



## The Creation of a Sustainability Index for Public Health Supply Chains

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### Abstract

**Background:** The large percentage of research in this area focuses on the triple-bottom line of sustainability, which entails understanding the economic, social, and environmental outcomes of supply chain process. A few sustainability measures have been proposed in the literature to recognize supply chain sustainability, assisting interested parties in making strategic decisions. Researchers and practitioners alike have become more aware of and interested in sustainable supply chain management. The majority of these studies, however, focus on supply chains in wealthy countries, with little research on sustainable supply chains in poor countries. Existing research focuses solely on the triple bottom line approach to supply chain sustainability, and more study is needed to identify and quantify additional components of supply chain sustainability. Although the lack of empirical evidence in the current conceptual study, it intends to propose this index to improve the evaluation and health coverage of public health supply chains. It will serve as a starting point for more study and will allow for actual testing of the index in public health supply chains.

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### INTRODUCTION

A well-functioning health system will require a supply chain to deliver and ensure improved health outcomes, which is vital for any country.<sup>[1,2]</sup> Although many people think of a

supply chain as just procurement, warehousing, and distribution, integrated processes and collaboration are critical to improving healthcare commodity accessibility. Supply chain management is a well-defined field that, regrettably, has not been used to



improving health supply chains.<sup>[3]</sup> As a result, public health supply chains in low- and middle-income nations are still poor, putting the health system's ability to respond to persistent health concerns at risk.<sup>[4,5]</sup> Limitations in the economic, legislation, rules, and standards make managing such supply chains complex, affecting overall performance, particularly in developing countries.<sup>[6]</sup> As a result, supply chain sustainability is critical to assisting countries in overcoming the constraints of overburdened health systems and performing better. Only once people realized the influence of their own actions on the environment did the concept of sustainability gain traction. People were unaware until the consequences manifested themselves in the form of global warming, climate change, and other threats to human survival. The Burtland Report, published by the United Nations in 1987, was the first to examine this topic. There have been many definitions of sustainability that are more practice-oriented and define the features of a sustainable society.<sup>[7]</sup> The European Union's definition is thought to be more holistic, encompassing many aspects of sustainability, including the economic, social, and environmental implications of all policies that are carefully studied before decisions are made. The concept of sustainability has evolved to include the well-being of individuals, communities, and the larger environment, rather than just environmental damage. Coordination amongst supply chain members is required to meet sustainability goals.<sup>[8]</sup> Failure to develop coordination among the many stakeholders would have an impact on the supply chain's overall competitiveness. Developing countries face an additional hurdle

because financial sustainability is prioritized over all other aspects of development.<sup>[5]</sup>

### **Sustainability in health supply chains**

An effort was made to comprehend the impact of sustainability on healthcare. Healthcare technologies and decreasing the carbon footprints of healthcare activities have received more attention.<sup>[9,10]</sup> In healthcare, environmental sustainability is defined in terms of waste management and pollution.<sup>[11]</sup> Furthermore, as healthcare businesses grow, the long-term viability of customer and staff care is becoming a key component of high-quality treatment and efficiency. As a result, an integrated approach is required so that these organizations can achieve improved health results.<sup>[12]</sup> In general, we discovered that existing sustainability research has primarily concentrated on environmental stability and organizational stability, both of which are primarily concerned with financial difficulties. There have been few attempts to highlight the other aspects of healthcare sustainability strategies. Similarly, there is limited evidence of research in the domain of public health supply chain sustainability, which is an area where few studies have sought to investigate. There are just a few research on specific subjects in healthcare logistics, such as inventory management outsourcing solutions.<sup>[13]</sup> A research also pointed for assessing healthcare organizations' environmental sustainability was created in such a way that the findings could be compared across time to produce benchmarking tools.<sup>[14]</sup> Another activity that was recognized was qualitatively identifying the driving drivers for healthcare sustainability implementation and proposing methods to



continually improve healthcare sustainability implementation.<sup>[15]</sup> Throughout generally, prior research on healthcare supply chain sustainability has primarily concentrated on environmental stability and organizational stability, both of which are primarily concerned with financial difficulties. Aspects of social sustainability have also been highlighted in several research. However, there has been minimal attempt to highlight the other aspects of health supply chain sustainability strategies. This effort will help numerous stakeholders enhance their actions by gaining a better grasp of the expanding breadth of sustainability practices in healthcare.

## MATERIAL AND METHODS

A measure that incorporates factors from more than one dimension, rather than a single dimension, gives a more complete picture of sustainability. However, it also raises a number of challenges with respect to measurement. The following steps have been identified for development of composite indicators a) Develop a theoretical framework, b) Identify and develop relevant variables I c) Standardize variables d) Weight and group variables, and e) Perform sensitivity analysis. . No major Ethical Implication was required. Statistical analysis was done by SPSS 24 version.

## RESULTS

**Table 1:** Economics outcome indications

Category	Metric	Measurement
Monetary	Productivity order measurement	Output/input/successful orders
Financial Health	Profitability value added	Revenue/cost/profit
Efficacy	Days of Supply	Avarage inventory

**Table 2:** Social outcome indications

Category	Metric	Measurement
Workplace	Wage ratio health	Top wages/Bottom wages
	Gender equality	Female/Male
Communnity	Product recalls employment	Total notification

**Table 3:** Environmental outcome indications

Category	Metric	Measurement
Source	Emission energy	Emissions per unit
Disposal	Recycling	Recyclable weight

**Table 4:** Health outcomes indications

Category	Metric	Measurement
Health and Well-being	Service delivery efficacy of healthcare	Patients served/ Total patients/ Counterfeits identified/ Total consumption

	Accessibility	Rural health points/ Total health points
	Affordability	State sponsored healthcare expenditure/ Total health expenditure

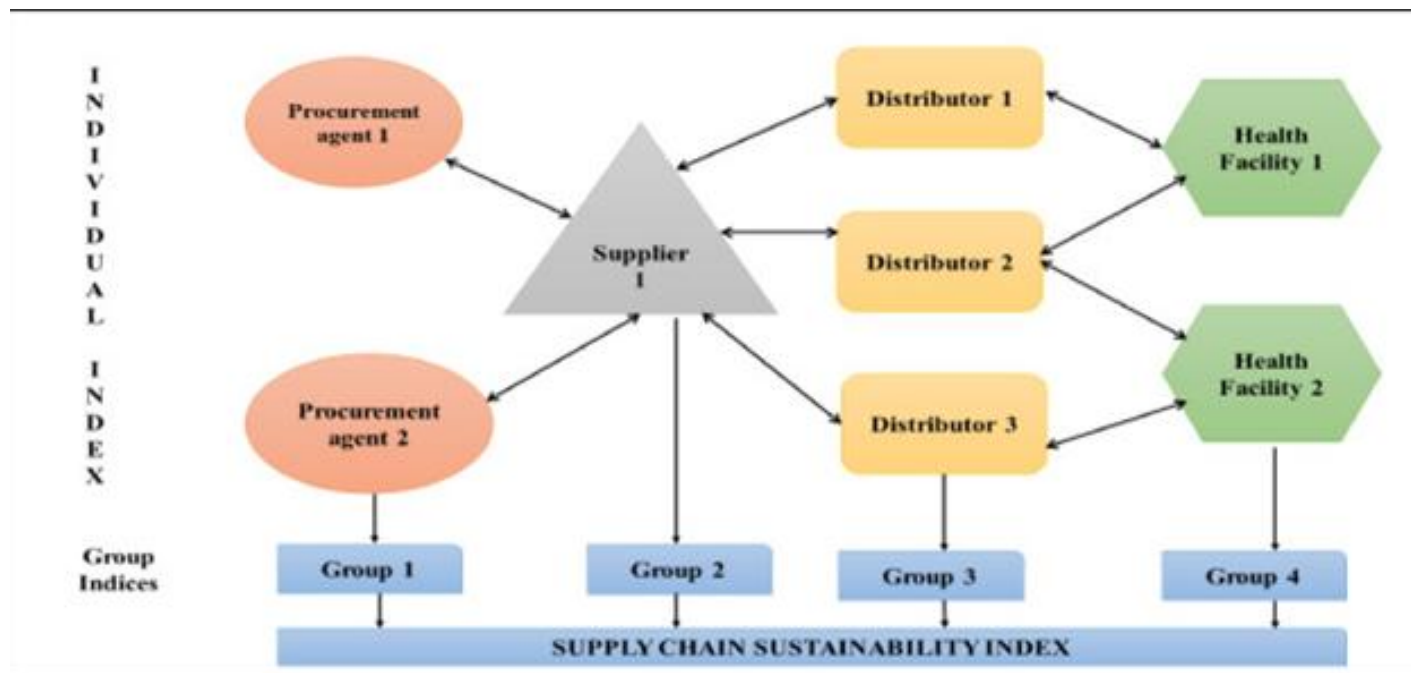


Figure 1: Supply chain sustainability INDEX (Reproduce by: Lakshmy Subramanian et al.)

Table 5: SCSi of the health supply chain.

Supply chain participants	SCSI <sub>p</sub>	SCSI <sub>g</sub>	SCSI
Health Facility	0.4805	0.646	0.571

### DISCUSSION

The research investigation assists us in comprehending the following aspects of health supply chain sustainability: the performance of each supply chain participant may be analyzed in terms of their sustainability index. This will make it easier to identify participants who have crucial levels of sustainability. At each echelon, the degree of sustainability recognizes the performance of each set of supply chain actors in comparison to the others. Comparisons of the various indicators and

sub-indicators can be made using the technique. Because all of the variables have been normalized, it is easy to compare the different indicators among supply chain members. We determine which sets of indicators and sub-indicators have the highest and lowest sustainability levels. The different participants will be able to compare and contrast their own results as a result of this. Good practices can also be identified, and knowledge of them can be shared across the supply chain's many activities. Priority can be given to selected indicators to improve the





participant's sustainability based on the weights allocated to each indicator's contribution to sustainability. Within health supply chains, the sustainability assessment of each dimension will reflect which sub-indicators are given importance and which elements are overlooked. Considering the various characteristics may facilitate the creation of strategies to improve individual participants as well as supply chain sustainability as a whole.

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## CONCLUSIONS

The processes are influenced will assist in broadening one's perception on the long-term sustainability of public-health supply chains. It's tough to come up with a perfect sustainability indicator. The present index, on the other hand, can be used as a self-evaluation tool for better health outcomes and coverage. It will serve as a foundation for future research that will enable the index to be evaluated in worldwide public health supply chains.

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