

# Understanding the Perspective of Stakeholders of the Manufacturing Industry Supply Chain on Applying Sustainability Principles in their Operations

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## 1. Introduction

Sustainable Supply Chain Management is the management of environmental, social and economic impacts, and the encouragement of good governance practices, throughout the lifecycles of goods and services [1]. For this process, the involvement of all the stakeholders in a supply chain is very vital. However different stakeholders may have different perspectives about different principles. Therefore, this research is focused on understanding what sustainable supply chain principles can best be applied in the supply chain of the manufacturing industry with positive perception of most stakeholders. In addition, this research also discusses the importance of sustainable supply chain principles, barriers to implementing sustainable supply chain principles and sustainability-related standard certifications.

## 2. Problem Statement

There are many stakeholders in the supply chain of a manufacturing industry and there are many sustainability principles that can be applied in this supply chain. Yet there is no understanding about the best sustainability principles that can be applied in the supply chain of the manufacturing industry with the positive perception of most stakeholders.

## 3. Research Objectives

- Identify different stakeholders in the supply chain of the manufacturing industry
- Identify the sustainable principles that can be applied in the supply chain of the manufacturing industry

- Identify how stakeholders will respond to different sustainability principles affecting the overall performance in the supply chain of the manufacturing industry
- Create a framework of the most suitable sustainability principles to be applied in different stages in the supply chain of manufacturing industry

#### **4. Literature Review**

The foundation for sustainable business was developed by John Elkington in 1997. He popularised the three dimensions (social, environmental, economic), which he called the Triple Bottom Line Principle [2].

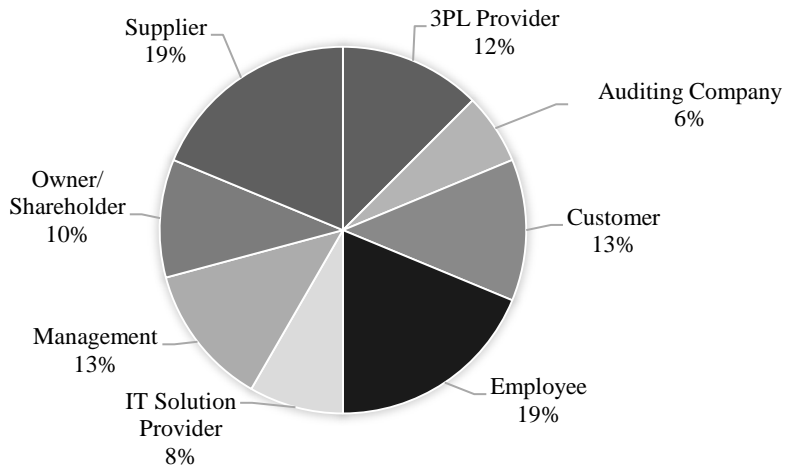
Achieving the Triple Bottom Line Principle from a social perspective means to make sure that businesses strive to uphold international labour standards within their supply chains, including the right to freely chose employment, freedom of children from labour, freedom from discrimination and the freedom to work convenient hours [3]. Moreover, sustainable business must choose how to react to environmental pressures using strategies such as promoting environmental responsibilities, having precautionary actions or using new technologies [4]. Because bringing sustainability principles into supply chain management requires a commitment of long-term supplier relationships accompanied by appropriate levels of engagement and working against corruption, collaborative initiatives that identify root causes reinforce best practices like maintaining correct accounting records and building capacity [5].

#### **5. Methodology**

The target population of this research is supply chain stakeholders of manufacturing industry in Sri Lanka (Figure 1). Thereby the sample population has become 88 individual stakeholders across the supply chain of manufacturing industry.

##### **5.1. Data Collection**

Data collection for this research was mainly done through an online questionnaire developed using the knowledge gained from the literature survey and in meetings with industry professionals. This questionnaire was shared with different stakeholders across the supply chain of manufacturing industries chain via email, Facebook, WhatsApp and LinkedIn.



**Figure 1: Stakeholders Responded to the Questionnaire**

## 5.2. Data Analysis

Data analysis process has been done in three ways including manual data processing, Microsoft Excel data processing and SPSS data analysis. Manual data processing has been used to calculate the response percentages, Microsoft Excel has been used to calculate means and sort them, and finally SPSS has used to Descriptive Analysis and Factor Analysis.

## 6. Results

There were nine sustainable supply chain principles selected from the literature review. After the factor analysis to get the correct rotation in the rotated component matrix, “the elimination of all forms of forced and compulsory labour” had to be removed (Table 1).

**Table 10: Final Rotated Component Matrix**

	Component	
	1	2
Human_Rights	.733	
Child_Labor	.681	
ENV_Challenges	.717	
ENV_Responsibilities	.695	
ENV_Friendly_Tech	.730	
SnD_Concepts		.660
Corruption		.644
Correct_Records		.771
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. <sup>a</sup>		
a. Rotation converged in 3 iterations.		

By doing the same process to get the correct rotation in all five stages of the supply chain, the most important sustainable supply chain principles for five different stages of supply chain were identified. Moreover, descriptive analysis was used to understand the significance levels of each sustainable supply chain principle (Table 2).

	N	Minimum	Maximum	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Human_Rights	48	2.00	5.00	3.9375	.09605	.66545	.443	-.383	.343	.650	.674
Child_Labor	48	2.00	5.00	4.2917	.11124	.77070	.594	-.854	.343	.222	.674
Compulsory_Labor	48	1.00	5.00	3.5833	.13913	.96389	.929	-.842	.343	.733	.674
ENV_Challenges	48	2.00	5.00	4.1875	.11399	.78973	.624	-.622	.343	-.273	.674
ENV_Responsibilities	48	3.00	5.00	4.2500	.08681	.60142	.362	-.153	.343	-.441	.674
ENV_Friendly_Tech	48	2.00	5.00	4.2917	.10296	.71335	.509	-.863	.343	.899	.674
SnD_Concepts	48	1.00	5.00	3.8125	.13201	.91457	.836	-.829	.343	.918	.674
Corruption	48	2.00	5.00	3.9375	.08633	.59809	.358	-.606	.343	1.927	.674
Correct_Records	48	2.00	5.00	4.0208	.09643	.66811	.446	-.917	.343	2.377	.674
Valid N (listwise)	48										

**Table 11: Descriptive Analysis for Sustainable Supply Chain Principles**

## 7. Conclusion

There are different stakeholders involved in the supply chain of the manufacturing industry, which are;

- 3PL Service Providers
- Auditing Companies
- Customers
- Employees
- IT Solution Providers
- Management
- Owners/ Shareholders
- Suppliers
- Transportation Providers
- Government
- Competitors

The following are the sustainable principles that can be applied in the supply chain of manufacturing industry with those stakeholders.

- a) The effective abolition of child labour and the elimination of discrimination in respect of employment and occupation.
- b) Encouraging the development and diffusion of environmentally friendly technologies.
- c) Undertaking initiatives to promote greater environmental responsibilities.

- d) Supporting precautionary approach to environmental challenges.
- e) Maintaining correct accounting and business records while reporting misconduct.
- f) Supporting and respecting the protection of internationally-proclaimed human rights.
- g) Working against corruption in all its forms, including extortion and bribery.
- h) Complying with efficient supply and demand concepts.

The framework table (Table 3) shows the most suitable sustainability principles which should be applied in different stages in supply chain of manufacturing industry. All the sustainable principles are ranked according to positive stakeholder perspective in each stage.

**Table 12: Framework for SSC Principles should be applied in different stages of Supply Chain**

Supply Chain Stage	Sustainable Supply Chain Principle
Planning Stage	<ol style="list-style-type: none"> <li>1. Undertaking initiatives to promote greater environmental responsibilities.</li> <li>2. Complying with efficient supply and demand concepts.</li> <li>3. The effective abolition of child labor and the elimination of discrimination in respect of employment and occupation.</li> <li>4. Supporting precautionary approach to environmental challenges.</li> <li>5. Encouraging the development and diffusion of environmentally friendly technologies.</li> <li>6. Working against corruption in all its forms, including extortion and bribery.</li> <li>7. Maintaining correct accounting and business records while reporting misconducts.</li> </ol>
Sourcing Stage	<ol style="list-style-type: none"> <li>1. Complying with efficient supply and demand concepts.</li> <li>2. The effective abolition of child labor and the elimination of discrimination in respect of employment and occupation.</li> <li>3. Supporting precautionary approach to environmental challenges.</li> <li>4. Supporting and respecting the protection of internationally proclaimed human rights.</li> <li>5. Encouraging the development and diffusion of environmentally friendly technologies.</li> </ol>
Making Stage	<ol style="list-style-type: none"> <li>1. The effective abolition of child labor and the elimination of discrimination in respect</li> <li>2. Encouraging the development and diffusion of environmentally friendly technologies.</li> <li>3. Undertaking initiatives to promote greater environmental responsibilities.</li> <li>4. Supporting and respecting the protection of internationally proclaimed human rights.</li> <li>5. Supporting precautionary approach to environmental challenges.</li> <li>6. Complying with efficient supply and demand concepts.</li> <li>7. Working against corruption in all its forms, including extortion and bribery.</li> <li>8. Maintaining correct accounting and business records while reporting misconducts.</li> </ol>
Delivering Stage	<ol style="list-style-type: none"> <li>1. Working against corruption in all its forms, including extortion and bribery.</li> <li>2. Encouraging the development and diffusion of environmentally friendly technologies.</li> <li>3. Maintaining correct accounting and business records while reporting misconducts.</li> <li>4. The elimination of all forms of forced and compulsory labor.</li> </ol>
Returning Stage	<ol style="list-style-type: none"> <li>1. Encouraging the development and diffusion of environmentally friendly technologies.</li> <li>2. Supporting and respecting the protection of internationally proclaimed human rights.</li> <li>3. Maintaining correct accounting and business records while reporting misconducts.</li> <li>4. Undertaking initiatives to promote greater environmental responsibilities.</li> </ol>

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