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The Impact of Sustainable Supply Chain Practices on the Environmental Performance of SMEs in Himalayan Region: Evidences from Uttarakhand

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Abstract: The primary goal of this research is to identify the critical success factors for sustainable supply chains among small and medium-sized enterprises in Uttarakhand's hills and plains. The Covid-19 pandemic in India had a significant impact on the SMEs sector. The Covid-19 outbreak demonstrates how pandemics can disrupt supply chains all over the world. Therefore, more research needs to be done in this area so that we can handle worsening situations in future. This article discusses the key success criteria in terms of management strategies and critical management practices that are critical for a sustainable supply chain. Secondary research was used to generate data on the success of SMEs in Uttarakhand, which was then examined for the contribution of management practices and their impact on SMEs' performance. 150 SMEs employees were evaluated using a systematic questionnaire. The questionnaire analyzed managerial personnel's commitment to and desire to implement long-standing business practices in light of management principles, as well as their impact on the performance of SMEs. Statistical methods were used to analyze the final results. It was established that managerial practices were critical for the development and expansion of SMEs in Uttarakhand's hilly regions. Employee recruitment and selection have a substantial impact on the growth of SME's. The study has immediate implications for academics researching how management practices affect the performance, growth, and development of SMEs, as well as for government officials who must take the necessary steps to properly train entrepreneurs and encourage them to incorporate these practices in their businesses located in Uttarakhand's hills and plains.

Keywords: Sustainable Strategic Operation • Supply Chain Management Practices • Sustainability • Small and Medium enterprises

Introduction

Today, sustainability is a key component for enterprises looking to maintain their organization for a longer time. Although, it is not solely a discipline of the company, sustainability now includes all operations within its supply network (Halldorsson et al., 2009). Sustainability has a vital role in Supply Chain Management (SCM). Therefore, in the contemporary time these two are used together and termed as Sustainable-Supply Chain Management (S-SCM).

However, the Sustainable-Supply Chain Management practices cannot be static. Globalization and technological advancement have concurrently increased the complexity and dynamicity which impose additional challenges to modern-day SCM and necessitate the requirement of higher order SC (Supply Chain) capabilities which are dynamic in nature. In the contemporary world it is important to explores the impact of SSCMP on two dimensions i.e., environment and society. SMEs working in the hill districts of Uttarakhand are also facing the challenges of sustainable supply chain management as these small and medium enterprises are not much aware of the sustainable management practices which lead to an adverse impact on environment and society. The State Infrastructure & Industrial Development Corporation of Uttarakhand Limited (SIDCUL), located in Udham Singh Nagar and Haridwar districts promote the industrial development in the state but they are also lacking in sustainable supply chain management practices.

The concept of sustainability in decision-making processes has grown in importance within the framework of SMEs (Small and Medium Enterprises). In order to combine economic, environmental, and social concerns in the SC process, it is frequently important to identify best practices to achieve sustainability because the environment is much competitive and volatile (Nayak Dhaigude, 2019). It has been observed that the environment of Uttarakhand Himalaya is much delicate and volatile. Therefore, the SMEs working in these regions need to focus on the sustainable supply chain practices to avoid their adverse impact on the local environment.

Small and medium-size businesses are under increasing legal and market pressure to embrace green practices which presents significant hurdles for improving the organizational and environmental performance of their supply chains. Although, many small and medium-size businesses respect green practices but they lack the expertise necessary to put these practices into practice in a way that will increase their operational effectiveness. For the establishment of a successful green supply chain, integration and alignment of green operations with organizational improvement programmes are seen as essential components (Kumar et al., 2019). Such programmes must be conducted by the Uttarakhand government on regular basis to make SMEs understand the importance of green practices in supply chain management.

Objectives of Study:

RO1: To study the Sustainable Supply Chain Management Practices (SSCMP) and its effect on the environmental performance of Small and Medium Enterprises (SMEs) of Uttarakhand Himalaya

RO2: To measure the impact of Sustainable Strategic Operation (SSO) on SMEs (Small and Medium Enterprises) environmental performance in Himalayan region.

RO3: To study the external pressure and its effect on Environmental performance of SMEs in Himalayan region.

Hypothesis of the Study

H1- The environmental performance of a firm is positively affected by Sustainable Supply Chain Management Practices (SSCMP)

H2- The environmental performance of a firm is positively affected by Sustainable Strategic Operation (SSO) practices

H3- The environmental performance of SMEs in Himalayan region is positively affected by External pressure

Literature Review

Uttarakhand is a small Himalayan state located in India. The major geographical region of the state is covered by mountains. The plains of Uttarakhand are known for its fertile agricultural land and industries. Keeping its mountain character in mind, an Integrated Industrial Development Policy 2008 was introduced to develop SMEs in the remote hilly areas of the state. This policy aims at developing the industrial infrastructure for SMEs and encourage the entrepreneurs through financial support to create more employment opportunities in the hills to remove the economic backwardness and check the migration. This policy targets SMEs to work in a sustainable manner while keeping the local environment in mind.

The Small and Medium Enterprises are focusing on their environmental efficiency by obtaining sustainability practices into conventional Supply Chain Management. They are lagging in order to improve their sustainable efficiency to evaluate and recognize prominent SSCM (Sustainable Supply Chain Management) practices (Jia et al., 2015).

At the moment, the issue of industrial emissions has risen globally. Nations around the world are aware of the notion of sustainable implementation to reduce

emissions in manufacturing industry from national to international levels. In conventional practices, the production of sustainability is a key to maintaining prevention of hazards and emissions. Many small and medium enterprises in India are engaged in the manufacturing of a range of goods and customer services. The production of automotive components plays a critical role in the Indian economy by providing multiple opportunities for employment. Based on this, researchers paid close attention to the auto components of Sustainable Development (SD) of SMEs due to environmentally harmful emissions. Sustainable Development research is an important method of ensuring environmental improvement for industries. The study of the Sustainable Development metrics serves to affirm the growth of sustainability in SMEs.

Analysing the measures for Sustainable Development, however, is a challenge for organisations and requires thorough research and considerable efforts. The study of metrics is a vague notion for administrators who ignore alternatives in their organization to measure Sustainable Development (Li and Mathiyazhagan, 2016). Small and medium-size enterprises are compelled to follow the laws and requirements of Sustainable Development. However, because of the scarcity of an effective and efficient methodology to coping with the challenges in structured relationships and interrelationships, Small and Medium-size Enterprises find it difficult to evaluate their success (Wu et al., 2019).

In the economies of all nations in the world, SMEs plays an important role. These SMEs lay the foundation for the national and international economic growth of all the countries. In today's changing and volatile market climate, the implementation of appropriate strategies is an important endeavour to promote the growth of SMEs. In this context, the use of the SSCM (Sustainable Supply Chain Management) concept in the Small and Medium Enterprises' Operational Strategy appears to be a very essential feature. All three dimensions of sustainable development i.e., economic, environmental and social are also covered in this supply chain.

Organizations experience the government's wrath to participate fully in environmental protection and the adoption, along with consumer requests, of sustainability initiatives. Businesses are now required to follow Sustainable Supply Chain Practices (SSCM) to gain the competitive edge. SSCM is now a management mechanism that allows eco-friendly practices in traditional supply chains. SSCM will bring a transformation in social and environmental performance by promoting organizational efficiency in this demanding and competitive world (Fahimnia et al., 2017). There is pressure on businesses to switch their business from traditional SCM to SSCM to meet the sustainability requirements of present world (Busse et al., 2017). In India, businesses are under immense pressure to integrate Sustainable Supply Chain Practices (SSCPs) into their traditional Supply Chains (Panigrahi and Rao, 2018).

Within the context of SMEs, the relevance of sustainability in decision-making strategies increased many folds. The business environment is very competitive and volatile for which best practices of sustainability are essential to integrate the social, environmental and economic practices in supply chain process (Nayak and Dhaigude, 2019).

The small and medium size companies are facing a huge challenge of organizational and green efficiency under the rising regulatory and market pressure to adopt green practices. Although several small and medium-size companies understand the value of green practices but they have a limited knowledge of implementing these practices to enhance their operational efficiency. There is a need to integrate and align green operations in

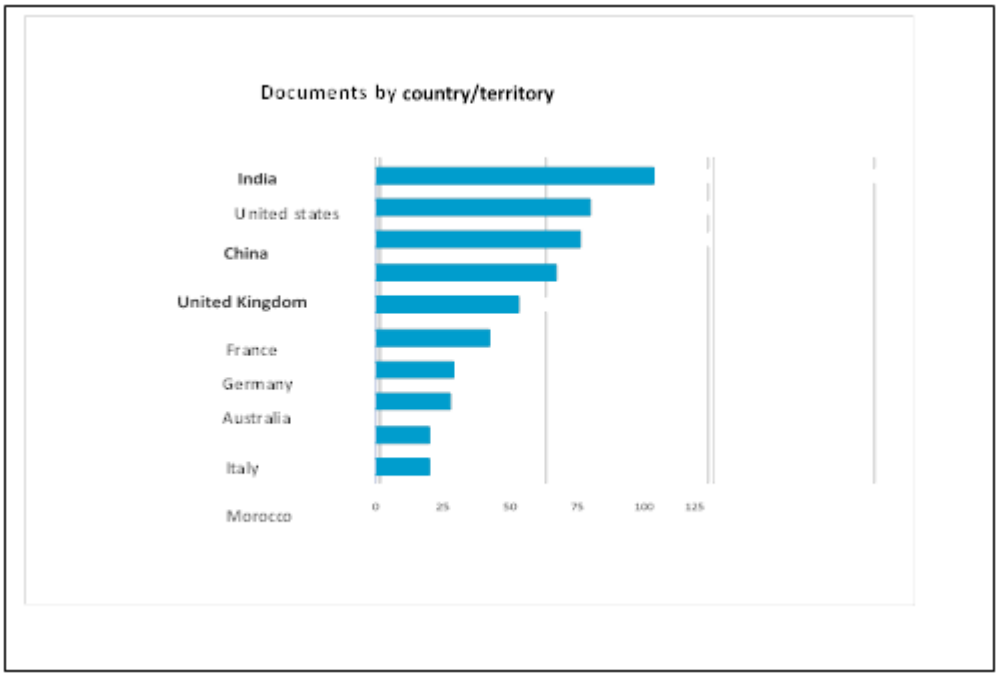
organizations for successfully establishing a green supply chain (Kumar et al., 2019). The SMEs working in the hills of Uttarakhand are small-scale industries, tourism, cottage, agriculture, khadi and village industries, handicrafts, and the silk and handloom sectors. These SMEs know the importance of green sustainable practices of supply chain management but they do not have much technical assistance on the ground. Still, they are following the traditional mechanism of supply chain management. But keeping the fragility of Himalaya in mind, these SMEs need to switch themselves to sustainable supply chain management practices.

Searched items for literature survey: Sustainability in terms of environment and Supply Chain Management

Tenure of Publication: 2019-2023

India Contribution in recent years (2019-2023)

Fig 1: Top 10 Countries by Publications



Documents by country/ Territory

So according Figure 1, India is the first-largest contributor to the publication on supply chain and sustainability in terms of environment. This demonstrates the importance of the sustainability in supply chain management. It shows country's interest to this topic. As everyone is aware, Uttarakhand is a Himalayan region with seven SIDCUL areas: Haridwar, Pantnagar, Dehradun, Selaqui, Kotdwar, Sitarganj, and Kashipur. As such, it is crucial to enhance the environmental performance of the SMEs that are prevalent in these industrial hubs in order to protect the great Himalaya's natural beauty.

Research Methodology

A quantitative approach is used to study the impact of sustainable supply chain practices on environmental performance of SMEs in the hills of Uttarakhand. A sample size of 150 was used with convenient random sampling method for the study. The sampling was employed in Uttarakhand State to collect the data. Primary and secondary data sources were used to gather the necessary information for the investigation.

For Primary data we used survey method i.e., questionnaire, while secondary data was collected from research papers and websites. Cronbach's alpha, Descriptive analysis, KMO and Bartlett's Test, Frequency Test, Factor Analysis, Correlation, and Multiple

Regression were the analytical tools employed for data interpretation with the help of SPSS. All characteristics were rated on a five-point Likert scale, from 1 to 5 (From strongly agree to strongly disagree).

Data Analysis and Interpretations

A structured questionnaire was prepared for the study. The variables used in the study were: (i) The Management's attitude and perspective towards firm's sustainability and its environmental performance (EP: External Pressure, SSMP: Sustainable supply management Practices) (ii) The firm's orientation towards strategic sustainability and its environmental performance (SSO: Sustainable Strategic Operation, ENP: Environmental Performance). There are four extracted factors.

Factor 1: Compliance with regulation, Pressure from NGOs, Pressure from Customers, Pressure from competitors.

Factor 2: Top Management commitment, Strict supervision, environmental policy, development of reliable suppliers, supply chain members' awareness and literacy, long term vision for survival and growth, Motivation of suppliers and vendors towards sustainable practices, workplace management, employee motivation.

Factor 3: Human resource Practices, market position, financial goals, green practices, efficiency for decision making, communication.

Factor 4: Reduction in air emission, oil usage elimination, waste content disposal, material recycling,

To check whether data is reliable or not, first we conducted a reliability test by using Cronbach's alpha.

1) Reliability of different variables used in questionnaire

The reliability metric, Cronbach's alpha, is shown in below table 1. It is crucial to first determine whether the questionnaire is trustworthy or not. The value of Cronbach's alpha greater than or equal to 0.7 is regarded as reliable. In the present case the value of Cronbach's alpha is 0.979 which is acceptable. It means our data is reliable to conduct a further study.

Table 1: Reliability Statistics

Cronbach's Alpha	N of Items
0.979	23

2) Descriptive Statistics

Descriptive statistics examines the data's normalcy. To clearly demonstrate whether there are issues with the data; the mean, minimum, and maximum values are displayed in table 2. Another crucial piece of information is the standard deviation shown in below table. Finally, the normalcy of skewness and kurtosis is examined. The degree of skewness indicates whether the replies are positively or negatively skewed in the data. The data trends in kurtosis ought to fall between -2 and +2. In this instance, all of the research data fell within this range, allowing us to carry out the remaining crucial tests.

3) Factor Analysis

Since there are several research questions and different variables, therefore, to validate the measurement of construct factor analysis was used and the factors were properly loaded and composites were created. The KMO and Bartlett's test is displayed in Table 3. The sample size was sufficient to get the KMO value more than 0.6. The below table shows the KMO value at 0.841 which was acceptable (Fidell and Tabachnick, 2003).

Table 2: Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
EP_1	150	1	5	2.87	1.319	.267	.198	-1.109	.394
EP_2	150	1	5	2.86	1.226	.116	.198	-.941	.394
EP_3	150	2	5	4.05	.933	-.661	.198	-.506	.394
EP_4	150	1	5	2.79	1.544	.164	.198	-1.492	.394
SSO_1	150	1	5	2.56	1.308	.186	.198	-1.157	.394
SSO_2	150	1	5	2.71	1.369	.179	.198	-1.154	.394
SSO_3	150	1	5	2.90	1.299	.095	.198	-1.241	.394
SSO_4	150	1	5	2.89	1.265	.143	.198	-.991	.394
SSO_5	150	1	5	2.86	1.563	.086	.198	-1.527	.394
SSMP_1	150	1	5	2.92	1.504	-.006	.198	-1.472	.394
SSMP_2	150	1	5	2.87	1.319	.267	.198	-1.109	.394
SSMP_3	150	1	5	2.86	1.226	.116	.198	-.941	.394
SSMP_4	150	1	5	2.79	1.544	.164	.198	-1.492	.394
SSMP_5	150	1	5	2.81	1.449	.090	.198	-1.358	.394
SSMP_6	150	1	5	2.87	1.271	.162	.198	-1.056	.394
SSMP_7	150	1	5	2.96	1.325	.127	.198	-1.127	.394
SSMP_8	150	1	5	2.83	1.526	.067	.198	-1.493	.394
ENP_1	150	1	5	2.87	1.319	.267	.198	-1.109	.394
ENP_2	150	1	5	2.86	1.226	.116	.198	-.941	.394
ENP_3	150	2	5	4.05	.933	-.661	.198	-.506	.394
ENP_4	150	1	5	2.79	1.544	.164	.198	-1.492	.394
ENP_5	150	1	5	2.81	1.449	.090	.198	-1.358	.394
ENP_6	150	1	5	2.87	1.271	.162	.198	-1.056	.394
Valid N (listwise)	**150**								

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.841
Bartlett's Test of Sphericity	Approx. Chi-Square	3758.816
	Df	91
	Sig.	.000

4) Multiple linear regression

Table 5 depicts the model summary in which the value of R and R^2 is 0.992 and 0.985 respectively, whereas, the value of adjusted

square is 0.984. The Model shows a significant relationship between Sustainable supply chain management practices and environmental performance of Small and Medium Enterprises. The table 4 and 6 also reflect the same when it is generalized.

Table 7 depicts the coefficient. It can also be defined as the significance of an individual factor. The first hypothesis of the study got accepted because there is a significant relationship between sustainable supplier management practices (SSMP) and environmental performance (ENP) of the firm. Whereas, the second hypothesis got rejected because factor 2 (SSO) in the table does not show a significant relationship with environmental performance. Hypothesis three also got accepted as there is significant relationship between External pressure (EP) and environmental performance (ENP).

Findings: We found in our study that there is a significant relationship between sustainable supply management practices and environmental performance, its mean when firm includes green practices such as green manufacturing, green design, green packaging in their organization they can enhance their environmental performance. Also, there is significant relationship between external pressure (pressure from NGOs, Customers, Government to follow the environmental policies and regulations) and environmental performance. Which shows that government policies, rules, regulations and customers awareness towards green practices plays a vital role to enhance environmental performance of firm. The second hypothesis of the study got rejected which shows least impact of sustainable strategic operation on the environmental performance of the firm.

Conclusion: This study aims to understand how management techniques affect the performance of SMEs in the hills of Uttarakhand. It examines the four variables i.e., external pressure, environmental performance, sustainable strategic operations, and management attitude and perspective toward sustainability. In terms of managerial attitude and perspective toward sustainability, we found that management practices within the context of sustainable supply chain and external pressure had a greater impact on the environmental performance of small and medium-size firms than other management practices. In this study we only analyzed one aspect of performance i.e., environmental performance. Himalaya and its environment have a crucial role in our life. Therefore, we should more careful about the consequences of negligence towards environment. SMEs (Small and Medium Enterprises) in Uttarakhand should adopt such kind of practices in their organization which can improve their environmental performance and sustainability. The current research paper is based on the impact of SSCM practices on environmental performance of Uttarakhand Himalaya. Future research can also be done on two more aspects; namely social and economic performance.

Management must effectively utilize all available Human Resource, Marketing tools, and other Management methods to avail the sustainable green practices so that the fragile environment of Himalaya may get affected minimally. SMEs must examine all essential success elements while managing their operations and supply chains.

Table 4: Correlations

		SSO	SSMP	ENP	EP
SSO	Pearson Correlation	1	.974**	.947**	.876**
	Sig. (2-tailed)		.000	.000	.000
	N	150	150	150	150
SSMP	Pearson Correlation	.974**	1	.982**	.936**
	Sig. (2-tailed)	.000		.000	.000
	N	150	150	150	150
ENP	Pearson Correlation	.947**	.982**	1	.969**
	Sig. (2-tailed)	.000	.000		.000
	N	150	150	150	150
EP	Pearson Correlation	.876**	.936**	.969**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	150	150	150	150

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.992[a]	0.985	0.984	0.12893

a. Predictors: (Constant), EP, SSO, SSMP

Table 6: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	155.861	3	51.954	3125.641	.000[b]
	Residual	2.427	146	.017		
	Total	158.288	149			

a. Dependent Variable: ENP

b. Predictors: (Constant), EP, SSO, SSMP

Table 7: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.013	0.039		0.336	0.737
	SSMP	0.405	0.066	0.433	6.157	0.000
	SSO	0.114	0.043	0.136	2.664	0.009
	EP	0.477	0.035	0.444	13.476	0.000

a. Dependent Variable: ENP

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