Sustainability Practices in Agricultural sector and International Trade: A Multinational Study

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Abstract

In the twenty-first century sustainability has become an important issue. Practices of sustainability by the business are prescribed in the standards prepared by various standard-setting bodies. From among the available standards, the International Trade Centre (ITC) approves the appropriate ones for the SMEs. The present study makes a modest attempt to address the issue of diverse practices of sustainability of the agricultural sector across nations and their determinants. The result of the study provides a very high degree of diversity among the standards and a very low level of diversity among the nations. The study also provides some determinants that positively influence and some determinants negatively influence the sustainable behaviour of the agricultural sector.

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

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1.Introduction

Sustainability has become an important issue in the twenty-first century. Sustainability practices for business are prescribed in the standards, prepared by the standard setters around the globe. In case of SMEs also several standards are available. SMEs are expected to follow these standards. In the present study agricultural sector is used as a SME.

Over the last decades the entire world has experienced hot discussions on the 'Sustainability' of human civilization and for that matter, our 'Mother Earth'. For developing the dissertation, the present study adopts the definition of sustainability from the report of the Brundtland Commission of the United Nations which was submitted in 1987. The idea of 'sustainability' is not a new one. The 'sustainability' was first raised explicitly by Hans Carl Von. Carlowitz in the year 1713. (According to Edinger and Kaul, 2003). As per Negi et al (2020), the concept of sustainability means economic globalization which has generated more employment and income around the globe. It has also been one of the drivers of unsustainable production and consumption system across the globe. Sustainability is every day's conditions of production somewhere in the world infringe on human health and wellbeing. This is far away from the place where the goods and services are eventually purchased by the end consumer. However, sustainable principles in modern terms were for the first time spelled out in the form of the concept of 'sustainable society' by the World Council of Churches at a conference on 'Science and Technology for Human Development' in the year 1974 (Dresner, 2002).

To know about sustainability standards, first, one needs to specify, 'what is standards' in the context of international trades? 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.

Negi et al (2020) say sustainability standards have been developed to achieve a spectrum of societal objectives by adding certain criteria to goods

and their production. Sustainability standards inspire to achieve the social, cultural and environmental values which consumers wish to see promoted in society. As per'United Nations Conference on Trade and Development (UNCTAD)'sustainability standards and regulations have an impact on approximately 80% of the world's trade in commodities.

At present, there are 132 (as on 04-03-2020) standards that have been approved by the ITC for agricultural sector. The uses of these private Standards have become popular. A cursory look into the scope of these standards will clearly bring out the fact that they differ in terms of their respective coverage regarding sustainability-related issues. Moreover, some standards are seen to have concentrated on specific sustainability issues. For example, ILO concentrates mainly on labour-related issues; relevant social issues are also partially touched by it.

All standards do not cover all sustainability issues equally. More specifically, differences, as regards the coverage of the sustainability issues, are present between the standards. Hence, diversity in the sustainability practices of agricultural sector is expected. In order to identify the current state of sustainability practices of agricultural sector across nations, a brief literature survey is prescribed in the following section.

2.Review of literature

From the vast literatures, some of the notable studies are reviewed here to identify the research gap and scope of the present study.

According to some researchers (Gray et al, 1997, p.328) 'Social accounting' may be viewed as the "universe of all possible accounting". It contains researchable sub-sets which range from traditional accounting to other special accountability of business namely, social, environmental, and other related issues. But these accountabilities of the business firms lack in terms of inadequate theoretical bases (Gray 2001 and Gray 2002). Subsequently, explanations provided by the political-economic theory have been used as the basis of research in the area of social and environmental accounting and disclosures by the firm. These explanations are popularly known as legitimacy theory and stakeholder theory (Gray et al 1996 and Deegan 2000).

About the additional accountability of business over traditional accounting and reporting varying degrees of interest among researchers can be traced from the earlier research studies (Deegan 2002: Gray, 2002: Mathews, 1997). During the period ranging between the late 1970s and early 1980s labour-related issues dominated the reporting by the firms and research activities relating thereto (Gray, 2002). Environment-related disclosures started getting additional importance among the firms as well as among the

researchers as a result of increased social awareness in respect of natural capital after the publication of the Brundtland Commission report in 1987. Initiatives towards the inclusion of more issues relating to social concerns may have been further increased due to the adoption of Millennium Development Goals (MDG) by the United Nations and the involvement of the global business community with this endeavor through the United Nations Global Compact (UNGC). Since the establishment of the Global Reporting Initiative (GRI), ESG reporting is seen to have received further momentum throughout the globe which has spurred considerably after the acceptance of the Sustainable Development Goals (SDGs) in 2015. Business firms have been involved more directly with this initiative. Apart from the social responsibility or sustainability disclosure practices of the large corporate, entities belonging to medium and small enterprise sectors including agricultural, fishery, forestry, etc. also are seen to follow sustainability practices, particularly for taking part in the international trades. Various frameworks and guidelines have been developed for this purpose. In addition to ISO, GRI, etc. large numbers of private standards are now available for implementation of sustainability practices. Accordingly, the tasks concerning accreditation and certification have emerged as a major function in the field of accounting and reporting of business' financial and non-financial performances.

A business organisation is an economic unit engaged in generating values that are to be consumed by various individuals and groups. Thus, economic relationship of the enterprise with state, individual member of the society, market and various groups is obvious. Social and political theories seek to focus on the role of information generation and disclosure by business firms on these relationships has been focused (Deegan, 2000: Deegan, 2002: Gray et al, 1996). Political economy theory also explains the impact of corporate disclosure on the distribution of income, power and wealth (Miller, 1994, Cooper and Sherer, 1984). According to Blomquist and Deegan (2000) this political economic approach allows to consider society, politics and economics are integrated and hence, economic issues should not be considered as an independent issue. They should be viewed together with the society and the politics. We live in a pluralistic society. An accounting report is, therefore, a social, political and economic document which provides the basis of legitimising the political and economic arrangements devoted to create corporate benefits (Guthrie and Parker, 1990). The political economic perspective offers two distinct explanations in this respect. One is known as the 'Legitimacy theory' and the other one is named as the 'Stakeholder theory'. While the second theory deals at the micro level by taking into considerations the concerns of the associated stakeholders, the first one is more conceptual and therefore, global in providing analyses on

power relationships (Moerman and Van Der Laan, 2005). Stakeholder theory is known for its descriptive accuracy, instrumental power and normative validity. It seeks to identify those interest groups to whom business should be accountable (Woodward and Woodward, 2001). Having identified the stakeholders and their diverse information requirement, firm tries to select the relevant type of information which is necessary to satisfy the powerful stakeholders. The selection of information by management of the enterprise follows a dynamic process such that the more powerful groups get priorities over the less powerful ones. Thus, degree of disclosure by firms varies across firms and is dependent on this dynamic process (Miles, 2002: Mitchell et al, 1997: Tilt, 1994). Ullmann (1985) argues that the corporate social responsibility disclosures are used by the management of the firm as strategic tools in order to manage the relationships with the stakeholders. Compliance to the information need of the stakeholder will depend on the degree of importance of the resources held by the stakeholder in relation to the operations of the business. More critical the resource is, more will be the degree of information disclosure by the firm. Roberts (1992, p 595) finds that "stakeholder power, strategic posture and economic performance are significantly related to levels of CSD". This observation is seen to have been supported by the works of Neu et al. They discourse that disclosure contained in the annual reports is predisposed primarily by an organization's related publics, and that the communication strategies accepted by the organization are predisposed by the diversity and power of these diverse publics (Neu et al, 1998, p. 274). This establishes link between 'organisational legitimacy' and strategy to manage the stakeholders of the firm. The crux of the Legitimacy Theory may be understood from the writing of Suchman (1995. As viewed by Richardson (1987), accounting is a legitimating institution. It provides the basis through which the social values are linked with the economic actions of business. Organisational legitimacy varies across time, space and stakeholders as well as cultural groups (Lindblom, 1993). According to Lindblom (1993) and Dowling & Pfeffer (1975), four broad strategies may be considered to deal with the perceived 'legitimacy gap'. These are: i) keep pace with the public demand in order to enhance 'public image'; ii) instead of changing its role, it should try to demonstrate the appropriateness of its product by educating and convincing public using adequate information; iii) it may try to change people's perception by associating it with an appropriate one which has high legitimacy status; and iv) may try to change people's perception by associating them with the organisation's activities. Depending upon the societal norms, values and beliefs firm may adopt any of the above four strategies in order to disclose information in respect of its social responsibility performances. Empirical researches have tried to provide explanations in respect of variations among firms in the matter of voluntary

disclosures. Empirical studies conducted by Hogner (1982) and Guthrie and Parker (1989) report contradictory findings. While former study reports evidence in favour of legitimacy theory, the latter study claims that no influence of this theory on firms' disclosures is observed. However, Campbell et al, (2003) and Deegan (2002) strongly argue in favour of the ability of this theory to explain variations in corporate behaviour in respect of voluntary disclosures.

Quite a large number of studies have been made on Sustainability practices by agriculture, consumer products, and fish-aquaculture around the globe. Several researchers have tried to address the issues relating to environmental practices, in the contexts of different countries. Roome (1994) has shown that in the case of Canada R&D management is not only needed to apply new management techniques but also has to play a leading role in innovative organizational structures in order to fulfill the full potential of environmentally sensitive products and processes. In the context 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).

According to Masurel (2007), improving the working conditions is the most important reason which might have allowed theSMEs in the Netherlands to invest in environmental measures. Also, this investment in improving environmental conditions at the workplace has believed to have created a positive impact on their employees by enhancing motivation vis-à-vis performance. Aragón et al (2008) conducted a study on 108 SMEs in the automotive repair sector in Southern Spain. They find that SMEs in the country has undertaken a range of environmental strategies from reactive regulatory compliance to proactive pollution prevention and environmental leadership. In case of Australia Gadenne et al (2009) indicate that legislation does result in general environmental awareness unless organizations themselves are willing to change their business processes and environmental strategies. In the UK, policymakers play an important role to encourage more strategic and comprehensive environmental reforms in the SME sector (Revell et al, 2010). Wattanapinyo et al (2013) assess feasible paths toward the ecological modernization of small and medium-sized agro-food processing industries in Thailand. In case of New Zealand, Williams et al (2015) report that the environmental pressure groups are one of the major forces which have compelled the SMEs to undertake environmental

sustainability practices. According to Saez-Martinez et al (2016), most managers perceive no clear benefit of environmentally friendly behavior of their firms and therefore, do not consider 'going beyond environmental legislation' as a source of adding competitive advantage for the firm. Only 9% of the firms consider environmental responsibility as one of their priority objectives in Spain. Based on a survey conducted in Italy, Testa et al (2016) tested the set of hypotheses using a structural equations model and find external pressures and entrepreneurs' attitudes are the most important predictors of environmental measures undertaken both by small and micro firms. Their study also confirms a positive relationship between environmental proactive behaviour and environmental investments as well as environmental performance. Reyes et al (2016) report that they conducted four consecutive surveys over a period of 14 years among Danish manufacturing SMEs. Their findings show that Danish SMEs have increasingly deployed environmental initiatives to reap benefits of lower costs of production which, in turn, has resulted in achieving competitive advantage at the market place.

In New Zealand environmental as well as social issues are rarely considered to be appropriate for reporting by the small firms, though they tend to be close to their communities. The survey conducted by Lawrence et al (2006) reveals that many of the surveyed firms are actively engaged in employee and community support. In the context of China Yu et al (2007) have found a very low level of engagement of large firms in respect of both environmental and social dimensions. In contrast, a high level of concern for the same is reported to have been found among the SMEs of the same country

According to Abraham et al (2015) Malaysian SMEs' managerial functions tend to concentrate more on the activities namely marketing, finance, accounting, and production; HRM practices seem to be less important, weak, and unsophisticated. There is a close correlation between sustainable practices and commitment to sustainability in Sweden (Jansson et al. 2017). Though this relationship does not seem to be unexpected, it is difficult to evaluate the causality. Paramanathan et al (2004) develop new methods for technology valuation which integrate the concept of triple bottom line accountability and existing technology strategy in organizations. Those new methods, according to the authors, may be extended to include the wider set of values that underpin the concepts of industrial sustainability in the UK. Font et al (2016) have conducted a survey on around 900 tourism enterprises in 57 European protected areas and find that small firms are more involved in taking responsibility for being sustainable than previously expected. They are seen to undertake eco-savings-related operational

practices. They also use to report on a wide range of activities which clearly bring out their concern in respect of social and economic responsibility.

Relationships between SMEs and their stakeholders are the prerequisites for ethical business practices. Such relationships between the SMEs and their respective suppliers, employees, customers, local communities, etc. may enable the firms to opt for ethical business practices. On the contrary, unethical relationships, such as those with corrupt governments, are expected to become counter-productive in respect of sustainability which has been found in Africa (Painter-Morland et al. 2009). Collins, et al (2009) discusses the role of SMEs in New Zealand and in Australian society. Both studies find that owner-managers undertake a number of triple bottom line activities, without overtly identifying these actions as a sustainable practice. At the same time, both studies show that an overriding focus on the financial bottom line may be a significant barrier to SMEs adopting further sustainability practices.

Lee (2008) finds that buyers' environmental requirements and support are positively linked to their suppliers' willingness to participate in green supply chain initiatives in South Korea. SMEs are less active in adopting environmental management initiatives than larger companies in China (Zhang et al 2009). This finding is completely different from the findings reported by China Yu et al (2007). Cambra et al (2011) opines that in the context of Spain sustainability may be understood as a strategic tool in order to achieve competitive advantages and help companies successfully operate internationally. Johnson (2015) has conducted a survey on 176 German SME managers. He has identified five key barriers (Poor market structure, Lack of appropriate logistics infrastructure, underdeveloped environmental legislation, demanding warehousing and distribution processes, and unorganized returns management) and six drivers (organizational performance, investors, suppliers, government, customers, and competitors), for the implementation of green practices within the dairy SC. While external drivers significantly influence the market structure and logistics network, government, competitors and customers are the driving factors for improving environmental performance (Ghadge et al (2017). Wahga (2018) suggests that in Pakistan heterogeneity of institutional structures and multi-level approach provides an effective framework for examining drivers of sustainable entrepreneurial practice.

In case of India, "Government support" is reported to be most significant for the successful lean-green implementation by the SMEs. Thanki et al (2018). Literature in this case is also found to be scanty. In India, Yadav et al (2018) reviewed 733 articles and show that there are two drivers of sustainability

practices in the SMEs context namely External drivers (Government, Customers, Network and Alliances, Suppliers, Community Surrounding, Competitors, Tangibility aspect of the business sector) and Internal drivers (Employees, Organization culture, Brand image and reputation, Competitive advantage & strategic intent, Environmental Management Capability and Size of the firm). According to Gandhi et al (2018) top management commitment, technology up-gradation, current legislation, green brand image, and future legislation are the five most critical drivers of sustainability practices. Top management commitment emerged as a key driver as per their study which is supported by the initiatives taken by the government towards entrepreneurial and management development. In a recent study, Ghosh (2020) has identified some factors which have influenced the selection of VSS by the UN member nations.

Sustainability standards, however, deal with social values concerning health, environment, labour, ethics, human rights, etc. These issues started gaining importance during 1970s (Negi, 2020). But the proliferation of standards is a comparatively new phenomenon. Use of these standards voluntarily by nations is a very common trend in the case of international trade. According to a report entitled Trade Standards Compliance 2015, this may be the impact of multilateral trade agreements which do not allow the countries to impose arbitrarily excess tariffs to restrict trade. VSS may instead be used as a tool for this purpose. Thorstensen & Vieira (2016) describe them as 'wolf disguised under sheepskin'.

Apart from analyzing the reason for using the private voluntary sustainability standards from this negative angel, it may be judicious to consider the issue from the point of view of the positive impacts also. Literature survey series II (2011) has addressed this issue. This study has gathered evidences of impacts of using private VSS from the earlier studies which have documented impacts on profitability (producer), business opportunities, livelihood (producer) and labour conditions, social, and environmental impact. Sustainability standards cover many of these aspects. This study also provides evidences of considerable impact upon i) global value chains; ii) producers and exporters; iii) sustainable development and the issue of interdependencies between public and private standards. Using systematic literature survey technique, the authors have finally identified 47 papers which cover all geographic regions of the globe. Among the 35 studies were conducted on agricultural produce. 19 of them provide information on impacts in numerical terms.

Though this initiative seeks to remain confined only on the sustainability standards, some idea about the impact of private standards on the exporters of developing nations will be understand the matter of using standards as barriers to trade. ITC's (2011) literature survey series-II has addressed this

issue and offers findings of the previous prominent research works on various aspects namely, profitability(producer), business opportunities, livelihood (producer)and labour conditions, social and economic impacts on a community level, and environmental impact. Sustainability standards cover many of these aspects. ITC's research initiative has tried to focus on the impact of all private standards on- i) global value chains; ii) producers and exporters; iii) sustainable development and the issue of interdependencies between public and private standards. The authors have adopted a systematic process for identifying the relevant research works for analysis. They have followed three distinct phases namely, search and screen followed by extraction and analysis. Identification of literature has been done using a 'six-step' process: i) identification of keywords; ii) identification of key journals; iii) review of references of the select literature; iv) review of influential researchers in the field; v) review of publications of the prominent research institutes and organizations in the field, and vi) identification of key books and articles. After the final screen altogether 47 papers have been retained for analysis. Regional distribution of these papers is: i) Global-3, ii) Asia-5, iii) South America-10, iv) Africa-15 and, v) North America & Caribbean-18 and 35 of these papers have concentrated on the agricultural sector. The following table brings out the coverage of issues and reporting on the positive outcome (impact) – of using private standards by the selected 47 papers (of them 19 papers provide numerical values of impact). Table-1 provides a summary view of the impacts of using private standards which have been brought out by these studies. This issue is focused by Narrod et al (2009). Growing concerns of the affluent consumers in respect of food security create immense pressure upon the producers, particularly the smallholders to comply with the appropriate standards in order to carter to the demands of the domestic as well as international markets. A study by Ait Hou et al. (2015) on the food and vegetable producers of Morocco provides some clues in this respect. In order to come out of this problem, smallholders have been adequately helped in order to become associated with the global supply chain. This solution is called the 'inclusion effect' by virtue of which the smallholders, in particular, have been adequately empowered to comply with the desired standards.

Some other important evidences are available, but most of them cover product-related technical (regulation/standard) issues. Otsuki et al (2001)'s study is considered as one of the first empirical analyses on this issue. This study on the impact of SPS standards (EU regulation) on the exports of African cereals estimates the loss of exports to the extent of 65% to the exporting nation. Almost, in the same way, Gebrehiwet et al (2007)'s study shows that as a result of a similar type of regulation (standard) set by five OECD countries an estimated revenue loss of $65 million had occurred in South Africa during 1995-99.

Wilson et al (2003) have been directed a study on the trade
outcome of using diverse standards by Australia, New Zealand, United States, Canada, European Union, and Japan on the exports of Australia, Argentina, Brazil, Canada, Chile, China, Hungary, Mexico, New Zealand, Nicaragua, South Africa, Switzerland, Thailand, Ukraine, Uruguay, and United States. Their estimation shows a loss of exports: South Africa -$160 million, Brazil-$200 million and Argentina-$300 million, etc. to name a few. Another important study in respect of the harmonization of standards and its impact on the developing nation's export positions has been conducted by Disdier et al (2012). They show that regular acceptance of the standards used by the North has undoubtedly led to the enhancement of the product's standard but it services the cost to go up to a higher level. Under such a situation, south-south trade is bound to be replaced by north-south trade because of high product prices. Alternatively, it may be expected that for export incomes, southern nations will have to depend more upon the markets of the northern countries.

The impact of standards has been investigated also from the viewpoint of possible trade-diverting effects. Reyes (2011) has made an attempt on this line. The rationale behind this trade diversion is that differences are there between countries in respect of the cost of compliance due to varying capacities in terms of technology, infrastructure, and geographic conditions. Reyes shows that harmonization tends to increase exports of the developed nations while their developing counterparts receive an ambivalent impact. This indication, therefore, clearly ropes the new day practice of permitting countries to select sets of voluntary sustainability standards to fit into their individual requirements.

Timmis (2017) has made a systematic review of the literature to address a similar issue; the impact of standards on developing country exports. More specifically, the issue has been addressed with two different objectives: i) Impact of complying with existing standards on export opportunities (cost/barrier), and ii) Does the adoption of existing standards or development of new standards have a catalytic effect on export occasions? These studies have addressed basically three issues: i) impact of standards on developing country trades; ii) standard's role as catalyst/barrier to developing country trades; and, iii) methodological issues in measuring the impacts.

Important findings of this review are: i) three multi-sector secondary review brings out the fact that standards act as a barrier to agricultural sector trades and have a catalytic effect on the trades of some manufacturing sectors. Moenius's (2004) study mentioned above also provides the same findings. These results, however, vary across countries and do not always bear similarity in respect of similar types of countries; ii) owing to variations in the compliance cost, it acts as barrier or catalyst; iii) countries equipped

with a higher level of skills, equipment's credit facilities, and other inputs get benefits from standards (Reyes, 2011, reports the same); iv) availability of conformity assessment infrastructure and certification services help the countries to gain from using standards.

From the survey of the literature, it is apparent that the researchers have so far tried to address the issue of sustainability practices by agricultural sector in the context of different countries and the determinants of such practices without associating them. The present study tries to fill in this research gap. Pertaining to this gap, the selected objectives are described in the following subsection.

2.1. Objectives of Study

To fill in the gap which has been identified in the above, the present study proposes to take up the following tasks:

1) To make an analysis of the sustainability standards in order to identify various dimensions of sustainability which have been prescribed by the standard setters around the globe for agricultural sector.

2) To measure the scores of all dimensions of sustainability practices suggested by the identified standards.

3) To measure the variations if any, among the standards of sustainability practices as well as country level practices.

4) To identify the principal determining factors for the observed variations if any at the country level.

To complete the above-stated tasks some statistical tools have been adopted, which are discussed in the next section

3. Methodology of the study

3.1. Development of standard level and Country level Indexes

The study is concerned with the SMEs of various countries which are not required to submit any report of sustainability to the appropriate authority. Hence, no such database is maintained by ITC on the sustainability performance of the participating enterprises where from reports could be collected. Hence, the present study seeks to address the identified problem on the basis of the available standards. At present, there are altogether 132 standards that are identified for the agriculture.

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 whole methodology have been discussed in the current chapter and it have also been discussed separately in the different chapter (where is applicable).

3.1.1. Measurement of Diversity at the Standards Level

Our main purpose here is to measure diversity in the sustainability practices of SMEs. Here, diversity will be measured at the standards level as well as at the country level. Measurement of diversity at the standards level 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, a 'dimension index (id)' (standard level) is 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 stands for the actual score of the dimension of i^{th}, m_i represents the minimum score of i^{th} dimensions, and the maximum possible 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)' (id_1, id_2, …. id_n), and id_1, id_2, id_3, id_4, and id_5 stand 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 point1. For this following formula has been applied:

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

In the above formula, the numerator represents the Euclidean distance of d_i from the ideal point-1. Here has been used for normalization purpose. The normalization is necessary to keep the derived value between 0 and 1. This method is a bit different from that used by Sharma (2008). In her study she deducted the normalized distance from 1 in order to work out the index of inclusion (i.e., the inverse of the observed exclusion given by the Euclidean distance). 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. As reported by Sharma (2008), UNDP uses this method. But in this case the assumption of 'perfect substitutability' is made. This necessarily means that an increase in a dimension is exactly compensated by the decrease of equal magnitude in other dimensions. Desai (1991), has questioned the appropriateness of this methodology. A distance-based approach has been suggested by him. The present study has accepted this suggestion of Desai (1991) and Sharma (2008) because of its widespread acceptability. Hence, a higher value of the normalized distance (ID) will represent a higher degree of diversity and vice-versa.

3.1.2. Measurement of Diversity at the Country Level:

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 a grouping of standards as per the choices of the countries for both the Destination Market (DM) and Producing Country (PC). This process results in obtaining 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.

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

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 0and 1. A high value of it naturally indicates high degree of diversity and vice versa. In this way the process offers five-dimension index and one diversity index of 193 countries separately for PC and DM.

3.2. Development of Independent Variables:

All independent variables used in this study are grouped into three composite indexes in order to minimize the possibility of multicollinearity. These three groups are Group-1 (combined culture), Group-2 (combined economy), and group- 3(combined innovation). The details of the variables included under each group are shown in table-1.

Table-1
List of combined variables

Group-1 (Combined Culture)	Group-2 (Combined Economy)	Group-3 (Combined Innovation)
1. Power Distance 2. Individualism, 3. Masculinity, 4. Uncertainty Avoidance, 5. Long Term Orientation, 6. Indulgence.	1. Competitiveness Index, 2. Aggregate Score of PR & CL, 3. Score of Rule of Law and 4. Happiness.	1. Human Capital Index, 2. Global Innovation Index

The methodology adopted to formulate the composite value for each group is discussed below:

Step 1: We have employed exploratory factor analysis (principal component technique) to identify the factors. Before factor analysis, we checked the correlation structure to see whether factor analysis is appropriate or not for the given data set. We observed substantial correlation among the variables and additionally, the KMO test also indicates the appropriateness of the technique used in the present context. The total number of factors has been identified based on the criterion of eigen values greater than one.

Table 2
Factor loading and Square of factor loading for combined Culture

	Factor loading		Squared factor loading (scaled to unity sum)	
	Factor 1	Factor 2	Factor 1	Factor 2
Power Distance	-0.837	0.201	0.343	0.035
Individualism	0.870	0.042	0.370	0.002
Masculinity	0.025	0.607	0.000	0.323
Uncertainty Avoidance	-0.231	0.658	0.026	0.379
Long Term Orientation	0.506	0.546	0.125	0.261
Indulgence	-0.525	0.016	0.135	0.000
Explained variation	2.043	1.142		
Exp/Total	0.641	0.359		

Step 2: After obtaining the factors, the second step is to compute the squares of factor loading. The results are shown in table-2 in case of combined culture.

Step 3: This step deals with the normalization of the factor loading by applying the following formula:

$$\text{Normalization of the factor loading} = \frac{\textbf{Square of factor loading}}{\textbf{Sumation of the square of all factors loading}}$$

Step 4: In this step, factors are aggregated by assigning a weight to each of them equal to the proportion of the explained variance in the data set. This is computed by applying thefollowing formula:

$$weight = \frac{maximum\ normalized\ factor\ loading}{ratio\ of\ explaned\ to\ total\ variance}$$

$$\text{Where, the ratio of explained to total variance} = \frac{explained\ variance\ in\ respective\ factor}{total\ explained\ variance}$$

The results in case of combined culture are shown in table 3. In case of combined Economy and combined Innovation, only one factor for each group has been obtained. Results are shown in table 4 and 5 respectively for combined Economy and combined Innovation.

Table 3

Computation of weight for combined culture

	Weight	Weight (Normalized to unity sum)
Power Distance	0.099	0.028
Individualism	0.578	0.162
Masculinity	0.900	0.252
Uncertainty Avoidance	1.057	0.296
Long Term Orientation	0.728	0.204
Indulgence	0.210	0.059
Total	3.572	1.000

Table 4

Computation of weight for combined Economy

	Factor 1	Normalized by scaled to unity sum	Normalized Weight
Competitiveness Index	0.885	0.251	0.251
Avg. Score of PR & CL	0.836	0.224	0.224
Score of Rule of Law	0.933	0.279	0.279
Happiness	0.873	0.245	0.245
Explained variation	3.115		
Exp/Total	1		

Table 5

Computation of weight for combined Innovation

	Factor 1	Squared factor loading	Weight
Human Capital Index	0.970	0.941	0.500
Global Innovation Index	0.970	0.941	0.500
		1.882	1.000

Step 5: In the last step composite value has been estimated by applying the following formula:

$$composite\ value = \sum_{i=1}^{n} (computed\ weight\ for\ each\ variable \times original\ value\ of\ the\ variable)$$

Where, n= number of variables Following the above procedure, the composite values for all the three groups have been computed. These composite values are used as the independent variables of the regression model. The following specific model has been used to examine the impact of combined culture (CC), Combined Economy (CE) and Combined Innovation (CI) on Index of Diversity (DI).

$$DI_i = \beta_0 + \beta_1 CC_i + \beta_2 CE_i + \beta_3 CI_i + \varepsilon_i$$

Where,$\varepsilon_i$represents the residual. Since, DI has been computed from two dimensions i.e., based on producing countries (PC) and destination market (DM), the above model has been run two times separately using PC and DM as dependent variable. Observed findings are analysed in the following few chapters.

4. Analysis and Interpretation

4.1. Dimensions and dimensions index wise analysis and interpretation of standards level

As mentioned in the preceding section, every selected standard has been analyzed to identify sustainability indicators under five different aspects which are mentioned as "dimensions". A 'dimension index' is computed using equation-1 mentioned in the foregoing chapter for each dimension. Present study analyses the sustainability practices in respect of agricultural sector, as reflected by these dimension indexes. At present, there are 132 standards for this sector. These standards have been analyzed to capture the expected sustainability performances for the concerned economic sector. Based on their prescriptions, indicators of sustainability performances have been grouped under five dimensions of sustainability. A brief report on each of such dimension is shown in the followings subsections:

In the case of the agricultural sector, all of the approved standards (132) do not cover every dimension of sustainability. As indicated in Table-6, out of 132 standards, only 124 standards have prescribed environment-related practices, 114 standards have covered social issues, 118 standards recommend management-related issues, quality-related issues are covered by only 93 standards and 103 standards have suggested practices relating to ethics.

Table-6
Number of standards and different range of indicators

Dimension	Number of standards	Range-1 (1-10)	Range- 2 (11 - 49)	Range-3 (50 - 100)	Range-4 (Above 100)
Environment	124	12	73	39	0
Social	114	13	49	51	1
Management	118	61	57	0	0
Quality	93	57	35	1	0
Ethics	103	94	9	0	0

For easy understanding of the observed diverse practices proposed by the standards, analysis has been conducted using four arbitrarily selected

ranges. These are: range-1, for the standards which include 1-10 indicators; range-2 includes the standards which prescribe 11-49 indicators; range-3 includes standard with 50-100 indicators and standard which offer more than 100 indicators are grouped under range-4.

The distribution of the standards varies across four different ranges arbitrarily set for the present purpose. In the case of the environment, standards are distributed 10% in range-1, 59% in range-2, 31% in range-3. Similarly, in the case of the other dimensions distribution among the ranges are: social-11% in range-1, 43% in range-2, 45% in range-3, and only 1% in range-4; management- 52% in range-1 and 48% in range-2; quality- 61% in range-1, 38% in range-2, 1% in range-3; ethics- 91% in range-1, 9% in range-2. The distribution of the standards among various ranges of performance indicators indicates the concentration of majority standards within 50. However, in table-1, in the case of environment and social dimensions, 39 and 51 standards propose more than 50 indicators and in the case of other dimensions, majority standards propose less than 50 indicators. On the whole, wide variations are found in the number of performance indicators relating to various dimensions proposed by the selected standards. Hence, countable diversity in sustainability practices is expected at the standards level. For a better understanding of the same, we use a summary statistic in table-7.

Table-7
Summary statistics of dimensions (Standards Level)

Particulars	Environment	Social	Management	Quality	Ethics
Mean	41.68	46.28	11.54	11.85	3.66
SD	23.62	27.06	7.69	11.73	3.68
Maximum	96	102	32	51	17

Following are revealed through table-7: 1) the average number of indicators under different dimensions (ranges between 3.66 and 46.28), 2) Standard Deviations among the suggested dimension-specific indicators by the standards (vary between 3.68 and 27.06), and 3) the maximum number of indicators suggested by any standard for various dimensions (varies between 17 and 102). The maximum number of indicators in case of the environment (96) has been suggested by the standards "**Roundtable on Sustainable Biomaterials – RSB**"; and same for the other dimensions are Social 102 (**Forest Stewardship Council® - FSC® - Forest Management**); Management 32 (**Flowers and Ornamentals Sustainability Standard-Silver Level**); Quality 51 (**IFS Food**), and Ethics 17 (**UN Global Compact** and **Sedex Members Ethical Trade Audit - SMETA Best Practice Guidance**).

This table also shows that the average number of indicators is very low in cases of management (11.54), quality (11.85), and ethics (3.66) dimensions. But a bit better situation is seen in cases of the environment (41.68) and social (46.28). Observed SD values are also not very high. This means standards have more or less concentrated around some range and in this case, at around lower ranges which is advocated by the lower average values. Thus, the overall condition of sustainability practices in the agricultural sector is still at the initial level. For the recheck of this situation, we use **dimension indexes (id)** and **diversity index (ID)** (shown in table-8).

Table-8

Summary statistics of dimensions index and diversity index (Standards Level)

Particulars	**Environment**	**Social**	**Management**	**Quality**	**Ethics**	**Diversity**
Mean	0.428	0.448	0.340	0.217	0.166	0.714
SD	0.249	0.270	0.248	0.235	0.230	0.148
Maximum	1	1	1	1	1	0.995
Minimum	0	0	0	0	0	0.119

Table-8 gives a birds' eye view of the **id** and **ID**. Performance indicators of each standard have been compared with those of the ideal standard. This helps us understand the extent to which a standard is close to the ideal practice regarding sustainability (as suggested by the ideal standard). The **id** varies between 0 and 1. A value close to one means almost full compliance of a standard in respect of the performance metrics of a dimension with the indicators suggested by the ideal standard. Thus, an **id** value close to zero is certainly proof of non-compliance i.e., a high degree of diversity is expected. For the agricultural sector, the maximum of the average dimension index value is seen in the case of social (0.448) followed by environment (0.428); management (0.340); quality (0.217), and ethics (0.166). For all five dimensions, the average id value is below 0.50. Hence, a high degree of diversity is possible at the standards' level which is verified from the average value of ID (0.714).

We may recall that the normalized Euclidean distance of id (=d_1, d_2, d_3,.. d_n where, id stands for 'dimension index') from the ideal point1 represents the index which we call the 'ID'. Its value also varies between 0 and 1. This means that a value equal to 1 represents the highest possible diversity and therefore, ID equal to zero indicates no diversity or in other words, full compliance or conformity with the ideal standard.For this sector, the average value of ID is greater than 70% which

indicates that most of the standards' ID values are very high i.e., a high degree of diversity at the standards' level is evidenced.

From the above discussion, observed ID values indicate a lower degree of compliance. Hence, a high degree of diversity is possible at the standards' level which may be verified from the data presented in the following table. Table-9 shows, more than 55% standards are characterized by a very high degree of diversity (id>0.75). More than 92% of standards have registered ID values of more than 0.50 i.e., a high degree of diversity at the standards' level is evidenced. It may lead to a high degree of country-level diversity (ID>0.50). The country-level analysis is shown in the following subsection.

Table- 9
Distribution of standards over various ranges of diversity index (ID)

Range of DI	Number of Standards
DI> 0 to 0.25	0
DI> 0.25 to 0.50	10
DI> 0.50 to 0.75	49
DI> 0.75 to 1.00	73

4.2. Dimension index (di) and diversity index (DI) wise analysis and interpretation in country level

4.2.1. Analysis and interpretation of dimension index (di)

For analysis of country-level position, country-wise dimension indexes (di) are computed. This is done by a grouping of standards as per the choices of the countries for both as- destination market (DM) and producing country (PC). The country-wise dimension index (di) is the simple average of the dimension indexes relating to the standards. The computed di is expected to vary between 0 and 1. A higher value of it represents a higher degree of sustainability practices relating to the concerned aspect of sustainability and vice versa. In this way, the process offers five dimensions index of 193 countries separately for PC and DM. A brief report is analyzed in bellow.
Relating to the agricultural sector dimension index-wise country position has been shown in table-10. Under PC, 106 countries are seen to follow the suggested practices by the available standards in respect of quality. Similarly, suggested practices regarding the social dimension are observed by 99 countries. Also, it is apparent from the table that more than 50% of the countries bear dimension index values that lie above the mean value. The important point to note in this respect is that dimension-wise distribution of countries is: ethics 106, management 98, and environment

97. Index values in these respects of more than 50% of the countries lie below the mean. 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- 10

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	96	108	97	85
Social	99	95	94	98
Management	95	90	98	103
Quality	106	93	87	100
Ethics	87	88	106	105

On the other hand, under DM, only the environment (108) shows that more than 50% of countries fall above the mean. However, contrary to the said position is found in respect of the dimensions named social 98, management 103, quality 100, and ethics 105; clearly, more than 50% of the countries lie below the respective mean index value. So, in the case of DM, for all dimensions except the environment dimension, most of the countries have lower dimension index values of the respective mean index value. A summary statistic is shown in table-11 to understand the actual position of the countries in this regard.

Table-11 shows the maximum, minimum, mean, and standard deviation (SD) of country-wise dimension indexes (di) for both PC and DM. Under PC, the maximum value is 0.199 for the environment, 0.269 for social, 0.180 for management, 0.152 for quality, and 0.140 for ethics. But under DM, the maximum index value for the environment is 0.239, for social is 0.374, for management is 0.209, for quality is 0.113, and for ethics is 0.111. We can see that the maximum index value varies between 0.374 and 0.111. While the highest maximum value occurs in the case of the social dimension (DM) and the lowest value of the same is seen to have been arrived at the ethics dimension (DM).

Table-11

Summary statistics of dimensions index (di) (Country Level)

Particulars	Environment		Social		Management		Quality		Ethics	
	PC	DM	PC	DM	PC	DM	PC	DM	PC	DM
Mean	0.147	0.138	0.211	0.206	0.136	0.119	0.090	0.089	0.095	0.073
SD	0.019	0.014	0.024	0.017	0.016	0.011	0.023	0.011	0.018	0.007
Maximum	0.199	0.239	0.269	0.374	0.180	0.209	0.152	0.113	0.140	0.111
Minimum	0.082	0.105	0.149	0.168	0.101	0.097	0.037	0.063	0.052	0.055

In the case of PC, the minimum index value is 0.082 for the environment, 0.149 for social, 0.101 for management, 0.037 for quality, and 0.052 for ethics. In the other case of DM, the minimum index value for the environment is 0.105, for social is 0.168, for management is 0.097, for quality is 0.063, and for ethics is 0.055. The minimum value lies between 0.168 and 0.037 which indicates that the variation in the sustainability practices among the countries is noticeable. And this variation is expected to influence the mean values.

The mean value under PC is 0.147 for environment, 0.211 for social, 0.136 for management, 0.090 for quality and 0.095 for ethics. On the other hand, under DM the mean value for the environment is 0.138, for social is 0.206, for management is 0.119, for quality is 0.089 and for ethics is 0.073. The highest (0.206) and lowest (0.073) mean values occur respectively in the case of social dimension and the ethics, under the destination market (DM) basis computations. Based on these observations, it may be logical to argue that the country-level sustainability practices belong to a very low level and in this respect, the variation among the nations also is very low which is proved by the observed SD value.

As revealed from the table 11, SD value for various dimensions under PC is: environment0.019, social 0.024, management 0.016, quality 0.023 and ethics 0.018. On the other hand, in the case of DM, the SD value is 0.014 for the environment, 0.017 for social, 0.011 for management, 0.11 for quality, and 0.007 for ethics. The observed values of the standard deviation of the dimension-specific indexes may be used as the indicator of variations among the nations in respect of sustainability practices. The reported SD values in respect of all dimensions are low i.e., less than 0.025. On the whole, it may not be unwise to argue that the concentration of the countries in respect of sustainability practices has occurred at a low level with a lower degree of variation among them.

4.2.2. Analysis and interpretation of Diversity Index (DI)

As mentioned in the previous subsection, the standards level diversity may lead to a considerable degree of diversity at the country level. For analysis of country-level position, the country-wise diversity index (DI) is computed. The country-wise diversity index (DI) is the simple average of standard-wise diversity indexes (ID) relating to the standards that are used by a country for international trade purposes. Here the computed DI is expected to vary between 0 and 1. A high value of it naturally indicates a high degree of diversity and vice versa. In this way, the process offers one diversity index of 193 countries as Producing Country (PC) and another under Destination Market (DM) basis analysis. A brief analysis on DI is shown separately in the following sub-sections:

Table- 12 shows the country positions based on the diversity index. In the case of PC, 95 countries lie above the mean, and 98 countries lie below the mean. On the other hand, for DM, 85 countries fall above the mean, and 108 countries fall below the mean. So, for both cases, PC and DM more than 50% of countries fall below the mean. Hence, in the case of the agricultural sector, the average level of diversity at the country level is expected to be low. A summary statistic is shown in table-13 to understand the actual position of the countries in this regard.

Table- 12
Diversity wise number of countries above and below the mean

Particular	Number of Countries			
	Above the Mean		Below the Mean	
	PC	DM	PC	DM
Diversity Index	**95**	**85**	**98**	**108**

Table 13 clearly speaks in favour of a very low degree of diversity in respect of sustainability practices among the nations. Maximum diversity is observed in the case of DM-based analysis (0.209). However, the PC-based analysis speaks in favour of a lower degree of diversity between the nations in this regard. A look at the mean values (PC-0.134, DM-0.125) also advocates in support of the lower degree of diversity among the nations which is supported by the observed very low values of the standard deviations. Hence, in the case of the agricultural sector, diversity is present at a very low level.

Table-13
Summary statistics of diversity index (DI) at country level

Particulars	Mean	SD	Maximum	Minimum
PC	0.134	0.015	0.170	0.092
DM	0.125	0.010	0.209	0.099

From the above discussion, we can see that in the case of the agricultural sector, for both PC and DM very low-level of diversity is present. Hence, the possibility of using the Voluntary Sustainability Standards (VSS) as barriers to trade not ruled out. However, the actual situation relating to it is left for future research.

4.3. Analysis and interpretation of determining factors behind the observed variations

In the present subsection, an analysis has been conducted to identify the principal determining factors which influence the practices of sustainability among the nations. some explanatory variables[1] {Cultural valuables (Power Distance, Individualism, Masculinity, Uncertainty Avoidance, Long Term Orientation, and Indulgence), Competitiveness Index, Aggregate Score of Political Rights and Civil Liberties, Score of Rule of Law, Happiness Index, Human Capital Index, and Global Innovation Index} have been arbitrarily selected. The sample size of the countries will depend upon the available data sets on the selected explanatory variables.

As mentioned earlier all independent variables used in this study are grouped into three composite indexes in order to minimize the possibility of multicollinearity. These three groups are Group-1 (combined culture), Group-2 (combined economy), and group- 3(combined innovation). The details of the combined value each group are shown in methodology section.

Before examining which of the selected determinants have impacted upon practices of sustainability, we have to check the multicollinearity, if any, present among the three groups of the variables. In this regard tolerance values, variance inflation factor (VIF), and coefficient of correlations have

[1] Corruption Index- https://en.wikipedia.org/wiki/Corruption_Perceptions_Index
Cultural Variables - https://www.hofstede-insights.com/country-comparison/
Happiness Index - WORLD HAPPINESS REPORT 2020
GDP- https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
Rule of Law :-World Justice Project- Rule of Law Index-2020
Aggregate score of PR & CL:-Populists and Autocrats:The Dual Threat to Global Democracy(by Arch Puddington and Tyler Roylance)-page 20(FREEDOM IN THE WORLD 2020)
Competitiveness Index:-The Global Competitiveness Report 2019
Human Capital Index:- The Human Capital Report 2020
Innovation Index:-The Global Innovation Index 2020 (Innovation Feeding the World)

been used. If the values of tolerance are greater than 0.10, the VIF is less than 10 and the coefficient of correlations among all variables is low then it is argued that there are no problems of multicollinearity among the variables. Table-14 shows that for all variables the values for tolerance are greater than 0.10 and the same for variance inflation factors are less than 10. Also, coefficient of correlations among all variables as reported in table-15 not very high (less than 0.74 for all cases). Hence, these evidences may be considered as enough to argue that there are no problems of multicollinearity among the three group variables.

Table 14

Values of Tolerance (> 0.10) and Variance Inflation Factor (VIF) (< 10)		
Variables	Tolerance Value	VIF Value
Group- 1 (Combined Culture)	0.797	1.254
Group- 2 (Combined Economy)	0.435	2.299
Group- 3 (Combined Innovation)	0.440	2.272

Table 15

Coefficient of Correlations			
Variables	Group- 1 (Combined Culture)	Group- 2(Combined Economy)	Group- 3 (Combined Innovation)
Group- 1 (Combined Culture)	1	0.425	0.414
Group- 2 (Combined Economy)	0.425	1	0.740
Group- 3 (Combined Innovation)	0.414	0.740	1

The methodology applied to identify the determinants of country behaviour in respect of sustainability practices has been explained in the methodology section. It has also been mentioned that the attempt to identify the probable influencing factor (s) on the basis of designating the countries as 'Producing Country' (PC) and 'Destination Market' (DM). Hence, the role of a country and the influencers which determine the degree of diversity in sustainability practices have been addressed using two bases as mentioned above. It may be important to note here that due to the non-availability of data in respect of the selected explanatory variables number of countries has come down to 73 only. For the present purpose, only those countries have been retained in the analysis for which data on all selected variables are available. For this, the selected regression model (in methodology part) has been used to examine the impact of each of the five-dimension indexes (di) and the Diversity Index (DI) considering the nations as PC and DM separately.

Environment: - Regression results relating to the environment-related performance and its determinants are reported in table- 16. Under PC the observed findings do not speak in favour of any specific group which has significantly influenced the environmental performance except group-3 which is found to be significant; but unfortunately, its impact is found to be negative. This requires further investigation for an appropriate explanation. However, analysis of the nations as DM, identifies group-2 and group-3 as the significant influencer to shape the environmental performance in connection with sustainability practices. But in respect of group-3, the impact is also found to be negative. So, group-3 also requires further investigation.

Table- 16

Results of regression analysis between environment and three groups

Model	PC				DM			
	Coeff.	Std. Error	t-value	Sig.	Coeff.	Std. Error	t-value	Sig.
Constant	0.158	0.009	16.682	0.000	0.130	0.005	28.458	0.000
Group- 1	0.000	0.000	-0.183	0.855	0.000	0.000	-0.097	0.923
Group- 2	0.000	0.000	1.236	0.221	0.001	0.000	**4.104**	**0.000**
Group- 3	-0.001	0.000	-2.799	0.007	-0.001	0.000	-2.842	0.006
R^2	0.127				0.202			

Social: - In case of social performance (reported table-17) also no group is found to have a positive significant influence on the PC. And under DM shows that only group-2 significantly influences (positive) the selection of standards by the nations. A negative impact is seen for group-3, which is not generally expected. This certainly requires further investigation.

Table- 17

Results of regression analysis between social and three groups

Model	PC				DM			
	Coeff.	Std. Error	t-value	Sig.	Coeff.	Std. Error	t-value	Sig.
Constant	0.254	0.012	21.581	0.000	0.196	0.007	29.903	0.000
Group- 1	0.000	0.000	0.139	0.890	0.000	0.000	0.424	0.673
Group- 2	0.000	0.000	0.231	0.818	0.001	0.000	**2.246**	**0.028**
Group- 3	-0.003	0.001	-5.352	0.000	-0.001	0.000	-2.275	0.026
R^2	0.465				0.084			

Management: - According to the result of the test (shown in table- 18) in respect of management-related performance under PC no positive significant influencer could be found. However, analysis of the nations as DM, identifiesgroup-2 as the significant influencer to shape the managerial performance in connection with sustainability practices. This finding seems to be important and encouraging in the sense that a country where the combined economy is upheld and is practiced by the citizens.

Table- 18

Results of regression analysis between management and three groups

Model	PC				DM			
	Coeff.	Std. Error	t-value	Sig.	Coeff.	Std. Error	t-value	Sig.
Constant	0.165	0.007	22.564	0.000	0.120	0.004	26.955	0.000
Group- 1	0.000	0.000	-1.826	0.072	0.000	0.000	-1.185	0.240
Group- 2	0.000	0.000	1.631	0.107	0.000	**0.000**	**2.604**	**0.011**
Group- 3	-0.002	0.000	-5.761	0.000	-0.001	0.000	-2.846	0.006
R^2	0.482				0.137			

Quality: - According to table-19 in case of Quality under PC only, group-3 appears to be the important contributor to determine the quality of the agricultural products produced by the country. This is an important finding to note, as trade partners generally appreciate high quality products. An innovation abiding nation can maintain the desired level of quality which is an important condition for the cross-border trade. On the other hand, for DM no such positive significant influencer is found.

Table- 19

Results of regression analysis between quality and three groups

Model	PC				DM			
	Coeff.	Std. Error	t-value	Sig.	Coeff.	Std. Error	t-value	Sig.
Constant	0.087	0.009	9.514	0.000	0.128	0.005	26.333	0.000
Group- 1	0.000	0.000	1.227	0.224	0.000	0.000	-3.132	0.003
Group- 2	0.000	0.000	-1.029	0.307	0.000	0.000	-1.600	0.114
Group- 3	0.001	0.000	**1.850**	**0.069**	-0.001	0.000	-3.536	0.001
R^2	0.092				0.562			

Ethics: - Table-20 which brings out the regression results regarding the influence of the computed groups on the ethical dimension of the PC concerned. Here only group-3 significantly influences but this impact is found to be negative. In the case of DM, no such significant influencer is found.

Table- 20

Results of regression analysis between ethics and three groups

Model	PC				DM			
	Coeff.	Std. Error	t-value	Sig.	Coeff.	Std. Error	t-value	Sig.
Constant	0.110	0.008	14.377	0.000	0.076	0.003	26.604	0.000
Group- 1	0.000	0.000	0.162	0.872	0.000	0.000	0.900	0.371
Group- 2	0.000	0.000	-0.843	0.402	0.000	0.000	-0.930	0.356
Group- 3	-0.001	0.000	-2.560	0.013	0.000	0.000	-1.575	0.120
R^2	0.251				0.131			

Diversity: -Table- 21 brings out the strength of the computed groups in explaining the observed diversity in the practices of sustainability in connection with cross-border trades. Under the PC-based analysis, no groups are seen to have positively influenced the countries to adopt diverse practices. On the other hand, DM-based analysis shows only group-2 has a positive significant influence upon the observed diversity in the sustainability practices.

Table- 21

Results of regression analysis between diversity and three groups

Model	PC				DM			
	Coeff.	Std. Error	t-value	Sig.	Coeff.	Std. Error	t-value	Sig.
Constant	0.155	0.007	21.097	0.000	0.130	0.003	37.205	0.000
Group- 1	0.000	0.000	-0.027	0.978	0.000	0.000	-0.891	0.376
Group- 2	0.000	0.000	0.286	0.776	0.001	**0.000**	**1.982**	**0.052**
Group- 3	-0.001	0.000	-3.662	0.000	-0.001	0.000	-3.562	0.001
R^2	0.283				0.196			

On the whole, the above discussions prompt that group-2 (combined economy - Competitiveness Index, Average Score of Political Rights and Civil Liberties, Score of Rule of Law and Happiness) significantly positive influences upon the dimensions of environment (DM), social (DM) & management (DM) and diversity (DM). Group-3 (Combined Innovation - Human Capital Index, Global Innovation Index) is found to have significant positive influences only on quality dimension (PC). On the other hand, group-3 significantly negative influences upon the dimensions of environment (PC and DM both), social (PC and DM both), management (PC and DM both), quality (DM) & ethics (PC) and diversity (PC and DM both). Group-1 significantly negative influences upon the dimensions of management (PC) and quality (DM). This requires further investigation for an appropriate explanation.

5. Summary and Conclusions

5.1. Research Overview and Contribution of the Study

The present study is a modest attempt to understand the state of sustainability practices throughout the globe. All together 132 standards have been analyzed in order to generate data relating to the required sustainability practices. Performance metrics are distributed in five different dimensions namely, environment, social, economic, quality and ethics.

The methodology applied in this study requires the computation of five-dimension indexes and using them a Diversity Index (ID) has been computed at the **standard level**. Based on the choices registered by the countries regarding the acceptance of standards for their role as 'Producing Country (PC)' and as 'Destination Market (DM)', the **country-level** five-dimension indexes, and one 'Diversity Index (DI)' has been computed, separately to capture the practise of the country as PC and as DM. And then it seeks to make exploratory factor analysis (principal component technique) with a view to identify the factors which might have influenced the dimension index as well as the diversity index.

The empirical findings conclude that in all three sectors, observed ID values indicate a lower degree of compliance. Hence, a high degree of diversity is possible at the standards level which may be verified from the data presented in the following table. Table-22 shows that more than 55% of standards are characterized by a very high degree of diversity (id>0.75). More than 92% of standards have registered ID values of more than 0.50 i.e., a high degree of diversity at the standards' level is evidenced.

Table- 22
Number of standards over various ranges of diversity index (ID)

Range of ID	Number of standards
DI> 0 to 0.25	0
DI> 0.25 to 0.50	10
DI> 0.50 to 0.75	49
DI> 0.75 to 1.00	73

An attempt has also been made here to measure diversity in sustainability practices in case of the selected sectors. Here, it is seen that for both PC and DM sustainability-related performances of the nations are very low. However, the present analyses, based on the dimension-specific indexes 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. Hence, with regard to the agricultural sector, for both PC and DM, empirical evidences speak in favour of a low level of sustainability practices coupled with the presence of a very low-level of diversity among the nations.

From the analysis of determining factors behind the observed diversities it is evident that in case of agricultural sector variables belonging to group-2 (combined economy - Competitiveness Index, Average Score of Political Rights and Civil Liberties,Score of Rule of Law and Happiness) have significant positive influences upon the dimensions of environment (DM), social (DM) & management (DM) and diversity (DM). Group-3 (Combined Innovation - Human Capital Index, Global Innovation Index) is found to have significant positive influences only on quality dimension (PC). On the other hand, group-3 variables have significantly negative influences upon the dimensions of environment (PC and DM both), social (PC and DM both), management (PC and DM both), quality (DM) & ethics (PC) and diversity (PC and DM both). Significantly negative influences of Group-1 upon the dimensions of management (PC) and quality (DM) are noticed. This requires further investigation for an appropriate explanation.

5.2. Limitations and Scope for Further Research:

In the present study, it appears that the arbitrarily selected explanatory variables have a diverse degree (positive and negative) of impact on sustainability practices.

The reasons for such varying impacts have not been explored in the present study. Hence this needs to be addressed in future research. As the variables selected in this study are not linked with any sound theoretical base, it is advisable that serious effort be made to identify the required theoretical bases.

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