of countries across different clusters, delineating the sustainable goals of startups in those countries. These findings align with existing research on sustainable entrepreneurship and contribute to the broader discourse in the field. The implications of these findings are significant for promoting sustainable entrepreneurship. While the study acknowledges several limitations, future research can expand upon these findings to develop a more comprehensive understanding of sustainable entrepreneurship on a global scale.

**Key words:** sustainability, sustainable development, entrepreneurship, sustainable startups

### Streszczenie

W dzisiejszym świecie dążenie do zrównoważonego rozwoju stało się globalnym priorytetem. Jednak integracja zrównoważonych praktyk w przedsiębiorczości, szczególnie w nowych start-upach, pozostaje w tyle. Artykuł ma na celu wypełnienie luki pomiędzy zrównoważonym rozwojem a przedsiębiorczością poprzez zbadanie roli zrównoważonego rozwoju w tworzeniu zrównoważonych start-upów. Dzięki zastosowaniu analizy skupień w niniejszym badaniu dokonano klasyfikacji krajów na podstawie ich celów środowiskowych i społecznych w kontekście zrównoważonych start-upów. Analiza ukazuje wyraźne skupiska krajów o różnym stopniu spojrzenia na kwestie środowiskowe i społeczne. Wyniki analizy dostarczają cennych informacji na temat rozmieszczenia krajów w różnych klastrach, wyznaczają zrównoważone cele start-upów w tych krajach. Ustalenia te pokrywają się z istniejącymi badaniami nad zrównoważoną przedsiębiorczością i przyczyniają się do szerszego dyskursu w tej dziedzinie. Konsekwencje tych ustaleń są istotne dla promowania zrównoważonej przedsiębiorczości. Chociaż w artykule wskazano kilka ograniczeń, przyszłe badania mogą rozszerzyć te ustalenia, aby uzyskać pełniejsze zrozumienie zrównoważonej przedsiębiorczości w skali globalnej.

**Słowa kluczowe:** zrównoważoność, rozwój zrównoważony, przedsiębiorczość, zrównoważone start-upy

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### Introduction

Entrepreneurs frequently disregard the essential aspect of sustainability when launching a new venture. Nonetheless, incorporating sustainable strategies into a business from the beginning can result in numerous advantages. Sustainable enterprises show increased resistance to external disruptions due to diversified revenue streams and lessened dependence on single sources of income (Lahti, Wincent, Parida, 2018). This fortitude protects businesses

during economic downturns and unexpected circumstances. Sustainable businesses are more efficient, constantly striving to minimize waste and conserve resources, resulting in cost savings that can be passed on to customers or reinvested in the business (Vegter, Van Hillegersberg, Olthaar, 2020). Moreover, sustainable businesses generate positive social and environmental impacts (Camilleri, 2022), playing an important role in mitigating climate change, reducing pollution, and creating opportunities for disadvantaged communities.

Incorporating sustainability into their businesses is imperative for new entrepreneurs, given the benefits. With creativity and planning, businesses can be economically successful while also being environmentally and socially responsible (Feng, 2022).

In modern society, nations are working towards attaining sustainable development, yet they exhibit notable variations. It is crucial to comprehend the specific type of entrepreneurship employed in particular countries, as entrepreneurship is a critical driver of development. However, ensuring sustainable development and promoting startup companies present distinct challenges. Sustainable development, acknowledged as the key to long-term success, is frequently implemented at a slow pace, allowing for further improvement. Literature highlights the importance of entrepreneurship and innovation in achieving sustainability (e.g., Pratono et al., 2019). Although sustainable development receives considerable attention from all societal stakeholders, sustainable startups are given relatively less attention than warranted, despite the growing significance of studying and supporting startups.

This article aims to explore the relationship between sustainability and entrepreneurship by analyzing the prevalence of sustainable startups. The main goal is to classify countries globally based on the environmental and social objectives of companies during their initial stages of development. Analyzing data on sustainable startups can provide valuable insights into the state of entrepreneurship for sustainability across different countries and identify the factors that contribute to the successful integration of sustainability principles. A balanced approach will aid in avoiding biases or subjective evaluations. These insights can inform policymakers, entrepreneurs, and investors about best practices and strategies for fostering sustainable startups and driving sustainable development globally. Sustainability is based on the pursuit of ongoing economic growth that is constrained by the limits of our planet (Desing et al., 2020). Overshooting planetary boundaries, which represent the natural limits of Earth's systems, poses significant threats to the environment and society worldwide. Nevertheless, global challenges have the potential to generate openings for entrepreneurs to generate value that assists in addressing these issues. The concept of sustainable development arose in recognition of the enormous impact that economic and industrial activities have had on the environment and social equilibrium since the Industrial Revolution. Environmental and societal crises worldwide have heightened awareness of the imperative to establish a more sustainable economic framework.

Sustainability prioritizes the conservation of natural resources and the continuous, sustainable operation of the economy and society in its entirety (Zoldy et al., 2022). Sustainable development necessitates achieving an equilibrium between environmental, economic, socio-ethical, and cultural progress, at both the local and global levels. Opportunities for sustainable entrepreneurs emerge when market mechanisms fall short of addressing environmental or social concerns. Sustainable entrepreneurs can capitalize on these opportunities to boost profits while simultaneously generating economic, environmental, and social benefits. Studying the presence and characteristics of sustainable startups provides a deeper understanding of the entrepreneurial landscape and the factors that contribute to successful integration of sustainability principles in various nations. This understanding can inform policymakers, entrepreneurs, and investors about the strategies and support mechanisms required to promote sustainable entrepreneurship and contribute to global sustainable development efforts.

The article includes a literature review, hypothesis statement, empirical analysis, results, limitations, further research, and implications.

## Literature overview and hypothesis development

Sustainability has gained significant attention in academic research and business practice, prompted by the necessity to address urgent environmental and social issues. The notion of sustainable development, initially introduced in the Brundtland Report by the United Nations World Commission on Environment and Development (UN WCED) in 1987, emphasizes the importance of meeting the immediate needs of present generations without jeopardizing the capacity of future generations to fulfil their own requirements (Hajian, Kashani, 2021). This comprehensive approach acknowledges that achieving sustainable development demands a harmonious blend of economic growth, social advancement, and environmental conservation (Yang, Masron, 2022). To achieve sustainable development, all three pillars of sustainability, commonly referred to as the triple bottom line, must be given equal consideration. These pillars encompass the economic, environmental, and social dimensions of sustainability (Purvis, Mao, Robinson, 2019; Domańska, Żukowska, Zajkowski, 2018) and neglecting any one of these aspects will hinder the achievement of sustainable development.

Sustainable entrepreneurship has become a vital catalyst for achieving sustainable development objectives. It surpasses conventional entrepreneurship by incorporating economic, social, and environmental factors into entrepreneurial endeavors (Terán-Yépez, et al., 2020). Sustainable entrepreneurship aims to create value not just in terms

of financial profitability, but also in terms of enhancing positive social and environmental impacts (Lüdeke-Freund, 2020). By incorporating sustainable practices, entrepreneurs can address social and environmental issues without compromising economic prosperity. This approach promotes a balanced and responsible business model that benefits both society and the environment. Adopting sustainable practices is crucial for a better future, and it is incumbent upon entrepreneurs to lead the way in this regard. The significance of sustainable entrepreneurship is being increasingly acknowledged, due to the potential it offers for innovation, job generation, and economic expansion, while also tackling sustainability challenges (Dean & McMullen, 2007; Patzelt & Shepherd, 2011). Sustainable entrepreneurs can detect and capitalize on market prospects that stem from environmental and societal issues that culminate in the production of sustainable commodities, amenities, and commercial models (Cohen & Winn, 2007). Research indicates that entrepreneurship can solve environmental degradation rather than cause it (Chien et al., 2021).

The adoption of the Sustainable Development Goals (SDGs) by global leaders in 2015 has provided a framework to address social, economic, and environmental issues (United Nations, 2015). Sustainable entrepreneurship aligns closely with the SDGs by pursuing economic prosperity, social well-being, and environmental sustainability (Youssef et al., 2018; Rahdari et al., 2016). When entrepreneurs integrate SDGs into their strategies and operations, they promote the achievement of these objectives and establish sustainable, responsible businesses.

Within the realm of sustainable entrepreneurship, the notion of sustainable startups has become increasingly important. These startups are newly established businesses that prioritize sustainable practices and strive to generate positive social and environmental impacts in addition to economic viability (Olteanu, Fichter, 2022). They adopt the triple bottom line approach by aiming to balance profits, people, and the planet in their business ventures (Elkington, 1998). Recognizing that financial success alone falls short, the aim is to create social and environmental value.

Understanding the characteristics and prevalence of sustainable startups across nations can yield valuable insights into the global landscape of sustainable entrepreneurship. Cluster analysis provides a stalwart methodology to identify unique country groups based on their sustainable startup activity and relevant factors. Exploring clustering patterns enables researchers, policymakers, and entrepreneurs to discover similarities, differences, and best practices within countries, providing them with valuable insights for the development of effective support systems, policies, and strategies to promote sustainable entrepreneurship worldwide.

Investigating the link between sustainable entrepreneurship and sustainable development is crucial for advancing our comprehension of how entrepreneurial endeavors can address societal and environmental needs while creating economic value. Analyzing the factors that impact the prevalence and success of sustainable startups can offer researchers insights into the drivers, barriers, and enablers of sustainable entrepreneurship. This knowledge can inform the creation of evidence-based policies and strategies that advance sustainable entrepreneurship and progress towards sustainability objectives.

Given the importance of sustainable entrepreneurship and its potential to further global goals, it is crucial to examine the role of entrepreneurship in achieving sustainability objectives. One approach is to utilize cluster analysis to categorize countries based on the environmental and social objectives of companies at various stages of development. This analysis leads to the following hypothesis:

*H: There exist clusters of countries based on the prevalence and characteristics of sustainable startups.*

The hypothesis proposes the identification of groups of countries that share similar levels of sustainable entrepreneurship through cluster analysis, suggesting distinct clusters based on such factors.

To further explain this hypothesis, it suggests that levels of sustainable entrepreneurship vary among countries. Some countries may have a greater abundance of sustainable startups while others may have fewer. Moreover, sustainable startups may have different characteristics in each country, such as their focus on environmental and social aspects. The hypothesis suggests that utilizing cluster analysis, a statistical method for grouping similar objects or individuals, can reveal clusters of countries with comparable levels and attributes of sustainable entrepreneurship. This analysis considers indicators and variables pertaining to sustainable entrepreneurship. These include the quantity of sustainable startups, their environmental and social impact, and their prioritization of sustainability over profitability or growth.

By analyzing sustainable startups' presence and characteristics in various countries and utilizing cluster analysis, valuable insights about global entrepreneurship's sustainability can be gained. These findings can provide policymakers, entrepreneurs, and investors with effective approaches, tactics, and support frameworks for promoting sustainable entrepreneurship and advancing sustainable development worldwide.

## Methods

This study used the Global Entrepreneurship Monitor (GEM) 2021 database for empirical analysis. The database comprises of an adult population survey and a national expert survey. This study exclusively focused on the first set of data, including harmonized information from 47 countries worldwide. The GEM is a longitudinal survey

examining diverse entrepreneurship facets on an individual scale. New data was analyzed in this study, which examined the environmental, social, and sustainable aspects of business practices among entrepreneurs. The aim of this analysis was to comprehend the variations among early-stage entrepreneurs' viewpoints on sustainable implications and their efforts towards sustainable goals. To obtain this understanding, a classification technique known as cluster analysis was utilized to establish clusters of countries with analogous goals as early-stage entrepreneurs. The study analyzed a total of 47 countries surveyed in 2021.

The variables used in the cluster analysis were as follows:

- Countries: The names of the countries included in the study.
- Social early-stage entrepreneurs: The percentage of total early-stage entrepreneurs who consistently consider social implications when making decisions about the future of their business.
- Environmental early-stage entrepreneurs: The percentage of total early-stage entrepreneurs who consistently consider environmental implications when making decisions about the future of their business.
- Sustainable early-stage entrepreneurs: The percentage of total early-stage entrepreneurs who prioritize the social and/or environmental impact of their business over profitability or growth.

A two-step process was used for cluster analysis. Firstly, an agglomerative hierarchical clustering process was employed, which merged individual countries into clusters based on their shared sustainable entrepreneurial considerations. This method aided in identifying initial groups that possessed similar characteristics. In the second phase, a k-means non-hierarchical clustering process was utilized to enhance the clusters created in the preceding phase and generate more distinct segments.

All variables, which include social early-stage entrepreneurs, environmental early-stage entrepreneurs, and sustainable early-stage entrepreneurs, were utilized together in the clustering analysis. The inclusion of these variables provided a comprehensive comprehension of the various aspects of sustainable entrepreneurship. To ensure the formation of meaningful clusters, we utilized Ward's minimum variance approach, a widely-used algorithm in cluster analysis that minimizes the within-cluster variance and maximizes the differences between clusters. This approach results in relatively homogeneous clusters in terms of variance within each cluster.

The methodology of cluster analysis utilized in this study offers valuable insights into the similarities and differences between countries in terms of their considerations for sustainable entrepreneurship. Through the use of multiple variables simultaneously and the application of Ward's minimum variance approach, identifiable clusters of countries with shared characteristics were established. This methodology facilitates comprehension of the objectives and priorities of novice entrepreneurs in diverse nations, elucidating the numerous paths to sustainable entrepreneurship around the globe.

## Results and discussion

Cluster analysis was used to group the countries into distinct clusters based on their level of association. The distances within and between the clusters were calculated to determine similarities and differences among the countries. Table 1 presents the descriptive statistics of the variables used in the analysis.

Table 1. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Social Early-stage entrepreneurs	47	40.46	93.32	76.3632	1.62575	124.224
Environmental Early-stage entrepreneurs	47	49.17	92.54	75.5238	1.70487	136.610
Sustainable Early-stage entrepreneurs	47	26.27	86.79	60.5566	2.18942	225.297
Valid N (listwise)	47					

To establish the optimal number of clusters, we first performed a hierarchical cluster analysis utilizing squared Euclidean distance and Ward's linkage. Based on the outcomes of this assessment, we opted for five clusters. Following this, we executed a k-means cluster analysis to extract the stated five clusters. All the results of the indicator cluster analysis are summarized and presented in Table 2.

Table 3 provides an overview of the final cluster centers for five distinct clusters. These clusters are defined by different types of early-stage entrepreneurs: Social Early-stage entrepreneurs, Environmental Early-stage entrepreneurs, and Sustainable Early-stage entrepreneurs.

The cluster analysis has successfully differentiated these early-stage entrepreneurs into five distinct groups. Each cluster appears to have its unique characteristics based on the variables used in the analysis. These cluster centers provide valuable insights into how these early-stage entrepreneurs group together based on the analyzed variables. Cluster 2 and Cluster 5 appear to be particularly noteworthy due to their high values, suggesting a strong presence of specific attributes or characteristics that differentiate them from the others.

Table 4 shows the distribution of countries across the five clusters and Figure 1 provides the insight into global distribution of countries within particular cluster.

Table 2. Cluster Membership

Country	Cluster	Distance	Country	Cluster	Distance
Israel	1	7,253	Ireland	3	3,209
Kazakhstan	1	7,196	Latvia	3	12,421
Norway	1	15,580	Oman	3	5,979
South Korea	1	9,746	Romania	3	6,980
Brazil	2	7,232	Saudi Arabia	3	6,201
Chile	2	5,557	Sudan	3	8,232
Colombia	2	4,675	Switzerland	3	13,139
Egypt	2	5,271	United Kingdom	3	7,571
Guatemala	2	12,435	United States	3	6,358
India	2	7,562	Belarus	4	5,262
Italy	2	9,199	Cyprus	4	2,948
Morocco	2	8,333	France	4	6,093
Panama	2	6,653	Germany	4	4,986
Qatar	2	6,730	Iran	4	6,053
Slovenia	2	4,946	Japan	4	5,474
Turkey	2	8,998	Luxembourg	4	7,182
United Arab Emirates	2	9,346	Netherlands	4	2,031
Uruguay	2	5,217	Russia	4	11,444
Canada	3	7,673	Slovakia	4	9,574
Croatia	3	5,159	South Africa	4	11,590
Dominican Republic	3	6,460	Spain	4	7,372
Finland	3	15,242	Sweden	4	10,772
Greece	3	7,287	Poland	5	0,000
Hungary	3	15,977			

Table 3. Final Cluster Centers

	Cluster				
	1	2	3	4	5
Social Early-stage entrepreneur	52,70	87,16	78,07	69,23	86,88
Environmental Early-stage entrepreneur	51,80	87,30	78,60	65,87	84,82
Sustainable Early-stage entrepreneur	35,81	76,98	63,15	49,84	30,11

Table 4. Cases in Each Cluster

Clusters	Number of Cases	Countries
Cluster 1	4	Israel, Kazakhstan, Norway, South Korea
Cluster 2	14	Brazil, Chile, Colombia, Egypt, Guatemala, India, Italy, Morocco, Panama, Qatar, Slovenia, Turkey, United Arab Emirates, Uruguay
Cluster 3	15	Canada, Croatia, Dominican Republic, Finland, Greece, Hungary, Ireland, Latvia, Oman, Romania, Saudi Arabia, Sudan, Switzerland, United Kingdom, United States
Cluster 4	13	Belarus, Cyprus, France, Germany, Iran, Japan, Luxembourg, Netherlands, Russia, Slovakia, South Africa, Spain, Sweden
Cluster 5	1	Poland

\*Valid: 47; Missing: 0

The results of our cluster analysis reveal the various environmental, social, and sustainability implications within the five developed clusters. Each cluster represents a group of countries with shared preferences regarding entrepreneurial considerations. Cluster 1 has four countries, Cluster 2 has fourteen countries, Cluster 3 has fifteen countries, Cluster 4 has thirteen countries, and Cluster 5 comprises solely of one country, Poland.

The study offers significant insights into divergent environmental and social priorities and methodologies embraced by fledgling entrepreneurs across several nations. A grasp of these distinctions can help shape policymaking and verdict-making aimed at fostering sustainable entrepreneurship on a global scale.

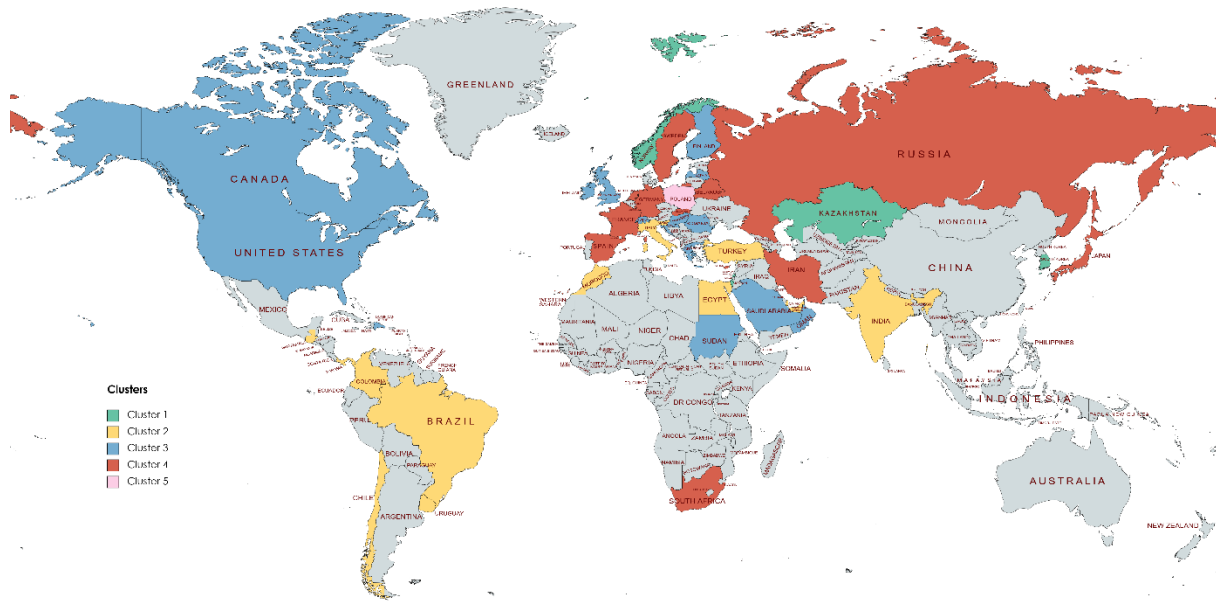
The cluster analysis results from Table 4 provide valuable insight into how countries are distributed across five clusters based on their environmental, social, and sustainable entrepreneurship goals.

Cluster 1 includes four countries: Israel, Kazakhstan, Norway, and South Korea. These countries exhibit relatively high levels of social early-stage entrepreneurship, indicating that they consistently consider the social implications when making decisions about the future of their businesses. However, their levels of environmental early-stage entrepreneurship and prioritization of sustainability over profitability or growth are comparatively lower.

Cluster 2, which comprises fourteen countries, is the largest cluster. Brazil, Chile, Colombia, Egypt, Guatemala, India, Italy, Morocco, Panama, Qatar, Slovenia, Turkey, the United Arab Emirates, and Uruguay demonstrate substantial levels of social and environmental early-stage entrepreneurship, indicating a significant focus on both social and environmental consequences in their business decision-making. Additionally, they prioritize the social

and/or environmental impact of their businesses over profitability or growth. This cluster represents countries that prioritize sustainable entrepreneurship.

Figure 1. Global distribution of countries within particular clusters, created with mapchart.net



Cluster 3 comprises fifteen countries: Canada, Croatia, Dominican Republic, Finland, Greece, Hungary, Ireland, Latvia, Oman, Romania, Saudi Arabia, Sudan, Switzerland, United Kingdom, and United States. These nations display elevated levels of social early-stage entrepreneurship and moderately elevated levels of environmental early-stage entrepreneurship. However, their prioritization of sustainability over profitability or growth marginally lags behind Cluster 2.

Cluster 4 comprises thirteen countries that prioritize social implications in entrepreneurship while needing improvement in environmental and sustainable practices. These countries include Belarus, Cyprus, France, Germany, Iran, Japan, Luxembourg, the Netherlands, Russia, Slovakia, South Africa, Spain, and Sweden. These countries exhibit moderate levels of social and environmental early-stage entrepreneurship but prioritize sustainability to a comparatively lesser extent. This group signifies nations that uphold a balanced approach towards both social and environmental matters while having the potential for further enhancement in sustainable practices.

Cluster 5 comprises solely Poland and stands out as a unique case in the analysis. Poland shows the highest levels of social and environmental early-stage entrepreneurship among all the countries, indicating a strong consideration for both social and environmental implications. In addition, Poland demonstrates the highest prioritization of sustainability over profitability or growth, reflecting its strong dedication to sustainable entrepreneurship.

The distribution of nations in the five clusters underscores the diversity in the environmental, social, and sustainable objectives of fledgling entrepreneurs around the globe. This implies that distinct countries display differing levels of emphasis and dedication towards sustainable entrepreneurship. Policy-makers and stakeholders can utilize this information to identify best practices, gain insights from successful countries, and devise precise strategies that promote and sustain sustainable entrepreneurship across different regions.

The cluster analysis offers an overview and categorization of countries based on similarities in environmental, social, and sustainable entrepreneurship. It is crucial to conduct additional analysis and examine the individual contexts of each country, as well as the factors influencing clustering within each group. This approach will result in a more comprehensive understanding of the specific dynamics and drivers behind the observed patterns.

Based on the cluster analysis outlined above, the hypothesis (Hypothesis: There are distinct clusters of countries based on the prevalence and characteristics of sustainable start-ups) is verified. The analysis revealed that there are indeed discrete clusters of countries distinguished by their sustainability entrepreneurship levels. The countries were categorized into five clusters according to their evaluation of the social, ecological, and sustainable implications of their entrepreneurial pursuits. This supports the stated hypothesis, proving the existence of clusters of nations with comparable levels of sustainable entrepreneurship.

The outcomes of the cluster analysis displayed in Table 4 offer valuable insights into the arrangement of nations in diverse clusters established on their ecological, societal, and sustainable entrepreneurship objectives. These results correspond and aid in expanding on the widespread discourse on sustainable entrepreneurship, as demonstrated by other research studies in this line of work.

A considerable number of studies have underscored the significance of taking social and environmental factors into consideration in entrepreneurial decision-making. For instance, Schaltegger and Wagner (2011) conducted a study which revealed that entrepreneurs who prioritize social and environmental objectives achieve economic success while also having a positive impact on society and the environment. The results of Cluster 2, where countries prioritize both social and environmental implications, corroborate this research, implying a growing acknowledgment of the correlation between business prosperity and sustainable practices.

Moreover, the prevalence of Cluster 2 in our study coincides with the results of the Global Entrepreneurship Monitor (GEM) Special Report on Social Entrepreneurship (Bosma et al., 2016). This report highlighted the growing significance of sustainable entrepreneurship and recognized nations like Brazil, Chile, India, Italy, and Turkey as emerging leaders in this domain. The incorporation of these nations in Cluster 2 confirms their dedication to ecological entrepreneurship and exhibits their endeavors to blend environmental and social aspects into their corporate tactics.

Conversely, Cluster 3, which is described by countries with relatively greater emphasis on social consequences and moderate levels of environmental considerations, mirrors a tendency noted in the GEM reports. These countries have strong support systems for entrepreneurship and innovation, but there is a need for greater emphasis on environmental sustainability. The GEM Global Report (2020) singled out the United States and the United Kingdom as having favorable entrepreneurship ecosystems, yet with scope for improvement in environmental sustainability practices. The inclusion of these nations in Cluster 3 validates the necessity for focused measures to boost their endeavors towards sustainable entrepreneurship.

The results of our analysis align with previous research on government policies and regulations' impact on sustainable entrepreneurship. Acs et al. (2017) found that nations with supportive policies and regulations for sustainable entrepreneurship tend to exhibit greater levels of environmental and social entrepreneurship. This observation is apparent in the way countries are distributed in various clusters, where those with robust policy frameworks and support systems for sustainable entrepreneurship tend to be placed in clusters with higher levels of social and environmental considerations.

Our analysis findings augment current research on sustainable entrepreneurship and offer important perspectives on entrepreneurial practices worldwide. The authors emphasize the differences between countries with regards to their environmental, social, and sustainable objectives. This underscores the necessity of customized strategies to cultivate sustainable entrepreneurship on both the domestic and global scales. By utilizing the discoveries of this study and incorporating them into the wider discussion on sustainable entrepreneurship, policymakers and stakeholders have the opportunity to establish precise approaches, exchange best practices, and facilitate knowledge dissemination to foster sustainable development and economic expansion.

## Conclusions

Our research implemented cluster analysis to investigate how countries are distributed across diverse clusters according to their ecological, social, and sustainable entrepreneurial objectives. The outcomes of our analysis make a valuable contribution to the wider discourse on sustainable entrepreneurship and are in line with prior studies in this area.

Our results demonstrate that there are five unique clusters of countries, each with differing degrees of emphasis on environmental, social, and sustainable considerations. Cluster 2 displayed a significant emphasis on the social and environmental consequences, demonstrating an increasing awareness of the interconnectedness between business prosperity and sustainable approaches. These results correlate with earlier research that underscores the favorable effects of prioritizing social and environmental objectives.

Cluster 3, which is characterized by countries that prioritize social implications and have moderate levels of concern for environmental considerations, suggests a pattern observed in countries with robust support systems for entrepreneurship, but room for improvement in environmental sustainability practices. Targeted interventions are needed to enhance sustainable entrepreneurship efforts in these countries.

Our analysis confirms that government policies and regulations play a crucial role in shaping sustainable entrepreneurship. Countries with supportive policy frameworks demonstrate higher levels of environmental and social entrepreneurship. This highlights the significance of fostering an enabling environment that promotes and facilitates sustainable entrepreneurial activities.

Our findings have relevance for policymakers, entrepreneurs, and stakeholders who aim to promote sustainable entrepreneurship. Through an understanding of how countries are distributed across distinct clusters, policymakers can develop targeted strategies to facilitate sustainable entrepreneurship at both domestic and global scales. Sharing best practices and promoting knowledge exchange among countries with similar economic clusters can accelerate progress towards achieving sustainable development goals.

It is important to acknowledge that our study has limitations. We based our analysis on data from the Global Entrepreneurship Monitor 2021 database, which covered a restricted number of countries. Future studies should

consider enlarging the sample size and including additional variables to capture a more comprehensive understanding of sustainable entrepreneurship.

This research contributes to the knowledge of entrepreneurial practices worldwide and emphasizes the differences in environmental, social, and sustainable goals among various countries. By using this knowledge, stakeholders can strive to cultivate a sustainable and inclusive entrepreneurial ecosystem that promotes economic growth while also generating positive societal and environmental outcomes.

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