Sustainability Practices in Consumer Products and International Trade: A Study of 193 countries

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Abstract

Sustainability has become an important issue in the twenty-first century. Business practices are prescribed in standards prepared by the standard setters around the globe. In the case of SMEs also several standards are available. This study tries to examine whether the sustainability practices in consumer products among the 193 nations have been used as barriers to trade or not. The outcomes of the current study provide evidence of the concentration of countries at low levels of practice. The possibility of using such practices as barriers to trade is found to be remote. However, a specific study may provide the actual position in this regard.

Keywords: Sustainability, dimensions, dimensions index, diversity, diversity index, environment, social, management, quality, ethics

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Introduction:

To know about sustainability standards, first, one needs to specify, 'what are standards' in the context of international trade? According to Negi et al (2020), standards mean some common rules and policies which are met appropriately to achieve the level of acceptability and are implemented for the operation of a cross-border context. However, there is no denying the fact that standards may be designed to suit the protectionist purposes keeping in mind the task of protecting the domestic producers from the foreign ones. In another word, standards may be used as a barrier to trade, even if they are not designed with that intention when producers are differentially equipped to meet it. The twenty-first century and the movements for sustainability are inseparable. Businesses are required to follow the practices relating to it that are suggested the standards prepared by various standard-setting bodies. From among the available standards, the International Trade Centre (ITC) approves the appropriate ones for worldwide trade. ITC is an agency of the 'United Nations' and the 'World Trade Organization'. It is the only multilateral agency that is fully devoted to supporting the internationalization of SMEs. It extends its technical assistance to support the internationalization of SMEs.

Different standards, available for the purpose of international trade, are used in different countries. Hence, differences in sustainability practices across countries may occur. Also, sometimes these diverse practices may result in differential treatments against countries to create barriers to trade. Such a possibility has been explored in the context of the Islamic States by Ghosh et al (2020). The present study makes a modest attempt to address the issue of using sustainability practices (standards) as barriers to trade among 193 nations. For this purpose,a brief literature survey is prescribed in the following section.

Literature review:

Quite a large number of studies have been made on Sustainability practices around the globe. Several researchers have tried to address the issues relating to environmental practices, in the contexts of different countries. Roome (1994), for example, has shown that in case of Canada R&D organizations is not only wanted to apply new administration techniques but also have to play a leading role in innovative organizational structures in order to fulfil the full potential of environmentally sensitive products and processes. In case of Hong Kong, Studer et al (2006) have analyzed the key barriers and incentives of voluntary environmental initiatives and have compared their relevance for companies of different sizes. In the Australian context, SMEs' participation is reported to be much lower in such environment-related activities than those of large firms. The participation of SMEs in Australia on average reduces hazardous waste generation to the extent of 48%, perchloroethylene consumption by 30%, and improved energy efficiency by 9% (Altham, 2007).

In India, Yadav et al (2018) reviewed 733 articles and display there are two drivers of sustainability practices in the SMEs background namely External drivers and Internal drivers. According to Gandhi et al (2018) upperadministrationobligation, technology upgradation, current legislation, green brand image, and future legislation are the five important drivers of sustainability practices. Upper administration obligation emerged as a key driver as per their study which is maintained by the initiatives taken by the government towards entrepreneurial and management development.

However, from the survey of the literature, no specific study has been found to address the issue of using sustainability practices as barriers to trade among the nations. Hence, present study makes a modest attempt to fill in this gap. Pertaining to this gap, the following selected objectives are described.

1. To analyze the behavior of 193 nations regarding sustainability practices for cross-border trades.

2. To examine whether or not the requirements of sustainability practices are used as barriers to trade.

Research design & Methodology:

In order to conduct the study, every major sustainability issue is mentioned here as a 'dimension'. Altogether we will have five dimensions namely environmental, management, social, quality, and ethics. All sustainability performance indicators are grouped by the standards under these five dimensions and each of the available standard's scores relating to these dimensions (performance indicators) are noted.The present study has been developed for consumer products and currently 75 standards are available for this sector.

Here, diversity is measured at the standards level as well as at the country level. Measurement of diversity has been accomplished by pegging the observed variations with the help of an index which is named here as '**diversity index (ID)**' (standard level). In order to compute this index, the method suggested by Sharma (2008) has been adopted.

First, standard level 'dimension index (id)'have been computed for each of the five dimensions as under:

$$d_{i=}\frac{A_i-m_i}{M_i-m_i}\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where $A_i$is the actual score of the dimension of i^{th}, $m_i$is the minimum score of i^{th} dimensions, and the maximum score of i^{th} dimensions is represented as M_i. The value of d_i varies between 0 and 1. A higher value of d_i will represent a higher degree of disclosure in the concerned dimension. Here d_i represents 'dimension index (id)' of $d_1, d_2, \ldots d_5$for the dimension index of environment, social, management, quality, and ethics respectively.

The Diversity Index (ID) at the standards level is then measured by the normalized Euclidean distance of d_i from the aforesaid ideal point 1. For this following formula has been applied:

$$ID = \sqrt{\frac{(1-d_1)^2+(1-d_2)^2+\cdots+(1-d_n)^2}{n}} \quad \ldots\ldots\ldots\ldots (2)$$

In the above formula, the numerator represents the Euclidean distance of d_i from the ideal point-1. Here$\sqrt{n}$ has been used for normalization purpose. The normalization is necessary to keep the derived value between 0 and 1. In the present case, the study is concerned with the value of the normalized distance which has been accepted as the measure of diversity.As the distance of the dimension value d_i represents the extent of diversity, a simple average of all five values (for five dimensions) could provide an average measure of diversity. Hence, a higher value of the normalized distance (ID) will represent a higher degree of diversity and vice-versa.

After the standard-level dimension index and diversity index, the country-level dimension index and country-level diversity index are computed. This is followed by grouping of standards as per the choices of the countries for both the Destination Market (DM) and Producing Country (PC). This process offers five country-specific dimension indexes (di) and one overall index i.e., country-specific diversity index (DI) for both sets separately. It is the simple average of the standard specific dimension indexes for di and the simple average of the standard specific diversity indexes for DI, i.e.

$$DI = \sum_{i=1}^{n} \frac{d_i}{n} \quad \ldots\ldots\ldots\ldots (3)$$

The computed di varies between 0 and 1 such that a higher value of it represents a higher degree of practices relating to the concerned aspect of sustainability and vice versa. Similarly, DI also varies between 0 and 1. A high value of it naturally indicates high degree of diversity and vice versa. In this

way the process offers five-dimension indexes and one diversity index of 193 countries separately for PC and DM.

In order to satisfy the first objective, present study uses the summary statistics of the above data set. This is followed by identification of the countries which lie either above and or below the average performance for all indexes. This may provide clue about the differences in sustainable trade practices of the select nations as PC and DM as well. Results are reported in the following section (Table-1 and Table-2).With a view to accomplish the second objective, the data set has been put into some diagnostic processes so that the detection of the appropriately applicable test method (s) is possible. In order to check whether the data set is suitable for parametric test or not, tests for- (A) Normality and, (B) Homogeneity have been conducted. In order to check for normality Skewness and Kurtosis values have been computed besides applying the Kolmogorov- Smirnov Test over the data set. Homogeneity, on the other hand, has been checked by using Levene's test.

These tests procedures clearly divide the data set into two distinct parts: i) normal & homogeneous and ii) non-normal and inhomogeneous. The observed results are reported in the following section.

The next process is obviously the correction of that part of the data set which is found to be non-normal and inhomogeneous. Three different tools have been applied for this purpose. These are: Log Transformation; Square Root Transformation and Reciprocal Transformation. To check whether the correction mechanisms applied have been successful or not in transforming the data set into the desired normality and homogeneity, test processes mentioned for (A) and (B) above have been reiterated. Based on the nature of the resulting data set, according to applicability, non-parametric (Mann-Whitney test) tests have been used. Observed findings of these statistical processes are reported and analyzed in the following section in a sequential manner.

Data analysis and findings:

As mentioned in the previous section, an analysis of the sustainability behavior of 193 nations in the matter of production and cross-border trades in consumer products is the first objective of the study. For this purpose, dimension index-wise and diversity index-wise country positions have been shown in table-1 by dividing the countries in terms of above and below average performances. Under the PC, nations with above the average sustainability performance are found in respect of environment (94), social (85), management (90), quality (108), and ethics (98). More than 50% of the nations are seen to have registered the above average sustainability performances in case of quality and ethics. The important point to note in this respect is that dimension-wise distribution of countries which are found to have below the average sustainability practices is: environment 99, social 108, management 103, quality 85, and ethics 95. So, in the case of PC, only for quality and social dimensions most of the countries have registered more than the respective mean dimension index value.

Table- 1
Dimension wise number of countries above and below the mean

Name of Dimension	Number of Countries			
	Above the Mean		Below the Mean	
	PC	DM	PC	DM
Environment	94	99	99	94
Social	85	82	108	111
Management	90	97	103	96
Quality	108	118	85	75
Ethics	98	98	95	95

On the other hand, under DM, distribution of countries having above the mean sustainability practices is: environment 99, social 82, management 97, quality 118 and ethics 98. For all dimensions except social more than 50% of the country population lie above the mean. However, dimension-wise distribution of countries for environment 99, social 108, management 103, quality 85 and ethics 95 are found to have below the average sustainability practices. A

summary statistic is shown in table-2 to understand the actual position of the countries in this regard.

Maximum, minimum, mean, and standard deviation (SD)of country-wise dimension indexes (di) for both PC and DM are shown in table- 2. As the dimension index varies between 0 and 1, the mid-point i.e., 0.5 may be used as a benchmark to assess the performance of the nations in respect of dimension-specific sustainability practices. Consider the maximum index values of the dimensions. Under PC, the maximum value is 0.507 for the environment, 0.625 for social, 0.540 for management, 0.267 for quality, and 0.508 for ethics. But under DM, the maximum index value for the environment is 0.420, for social is 0.536, for management is 0.469, for quality is 0.286, and for ethics is 0.375. These observed values may be used as evidence of better performances with regard to those dimensions whose index values are greater than the benchmark point of 0.5. More specifically, superior performance is seen to have occurred in the case of social dimension (0.625) under PC-based analysis. It may be noted that the maximum index value varies between 0.625 and 0.267. While the highest maximum value occurs in the case of the social dimension (PC), the lowest value of the same is seen to have occurred in the quality dimension (PC). Dimension specific minimum index values under PC are: 0.265 for the environment, 0.450 for social, 0.335 for management, 0.034 for quality, and 0.286 for ethics. In DM-based computations, the observed minimum index values are 0.324, 0.379, 0.303, 0.151, and 0.273 representing environment, social, management, quality and ethics respectively. These values vary between 0.450 and 0.034 which indicates a wide variation in the sustainability practices among the nations. These variations, in turn, may have a countable impact on the dimension-specific mean country performances. Another important indicator used to develop a general understanding of the dimension-specific country performance is the mean index value. A higher mean value indicates higher sustainability practices and vice versa. Under PC, the mean value is 0.378 for the environment, 0.523 for social, 0.447 for management,

0.178 for quality, and 0.382 for ethics. On the other hand, under DM mean values are: for the environment 0.376, for social 0.466, for management 0.392, for quality 0.231 and for ethics 0.329. The computed mean values vary between 0.523 and 0.178. In view of the range of the maximum and the minimum mean values, it seems to be logical to argue that the variation in the sustainability practices among the nations is high which is evidenced by the SD values discussed in the following paragraph.In the case of PC, computed SD values are: for environment 0.056, for social 0.032, for management 0.037, for quality 0.037, and for ethics 0.041. On the other hand, in the case of DM, the SD values are: 0.020 for the environment, 0.022 for social, 0.029 for management, 0.037 for quality, and 0.021 for ethics. The observed values of the standard deviation of the dimension-specific indexes may be used as the indicator of varying degrees of dimension-related sustainability practices. The reported SD values read together with the respective mean values (rule of thumb--SD lower than 1/3rd of the mean value indicates a lower degree of deviation) speak in favour of a low degree of deviations between the country's practices.

Table-2

Country Level summary statistics of dimensions index (di)

Particulars	**Environment**		**Social**		**Management**		**Quality**		**Ethics**	
	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.
Mean	0.378	0.376	0.523	0.466	0.447	0.392	0.178	0.231	0.382	0.329
SD	0.056	0.020	0.032	0.022	0.037	0.029	0.037	0.037	0.041	0.021
Maximum	0.507	0.420	0.625	0.536	0.540	0.469	0.267	0.286	0.508	0.375
Minimum	0.265	0.324	0.450	0.379	0.335	0.303	0.034	0.151	0.286	0.273

As mentioned in the forgoing section, fulfilment of the second objective involves a diagnostic process of examining the data set using two types of tests: normality and homogeneity. This is required to ensure whether parametric or

non-parametric test will be appropriate for the present purpose. For normality test, graphical displays (histogram and Q-Q Plot), Skewness & Kurtosis, and Kolmogorov-Smirnov test are used (To control page limit histogram and Q-Q Plot are not shown in this paper). In tables 3 and 4 test results are presented. A summary view of the results and the final diagnoses in respect of all dimensions as well as diversity positions in respect of sustainability practices for both PC and DM are shown in table-5. With the help of charts of the histogram, it may be argued that all index values for both PC and DM are normally distributed except for quality (DM). On the other hand, the Q-Q plots shownthat all dimensions except quality (DM) for both PC and DM are normally distributed as the observed values fall exactly along the straight line in the said plot.

It is widely held that for the data set to be considered as normally distributed the computed values of the Skewness and the Kurtosis should lie between -1 to +1. Table- 3 shows that under PC, all dimension index values except quality are normally distributed. Under DM also, all dimension index values except social are normally distributed.

Table: -3
Skewness/ Kurtosis (-1 to 1)

	Skewness		**Kurtosis**	
	P.C.	**D.M.**	**P.C.**	**D.M.**
Environment	0.045	0.106	-0.753	-0.585
Social	0.638	-0.080	0.425	1.115
Management	0.166	-0.096	-0.255	0.184
Quality	-0.815	-0.727	2.258	-0.739
Ethics	0.022	-0.411	-0.467	-0.400
Diversity	-0.290	0.370	-0.036	0.188

The test results relating to the Diversity index values are also shown in table-3. Under PC, the distribution of the diversity index (skewness value is -0.290 and kurtosis value is -0.036) is normal and a similar condition (normality) is found also in case of the analysis under DM (skewness value is 0.370 and kurtosis

value is 0.188). Therefore, like in the agricultural sector, in case of consumer products also a mixed result is found which needs to be verified further using another test mechanism. For this purpose, the Kolmogorov-Smirnov test has been applied, the results of which are shown in table-4. If the P value of the Kolmogorov-Smirnov test is greater than 0.05, then the data may be treated as the data set is normal. Table-4 shows that under PC, out of five dimensions only environment (PValue- 0.200) and management (PValue- 0.057) are normally distributed, and the remaining three dimensions (social: P value0.003, quality: P value0.000 and ethics: P value0.013) have non-normal distribution. On the other hand, under DM, all five dimensions (P valueless than 0.05) are not normally distributed.

The P value of the Kolmogorov-Smirnov test for diversity index is also shown in table-4. Under PC, the P value of the diversity index is 0.006 and, hence, the diversity index for PC is not normally distributed. Under DM, P value for the same is 0.002. Therefore, the distribution of the diversity index for DM also is not normal.

Table: -4
Kolmogorov-Smirnov Test

Variables	PC		DM	
	Z-Statistic	P value	Z Statistic	P value
Environment	0.055	0.200	0.075	0.011
Social	0.082	0.003	0.098	0.000
Management	0.063	0.057	0.077	0.008
Quality	0.093	0.000	0.179	0.000
Ethics	0.074	0.013	0.119	0.000
Diversity	0.078	0.006	0.083	0.002

For consumer products, in order to provide the synoptic view of the test outcomes, all results relating to normality along with the final diagnosis are shown in table-5. The final diagnosis under PC is that environment and management dimensions are normally distributed and indexes for other

dimensions are non-normal. On the other hand, under DM, no dimension is normally distributed. The final diagnosis for the diversity index also may be found in table-5. Under both PC and DM, the diversity indexes are not normally distributed.

Table: - 5
Summary of Diagnosis (Normality)

Index	Skewness		Kurtosis		Histogram		Q-Q plot		Kolmogorov-Smirnov test		Final Diagnosis	
	P.C	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C	D.M.
Environment	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**
Social	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Management	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**
Quality	**Nor**	**Nor**	**N-Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Ethics	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Diversity	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**

Note: Nor= Normally Distributed, and N-Nor= Not Normally Distributed.

The above discussions suggest that a mix of parametric and non-parametric tests will be appropriate for consumer products. However, another set of tests for homogeneity needs to be conducted to make the final choice. Therefore, this test is performed and reported in the following paragraph.

For the homogeneity test, the technique suggested by Levene has been used. According to this test, for homogeneity of the data, the observed P-values based on mean should be greater than .05. In this study, for all dimension indexes and also for the diversity index the observed P Values based on the mean are less than 0.05 (as per table- 6). Hence, the data sets may be identified as non-homogeneous.

Table: -6
Homogeneity Test: Levene's Test

Index	(P Value)Levene's Statistic	(P Value) Levene's Statistic after Log Transformation	Levene's Statistic (P Value) after Square Root Transformation	Levene's Statistic (P Value) after Reciprocal Transformation
Environment	156.82(0.000)	156.63(0.000)	156.23(0.000)	156.37(0.000)
Social	21.99(0.000)	18.10(0.000)	16.23(0.000)	14.56(0.000)
Management	10.54(0.001)	7.22(0.007)	5.27(0.022)	4.52(0.034)
Quality	4.20(0.041)	2.22(0.137)	0.04(0.842)	0.894(0.345)
Ethics	89.97(0.000)	81.41(0.000)	73.56(0.000)	73.01(0.000)
Diversity	9.56(0.002)	9.95(0.002)	10.05(0.002)	10.34(0.001)

It is apparent from the above discussion that some variables are normal while some other variables are not normal, but all variables are not homogeneous. So, there are some problems in the data set that may be corrected by using some techniques namely, log transformation, square root transformation, and reciprocal transformation. After making this correction, further tests for normality and homogeneity of the corrected data set will be conducted by using the same techniques. The test results of homogeneity are reported also in table-6 of data sets after log transformation, square root transformation, and reciprocal transformation. In case of quality, the P-values, after correction of data for all three techniques are greater than 0.05 (after Log Transformation 0.137, after Square Root Transformation 0.842, and after Reciprocal Transformation 0.034). Therefore, only the dimension value of quality is homogeneous. But according to tables 7, 9, and 9 the dimension index value of quality is not normal. Hence, in case of consumer products the data sets are appropriate for the non-parametric test.

Table: - 7
Summary of Diagnosis after Log Transformation (Normality)

Index	Skewness		Kurtosis		Histogram		Q-Q plot		Kolmogorov-Smirnov test		Final Diagnosis	
	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C	D.M.
Environment	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**
Social	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Management	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**

Quality	**Nor**	**N-Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Ethics	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Diversity	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**

Note: Nor= Normally Distributed, and N-Nor= Not Normally Distributed.

Table: - 8
Summary of Diagnosis after Square Root Transformation (Normality)

Index	Skewness		Kurtosis		Histogram		Q-Q plot		Kolmogorov-Smirnov test		Final Diagnosis	
	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.
Environment	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**
Social	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**	**N-Nor**
Management	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Quality	**N-Nor**	**Nor**	**N-Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Ethics	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Diversity	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**

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Table: - 9
Summary of Diagnosis after Reciprocal Transformation (Normality)

Index	Skewness		Kurtosis		Histogram		Q-Q plot		Kolmogorov-Smirnov test		Final Diagnosis	
	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.	P.C.	D.M.
Environment	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**
Social	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Management	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**
Quality	**N-Nor**	**Nor**	**N-Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Ethics	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**
Diversity	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**Nor**	**N-Nor**	**N-Nor**	**N-Nor**	**N-Nor**

Note: Nor= Normally Distributed, and N-Nor= Not Normally Distributed.

In order to accomplish the second objective following hypothesismay be tested for five dimensions of selected sectors separately.

H0: There are no significant differences between the destination market-wise requirements and the producing country-wise requirements of the sustainability practices.

H1: There are significant differences between the destination market-wise requirements and the producing country-wise requirements of the sustainability practices, and the destination market-wise requirements are greater than those of the producing country-wise requirements.

To test the above hypotheses, the Mann-Whitney test is used for five dimensions separately. The results of the dimension index are reported in table-10 and analyses thereof are presented in the following paragraphs.

Environment: - Table-10 shows that in the case of environment there is a difference between the mean rank of PC (195.48) and the mean rank of DM (191.52) but this difference is not significant as P value (.728) is greater than .05. So, in the case of the environment, the null hypothesis is accepted. This is to say that there is no significant difference between the destination market-wise requirements and the producing country-wise requirements of the sustainability practices.

Social: - As per table- 10 for the social dimension, the mean rank of PC is 278.48 and the mean rank of DM is 108.52, implying some differences between them, and as P value(0) is less than .05 the observed difference is considered as significant. Hence, in case of social the null hypothesis is rejected, and the alternative hypothesis is accepted. Therefore, the observed difference between the two requirements is considered significant, but DM's observed mean rank value is not greater than that of PC. Hence, this part of the alternative hypothesis is not accepted.

Management: - Table-10 shows that for the dimension named management, the mean rank of PC (267.58) differs from the mean rank of DM (119.42) and this difference is significant because the P value (0) is less than .05. So, in the case of the management dimension, the null hypothesis is rejected and the alternative hypothesis is accepted. This necessarily implies that there are significant differences between the two sets of requirements namely the destination market and the producing country in respect of trade-related sustainability practices. However, the second part of the alternative hypothesis is not accepted as the observed mean rank value of DM is not greater than that of PC.

Quality: - In case of Quality also a difference (as per table-10) between the mean rank of PC (129.58) and the mean rank of DM (257.42) is observed but the P valueis 0 which is less than the theoretical value of .05. This observed significant difference tells us to reject the null hypothesis and to accept the alternative hypothesis. Hence, in respect of the quality dimension, there are significant differences in the requirements between the sustainability practices among the nations being considered as PC and DM. Interestingly, the second part of the alternative hypothesis is also accepted because the mean rank of DM is greater than the mean rank of PC. Therefore, the higher mean rank of DM than that of PC prompts the researcher to suspect that the quality dimension may be used by the nations to use as a trade barrier in case of consumer products. The actual trade practices may be verified to confirm the actual position in this respect. As this does not fall under the defined scope of this study, the issue is left for future research.

Ethics: - According to table-10, in the case of ethics, there is a difference between the mean rank of PC (264.14) and the mean rank of DM (122.86). This difference is significant because the test statistic- P value(0) is less than 0.05. Thus, the null hypothesis is rejected and the alternative hypothesis is accepted but the second part of the alternative hypothesis is rejected as the mean rank of DM is not greater than the mean rank of PC.

Table-10
Nonparametric Test (Mann-Whitney Test)

Name of Dimension	Mean Rank		P value(<0.05)
	PC	DM	
Environment	195.48	191.52	**0.728**
Social	278.48	108.52	0.000
Management	267.58	119.42	0.000
Quality	**129.58**	**257.42**	**0.000**
Ethics	264.14	122.86	0.000

Conclusions:

The existing study is trying to learn about the sustainable behavior of 193 nations concerning their trade participation in consumer products in general. The sustainability behavior of the states has, therefore, been the main point of discussion. As this behavior which is revealed through the selection of the voluntary requirements relating to trades may differ based on the purpose for which this selection is done. A country's behavior as a producing country and as the destination market may not be equal for obvious trade-related reasons. However, a strict requirement of compliance to the desired practices of the importing countries may act as hurdle for other countries which are unable to afford to the requirements. Keeping this possibility in mind, an attempt has been made to put the observed behavior of nations into a test process to check if there is any possibility of using the stated requirements as barriers to trades.

Finally, it is seen that in the case of the selected sector (consumer product), for both PC and DM sustainability-related performances of the nations are low. However, the present analyses, based on the dimension-specific indexes also indicate the existence of variations among the nations in this regard. This, in turn, indicates the presence of diversity in sustainability practices between the countries. After discussion, we can see that in the case of this sector, for both PC and DM very level of diversity is present.

After dimension-wise analyses, null hypothesis is rejected, and the alternative hypothesis is accepted for the dimensions of social, management, quality, and ethics. Therefore, there is a significant difference between the destination market-wise requirements and the producing country-wise requirements of the sustainability practices for each of these four dimensions but only for the quality dimension, the mean rank value of DM is greater than the mean rank value of PC. Hence, only for the quality dimension, both two parts of the alternative hypothesis are accepted.

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