Journal of Sustainable Development of Transport and Logistics
journal home page: https://jsdtl.sciview.net

Farchi, C., Touzi, B., Farchi, F., & Mousrij, A. (2021). Sustainable performance assessment: A systematic literature review. *Journal of Sustainable Development of Transport and Logistics, 6*(2), 124-142. doi:10.14254/jsdtl.2021.6-2.8.

ISSN 2520-2979

Sustainable performance assessment: A systematic literature review

Chayma Farchi *, Badr Touzi **, Fadwa Farchi *, Ahmed Mousrij *

* *Hassan 1er University,*
Settat, Morocco,
Department of Mechanical and Electrical Engineering, Research Laboratory: IMII (Engineering, Industrial Management, and Innovation), Faculty of Sciences and Technologies
c.farchi@uhp.ac.ma; f.farchi@uhp.ac.ma; mousrij@gmail.com
*** Mohammed V University,*
Rabat, Morocco,
Department of Economics and Management Sciences, Research,
Faculty of Legal, Economic and Social Sciences - Souissi
b.touzi@um5r.ac.ma

Article history:

Received: November 03, 2021
1st Revision: November 05, 2021
Accepted: November 26, 2021

DOI:
10.14254/jsdtl.2021.6-2.8

Abstract: Current development trends are driving ubiquitous sustainability requirements, pushing organizations to achieve new sustainability goals and targets. To this effect, continuous and continual performance measurements are the key to any business-related success. Therefore, the sustainable performance of an organization can be defined as the performance that takes a long time to achieve its goals. The outcome is a well-balanced balance of context, strategy, management processes, resources, and intangibles especially since it is closely related to the notion of sustainable development (TBL). The goal of this paper is two-fold. Firstly, a systematic literature review is conducted to highlight the importance and the need to assess the three pillars of sustainability and, finally, to encircle the sustainability concept by identifying the most used techniques and approaches in its evaluation. This paper can be considered as basic support for future studies in the application of sustainable performance measurement/assessment systems.

Keywords: sustainability assessment, sustainable performance, PMS, sustainable performance measurement, tripple bottom line

Corresponding author: Chayma Farchi
E-mail: c.farchi@uhp.ac.ma

1. Introduction

Sustainable development is a complex issue associated with generally improving the living conditions of people on Earth without compromising the biosphere regulation and the ability of the world. It emerged about three decades ago, based on the publication of a report by the World Commission on Environment and Development (Cmed) (Vivien, et al., 2013).

The final purpose of companies is to proportionally implement a strategic long-term stakeholder value through the implementation of a business strategy based at first degree on the ethical, social, cultural, environmental, and economic aspects of practicing business. In practical reality, this shows that there are three main resources of the business in their operations: Social justice and human rights and social justice, Natural resource extraction and waste, and Short- and long-term thinking.

In globalization's context, the competition between companies has involved competitiveness between supply chains. Members of the Supply chain are now unanimous and hold a consensus on the importance of realizing sustainable supply chain management (SSCM) and integrating the approach of sustainable development into management systems (Wan et al., 2021).

SSCM has then emerged as a subject in the growth phase, taking raising and increasing interest in supply chain management area the sustainability (Seuring and Müller, 2008). Practicing and expanding such significant leverage on the stainability of national economies, aside from studies dominated by either case or survey-based research, measuring performances in the context of the sustainable supply chain has not attracted researchers' attention. Along with increasing pressure to act and report on sustainability strategies, an overwhelming number of principles, tools, and reporting formats have emerged and some of which are adopted by corporations to prove their loyal commitment to sustainable development (Beloff et al., 2004).

Given the above-mentioned concerns, this paper intends to review the literature related to the PMS in the context of SC. This paper also aims to encircle the notion of sustainability and its assessment and to detail the different evaluation methods and approaches found in the literature. Following the introduction, this paper is structured as follows : (2) the proposed methodology is developed, (3) the definitions of the main concepts relating to sustainability are given, (4) the main methods and approaches are detailed and analyzed, and (5) discussion, results and some, concluding remarks are provided.

2. Research methodology

This paper is derived from well-defined research goals and can be compared to a systematic review of the literature according to a structured protocol that minimizes subjectivity and allows critical evaluation of related research (Di Pasquale et al., 2017).

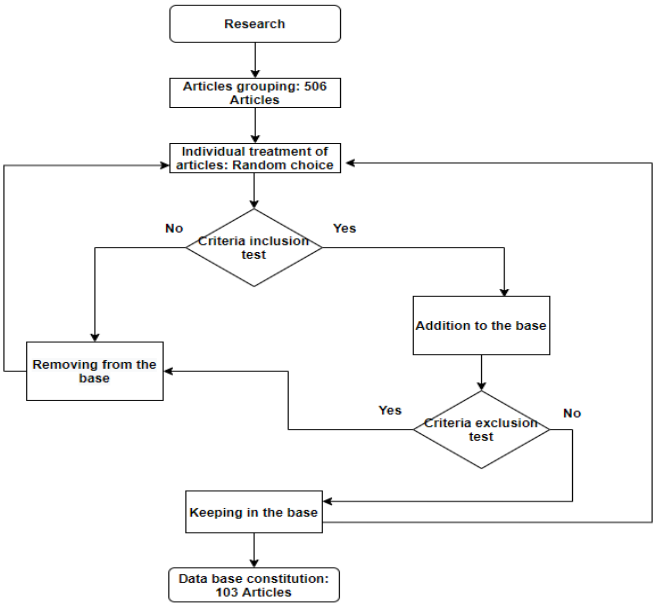
This study brings together the work of collecting, assessing, and synthesizing existing knowledge on the issue of measuring and evaluating sustainability and sustainable performance.

The aim is to first review and analyze documents and articles that discussed sustainability assessment and sustainable performance measurement and that provided frameworks, models, approaches, and sustainability-related indicators allowing its evaluation to highlight the importance and the need to assess the three pillars of sustainability (the three dimensions economic, environmental and social) contributing to the sustainability goals of organizations and finally present the most used techniques and approaches to encircle the concept of sustainability and its assessment.

2.1. Literature collection and selection

The collection and analysis of the literature included in this review were carried out for 4 months until the current structure of the topic of this review was formulated. Therefore, it is still difficult to quantify the incremental volume of retrieved and selected documents. The collection runs until the end of May 2020. Strategies for collecting, selecting, and reviewing existing literature are presented in Table 1.

Figure 1: Flowchart detailing the stages in the constitution of the article database



The retrieved literature emanates from an intersection of the three databases: ScienceDirect, ResearchGate, and Scopus without any constraint on the type of publication or journal. For the more than 506 documents discovered, the results were restricted by including the keywords: «Sustainable», «Sustainability», «Performance», «Assessment», «Evaluation», «Measurement», «Indicators»,« Mesure», «Model», «Framework», «Tool», «Approach» trying the different possible combinations. Only the works related to the sustainability assessment context were then included in the selection.

Table 1: Inclusion and exclusion criteria

1	**Search and collection criteria**		**Number of documents**
1.1	Database selection	ScienceDirect, ResearchGate, Scopus	506
1.2	Search date	May 2021	
1.3	Documents types	ALL	
1.4	Journals	ALL	
1.5	Search field	Titles, Abstracts, Keywords, highlights	
1.6	Publication period	Until April 2021	
2	**Selection criteria**		**Number of documents**
2.1	Inclusions	**Keywords**: Model, Framework, Tool, Approach, Assessment, evaluation, measurement, indicators, measure, Performance, Sustainable, Sustainability The model put into practice Model tested & applied	103
2.2	Exclusions	Off-topics Duplicates No evaluation model	

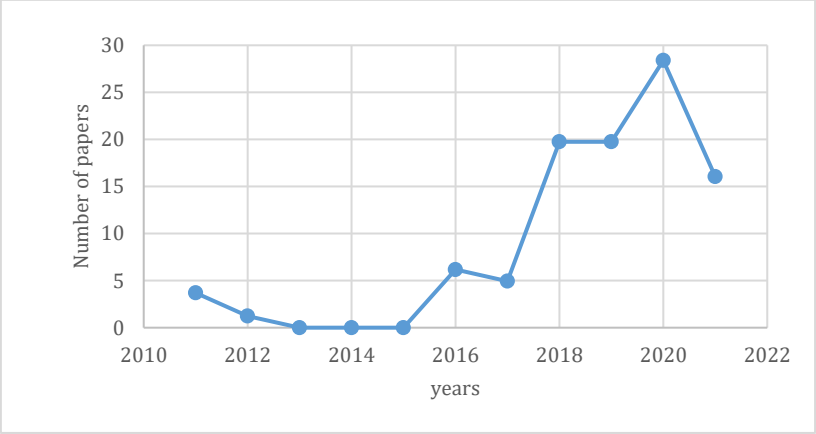
Excluding papers with no added value to our work, the most relevant literature has been analyzed for the aim of this current review. The final number of case studies, quantitative studies, and research papers are 82 out of 103 related documents retained and selected.

The flowchart above shows in detail the main stages of articles' selection Figure 1.

Figure 2 shows some initial thoughts and considerations regarding the collection and selection of literature to analyze. Eighty-two documents are distributed on a time scale from 2011 to 2021.

As can be seen, the number of articles surveyed has increased since the early 2016s, when awareness of the importance of sustainable development increased and grew.

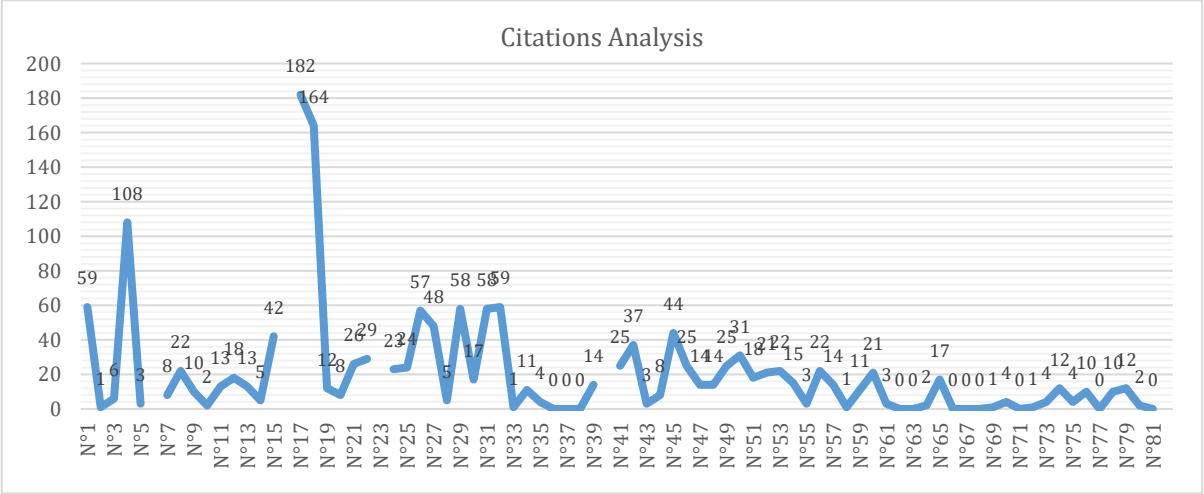
Figure 2: Distribution of the documents among the time span according to their year of publication



The citations of these articles were also analyzed to give Figure 3, which is the most frequently cited.

We can note that, compared to the total number of articles contained in our database to be studied, those published before 2015 remain practically insignificant (0 articles were meeting our selection criteria for the three years: 2012, 2013, and 2014). It is only from the year 2018 that the publications became important and therefore significant given the emergence of the sustainability assessment and evaluation.

Figure 3: Distribution of the articles' citations



The number of times each article has been cited varies from one to another. The mainly cited articles (182, 164, and 108 times) propose new evaluation methods and frameworks mainly using fuzzy logic associated with another decision support method. This can be justified by the interest given to fuzzy logic transforming human knowledge into a mathematical formula and reducing the uncertainty and the ambiguity of the data. These same articles present frameworks tested and applied (in purely professional contexts). This demonstrates the importance attributed by the scientific community to practical studies.

2.2. Distribution of research papers according to methodology

Based on the 103 articles constituting the final database (after the exclusion), the authors have classified and categorized the articles selected according to whether they are "Literature reviews", "Research articles", "Case studies" or "Quantitative studies". Results are shown in the Table 2 below.

Table 2: Distribution of research papers

Papers	Numbers	%
Case Studies	69	66,9902913
Literature Review	21	20,3883495
Research Articles	9	8,73786408
Quantitative Studies	4	3,88349515

Out of 103 articles, case studies remain the most predominant (64) in terms of the distribution, followed by literature reviews. While the number of quantitative research remains elementarThisich is due to the characterization of this field of research by strong applicability compared to other more theoretical fields of research.

3. Definitions

3.1. Sustainability assessment in SC

To implement a sustainable strategy, it is necessary to manage sustainability performance effectively. Sustainability performance measurement and assessment systems are some of the basic conditions for successful sustainability performance management. The measurement of the actual economic, environmental and social performance is an essential starting point to understand what, where, and how to improve (Beske-Janssen et al., 2015).

Table 3: Sustainability assessment

	Contributions	Authors	Year	Nature	Model	Key Strengths	key weaknesses
Sustainability Assessment	Pretended that assessing and managing sustainability enable to eliminate and reduce risks, confirm compliance with standards and regulations, signal opportunities and threats, reduce costs, increase efficiency, strengthen competitive advantages, facilitate sustainability reporting, and sharpen operational performance.	Qorri et al.	2018	Defining study	-	Improvement of efficiency & operational performance Reduction of costs and risk	Operational orientation
	Explored various applications of the concept of sustainable supply chain management (SCM) in the operation strategy of Small and Medium-sized Enterprises (SMEs).	Kot	2018	Exploratory study	-	Inclusive management of operation strategies	Operation strategies orientation
	Conducted a systematic literature review to identify the common themes across the literature on sustainable supply chains. They considered four factors regarding the adoption of SSCM: drivers, barriers, mechanisms, and outcomes and proposed an integrated conceptual model grounded on institutional theory.	Jia et al.	2018	Exploratory study	Conceptuel model proposal	Integrated evaluation model	Omission of input elements
	Investigated the impact of SSCM practices on supply chain (SC) dynamic capabilities and the sustainability performances of organizations. They observed that SSCM practices have a significant positive effect on SC dynamic capabilities and over the three dimensions of sustainability performances, economic, environmental, and social. And they noticed that SC dynamic capabilities showed positive effects over environmental performances, but no effect over economic or social performances.	Hong et al.	2018	Exploratory deductive study	-	Consideration of the three pillars of TBL Integration of a dynamic lever	Dynamic capabilities orientation

Operationalized SSCM and introduced a factor, which is the derivative of external green SCM, internal green SCM, and corporate social responsibility (CSR). They developed multi-item scales for measurement for SSCM and stressed the environmental and social side of sustainability	Zhang et al.	2018	Innovative study	Practical modem proposal	Operationalizing of SSCM Multi-item scales consideration	Concentration on the environmental and social dimensions
Admitted that Social sustainability supports other sustainable initiatives and established a basic construction for examining the social sustainability of supply chains in manufacturing business, gave weight to different social criteria and concluded that the "contract stakeholder influence" was the most important criterion for realizing social sustainability	Ahmadi et al.	2017	Classifying deductive study	-	Clarification of the importance of the social pillar Demonstration of the link between the social dimension and stakeholders	Concentration on the social dimension
Constructed a practical evaluation model for social sustainability that includes indicators that can regularly monitor the extent to which established goals have been achieved	Popovic et al.	2018	Exploratory study	Practical model proposal	Goal-oriented	Concentration on the social dimension
Stressed the importance of providing a secure environment and promoting human rights for improving SSCM performance.	Tseng et al.	2019	explanatory study	-	Demonstration of the link between a secure environment and human rights	Right oriented and based study
Established a tool to evaluate and compare the green performance of hotel supply chains by dividing green standards into basic and advanced green practices, showing that compared with advanced green practices, managers pay more attention to basic green practices.	Sari and Suslu	2018	explanatory study	Quantitative & Qualitative evaluation tool proposal	Consideration of basic green practices and advanced green practices	Concentration on the environmental dimension
Proposed a new economic, environmental and social performance evaluation model to realize the benefits of GSCM and evaluate its impact on overall performance using a comprehensive method.	Kafa et al.	2013	Exploratory comparing study	TBL evaluation model proposal	Consideration of the three pillars of TBL Consideration of sustainability impact	Benefits orientation

3.2. Triple bottom line sustainability perspective

Sustainability is increasingly becoming the focus of governance and political dialogue as issues such as climate change, biodiversity loss, reduced availability of materials, and reduced demand for energy consumption need to be addressed.

Sustainability has different interpretations, from a cross-generational philosophical perspective to a multidimensional expression (M.M. Bappy et al, 2019). Originally considered a social issue, sustainability is receiving now increased attention from businesses (M.M. Bappy et al., 2019). Among the various perceptions of sustainability, the central idea that helps to operate sustainability is the triple bottom line (TBL approach), which achieves the lowest ecological, economic, and social levels of performance (Elkington, 1997). Taking economics into account, natural and social cases (Dyllick and Hockerts, 2002) also classify aspects of sustainability.

In addition, a sustainability perspective is presented in the literature, including the planet, people, and interests as key features of the analysis (Asif et al., 2011; Seuring et al., 2019). Organizations that consider economic and ecological and social issues generally produce longer-term value than organizations that focus solely on financial and profit-generating issues (M.M. Bappy et al., 2019).

The sustainability indicators address the sustainable development among the companies which has many definitions, the table below summarizes the main definitions found in the literature.

Table 4: Sustainable development

Sustainable development/ TBL	Basis	Authors	Year
It defines sustainable development as the development that meets the needs of the present without comprising the ability of future generations to meet their needs.	Long-term needs satisfaction	Arena, M. et al. Beheiry, S. M. et al.	2013 2003
the Triple Bottom Line (TBL) has emerged as the concept of sustainability as the integration of economic, environmental, and social dimensions.	Three dimensions consideration	Elkington, J	1997
The TBL is a critical concept for many organizations because it implies that the firm's responsibilities are much wider than simply those related to the economic aspects of producing products and services that customers want, to regulatory standards, at a profit.	Compagnies accountability	Hubbard, G	2009
The TBL adds social and environmental indicators of performance to the economic indicators typically used in most organizations' performance.	Addition of the two social and environmental dimensions	Nappi, V. and Rozenfeld, H.	2015
Companies must undertake their most basic economic, environmental and social responsibilities	Compagnies accountability	Wan et al.	2021
Argued that enterprises are more and more thought responsible for the environmental, social, and economic consequences caused by their internal operations and those of their suppliers	Effect (on the three dimensions) consideration	Hartmann, J. and Moeller, S	2014
Balancing or optimizing the three dimensions of the TBL can guide supply chain members in achieving the sustainability goals demanded by multiple stakeholders	Optimization and balancing the three dimensions	Allaoui et al.	2019

The TBL encompasses the basic dimensions used to evaluate supply chain sustainability. The three dimensions are described as follows.

The definition of the economic dimension includes the economic language related to the sustainability of the supply chain, such as costs and benefits (Ahi & Searcy, 2013). Supply chain members meet their needs and the needs of their stakeholders by adopting innovative and valuable co-creation strategies, and provide economic guarantees for the sustainable development of supply chains. Economic sustainability is an inexhaustible source of strength for improving the profitability and competitiveness of supply chains and contributes to the long-term survival of enterprises in difficult market conditions (Wan et al., 2021).

Due to increasing environmental problems, companies are under pressure to be environmentally responsible and integrate the environmental dimension into their business systems to mitigate environmental damage. (Paulraj, 2009) showed that ecologically responsible practices that organizations have adopted can create sustainable competitive advantages that can improve their profitability in the long run. Thus, the environmental dimension relates to sustainable environmental practices (Wan et al., 2021). Organizations in supply chains, taking into account the requirements of stakeholders, take measures to reduce the impact on the ecological environment through energy management and other activities, at least to avoid environmental damage, meet environmental requirements and improve the economic performance of supply chains.

Supply chain social sustainability is described as identifying, addressing and resolving social problems and concerns that arise throughout the supply chain, involving all upstream and downstream enterprises, internal processes and other stakeholders (Mani et al., 2015). It solves the aspects important for human rights and quality of life and directs the management layer to take into account the potential social consequences of decisions made (Laguna, 2014). Social sustainability practices require enterprises to maintain effective communication with other stakeholders.

4. Classification of PMS for sustainability assessment

An effective PMS is required in the context of SC to measure the right thing at right time. (Neely et al., 2000) defined the PMS as the total set of metrics used to measure both the effectiveness and

efficiency of action. Kaplan and Norton stated that "No measure, No improvement". Hence, identification of key performance measures (KPM) and selecting the suitable PMS is more important in the success of SC performance evaluation. For the last two decades, many researchers have developed and applied various performance measurement frameworks for different problems of SC (Jagan Mohan Reddy. K et al., 2019).

The majority of researchers have classified performance measurement and evaluation systems in the context of SC as models, frameworks, approaches, and techniques. Anyhow, (J,M.Reddy. et al., 2018) have classified the SCPMS as approaches and techniques.

4.1. Approaches

The approaches were, in turn, classified as processed-based approaches, perspective-based approaches, and hierarchical-based approaches (Jagan Mohan Reddy. K et al., 2019).

Table 5: Sustainability Assessment Approaches

Authors	Article	Year	Attributes & contributions	Measure/Evaluation Orientation
1-Processed based approaches				
K.K. Ross-Smith, M. Yearworth	Dynamics of operational procurement: systems modeling for performance tracking and auditing	2011	Process-based approach to develop the models and also evaluated SC performance using six sigma metrics	Process-oriented and targeted model (Review On SC PMS - 2019)
H.-J. Bullinger, M. Kühner, A. Van Hoof	Supply chain performance using a balanced measurement method	2002	Combination of top-level and lower-level metrics to develop a performance framework	
A. Gunasekaran, C. Patel, R.E. McGaughey	A framework for supply chain performance measurement	2004	Development of a framework taking into account the four SC processes (planning, sourcing, manufacturing, and delivering)	
J. Thakkar, A. Kanda, S.G. Deshmukh	Supply chain performance measurement framework for small and medium scale enterprises, Benchmarking	2009	process-based approach to measure SC performance measures in small and medium-sized industries	
M.A. Wanous, Mohammed	A proposed value model for prioritising supply chain performance measures	2009	Hierarchical models were developed to prioritize performance measures in the context of the supply chain	
P. Mishra, R.K. Sharma	Benchmarking SCM performance and empirical analysis	2014	Presentation of the relationship between Supply Chain performance measures and strategies	
S.A. Bagloee, M. Shnaiderman, M. Tavana, A. Ceder	A logic-based model for facility placement planning in supply chain management	2015	Proposition of a model of SC performance measurement system integration at three levels (Distributor manufacturer supplier)	
K. Govindan, S.K. Mangla, S. Luthra	The Management of Operations Prioritising indicators in improving supply chain performance using fuzzy AHP: insights from the case example of four Indian manufacturing companies	2017	hybrid method to evaluate the Supply Chain performance considering green performance measures	
A. Qazi, A. Dickson, J. Quigley, B. Gaudenzi	Supply chain risk network management: A Bayesian belief network and expected utility-based approach for managing supply chain risks	2018	utility-based process approach capturing the interdependencies between risks, risk mitigation strategies, and performance metrics in the SC network.	
V.G. Venkatesh, A. Zhang, E. Deakins, S. Luthra, S. Mangla	A fuzzy AHP-TOPSIS approach to supply partner selection in continuous aid humanitarian supply chains	2018	Development of a framework to explore social issues related to suppliers and recognize performance measures in emerging economies.	
2-Perspective-based approaches				
A. Otto, H. Kotzab	Does supply chain management pay? Six perspectives to measure the performance of managing a supply chain	2003	Considered each perspective to provide the measures in the evaluation of the perspective of the SC. It assembles the generic performance measures and also provides the interrelationship among the performance measures	
2.1. Balanced Scorecard models (BSC)				
R.S. Kaplan, D.P. Norton	The Balanced Scorecard – Measures that Drive Performance The Balanced Scorecard — Measures	1992	BSC approach generally applied to choose and combine the SC performance metrics from the balanced view	BSC comprises traditional financial measures representing an organization's past and adds non-financial measures (operational measures)
M. Anand, B.S. Sahay, S. Saha	Balanced Scorecard in Indian Companies	2005	Association of the SCM framework with the BSC to define performance measures of different companies in different parts of the world.	

E.W. Davis, R.E. Spekman	The Extended Enterprise: Gaining Competitive Advantage Through Collaborative Supply Chains	2004	Application of BSC in theory and practice with many advantages compared to other models	representing the drivers of future performance which have been distributed between the four started classes. The fundamental quality of the BSC is that it measures the performance in all four main areas, which have associated with the strategic objectives (Review On SC PMS - 2019)
J. Chai, J.N.K. Liu, E.W.T. Ngai	Application of decision-making techniques in supplier selection: A systematic review of literature	2013	Use of this approach in the logistics industry to measure SC performance	
A. Trivedi, K. Rajesh	A Framework for Performance Measurement in Supply Chain Using Balanced Score Card Method: A Case Study	2013	combination of BSC and AHP methods to assess SC performance.	
G.F. Khanaposhtani, S.S. Jafari, F. Ariana	Formulating the supply chain strategy of automotive industry in Iran using balanced Scorecard	2017	Use of a mixed approach consisting of BSC, Game theory, and System Dynamics (SD) to evaluate the automobile industry performance	
D. Xia, Q. Yu, Q. Gao, G. Cheng	Sustainable technology selection decision-making model for enterprise in supply chain: Based on a Modi fi ed strategic balanced scorecard	2017	Development of a modified strategic balanced scorecard evaluating the technology candidates in terms of their features of sustainability.	
F. Rasolofo-Distler, F. Distler	Using the balanced scorecard to manage service supply chain uncertainty: Case studies in French real estate services	2018	Analysis of the role of the BSC in the management of SC uncertainty in service activities	
S. Thanki, J. Thakkar	Quantitative framework for lean and green assessment of supply chain performance	2018	Proposition of a BSC and strategy map-based quantitative framework for assessing the lean and green performance of the SC	
2.2. Supply chain operations reference model(SCOR)				
L.L.T. Li	An integrated framework for supply chain performance measurement using six-sigma metrics	2010	Model containing performance attributes and metrics depend on five different management processes (plan, source, make, deliver and return)	SCOR contains thirteen metrics corresponding to level 1 which fall into five categories; SC reliability metrics, flexibility metrics, responsiveness metrics, cost metrics, and assets metrics. The first three categories have directly linked to the customers and are hence called customer-facing. The rest of the metrics, measurements within the internal operation of the SC and are named as internal facing. (Review On SC PMS -2019)
W.P. Wong, W. Peng Wong, K. Yew Wong	A review on benchmarking of supply chain performance measures	2008	Application of SCOR measures as input variables and output variables for DEA to evaluate the performance of the SC	
J. Thakkar, A. Kanda, S.G. Deshmukh	Supply chain performance measurement framework for small and medium scale enterprises	2009	Mixing the features of the SCOR and BSC models to develop a PMS for the case of small and medium enterprises in India	
A.R.. Ghatari, G.. Mehralian, F.. Zarenezhad, H.. Rasekh	Developing a model for agile supply: An empirical study from Iranian pharmaceutical supply chain,	2013	Expression of PMS based on the SCOR for distributors in pharmaceutical supply chains.	
D. Essajide, L. Rachidi	Planning and modeling of Pharmaceuticals Wholesale-Distributors supply Chain using SCOR model: A Moroccan case study	2017	Adaptation of the SCOR models to the pharmaceuticals wholesale distributors in the performance of SC	
J. Zuniga, R.; Icarte, G.; Griffiths, J.; Lopez, J; Quezada	Modeling of Critical Products Supply Chain Required to Affected People on Earthquakes and Tsunamis Through Use of SCOR Model	2018	Use of SCOR model to identify the key performance measures to reduce the complexities of the SC	
3. Hierarchical based approaches				
A. Gunasekaran, C. Patel, E. Tirtiroglu	Performance measures and metrics in a supply chain environment	2001	Development of a framework with the strategic level metrics, tactical metrics, and operational level metrics.	Hierarchical based models are useful to measure the performance of an SC at different hierarchical levels (strategic level, tactical level, and operational level)
A. Gunasekaran, C. Patel, R.E. McGaughey	A framework for supply chain performance measurement	2004	Prioritization the metrics based on the three-point scores	
D. Gallear, A. Ghobadian, Y. Li, N. Oregan, P. Childerhouse, M. Naim,	An environmental uncertainty-based diagnostic reference tool for evaluating the performance of supply chain value streams	2014	Classification of metrics based on the three hierarchical levels	
V.R. Pramod, D.K. Banwet	Performance measurement of SHER service supply chain: a balanced score card – ANP approach	2011	Hierarchical based-model to evaluating the performance of service Supply Chain in terms of safety, risk, and health	
P.K. Dey, W. Cheffi	Green supply chain performance measurement using the analytic hierarchy process: a comparative analysis of manufacturing organisations	2013	Empirical research on the development of tier-based performance measurement systems in the green supply chain	

4.2. Methods

According to researchers and practitioners, sustainability assessments are increasing as a fast-growing emerging area. (Brandenburg et al., 2014; Glock et al., 2012). Nonetheless, the number of posts on this topic is very limited. To assess the sustainability of the supply chain, quantitative models can be created based on recent studies using the following techniques (Hassini et al., 2012; Seuring, 2013; and Brandenburg et al., 2014).

Table 6: Sustainability assessment Methods

Methods	Definitions	Characteristics	Limitations	Evaluation/Assessment perspective
Life Cycle Assessment (LCA) based model	Research and evaluate the potential environmental impacts associated with a product, process, or action. LCA is the most widely used system for studying sustainability issues in the supply chain (Seuring, 2013).	Multi-step and multi-criteria	Depending only on assumptions and scenarios.	The assessment is done by identifying and assessing the materials used, energy consumed, and waste on land (Abdallah et al., 2012; Pishvaee and Razmi, 2012). Typical components covered in the LCA are assessing environmental issues and trying to minimize their impact on the supply chain (Cholette and Venkat, 2009; Edwards et al., 2010)
Analytical Hierarchy Process (AHP)	AHP is the second most commonly used approach to assess sustainability (Seuring, 2013) To organize and analyze multi-objective decisions AHP is a structured technique (Moktadir et al., 2019). It is often used as a basic semi-quantitative decision-making procedure. To simplify and structure complex decisions, this approach is widely used (Ho, 2008; Moktadir et al., 2019).	Multi-criteria method	The impact of comparing many objectives. Interdependence between alternatives and objectives can lead an inaccurate/wrong results. Additional analysis is required to verify the results.	The AHP method helps to evaluate complex decision-making situations where economic and environmental objectives are evaluated simultaneously (Faisal, 2010).
Multiple Criteria Decision Making (MCDM) Structure	With this approach, the multi-criteria planning problem is structured and solved. Initially, the MCDM approach and the equilibrium approach are comparable because the aim is to create a balance between the criteria. economic performance and the environment differently (Seuring, 2013).	Multi-criteria method	The risk of inconsistent judgments is too high	The main areas of emphasis of this approach are to provide an optimal solution by optimizing economic and environmental criteria (Georgiadis and Besiou, 2009; Koberg and Longoni, 2019)
Models based on Input-Output Analysis (IOA)	IOA is another logical modeling approach for evaluating sustainability-related issues in the supply chain (Brandenburg et al., 2014)	Interdependencies based method	Accuracy and convergence problem	The relationship between supply chain input parameters and the results of some key performance indicators can be analyzed. Environmental capital and economic goals, as well as supply chain network throughput, can also be assessed by IOA techniques (Bonney and Jaber, 2014; Jaber et al., 2013).
Equilibrium Model	Equilibrium modeling is an established standard method and another widely used approach for assessing supply chain sustainability (Seuring, 2013).	Hypothetical method	One-period setting with only two stages on the supply chain networks	The balance of economic and ecological problems by providing relevant optimal solutions was a typical basis for equilibrium models (Kainuma and Tawara, 2006; Saint Jean, 2008).
Data envelopment analysis (Sartori et al., 2017)	Data Envelopment Analysis (DEA) is based on linear programming to assess the relative efficiencies and inefficiencies of decision-making units (DMUs) producing outputs by using inputs. DEA was first proposed in the pioneering paper by Charnes, Cooper, and Rhodes (Charnes et al., 1978). It is used to estimate the technical efficiency of a DMU with constant returns to scale (CRS) in the frontier of the production possibility set.	Non-parametric technique	Results are potentially sensitive to the selection of inputs and outputs	Organization and analysis of the Data allows the performance to be changed over time and it has no frontier about efficiency boundary.
Fuzzy Logic (Erol et al., 2011)	A fuzzy set is a class of objects, with a continuum of membership grades, where the membership grade can	Versatile logic method	The necessity to regularly update the rules of a Fuzzy	A fuzzy subset A of a universal set X is defined by a membership function f [A(x)] which maps each element x in X

	be taken as an intermediate value between 0 and 1(I. Erol et al., 2011)		Logic control system	to a real number [0, 1]. When the grade of membership for an element is 1, it means that the element is absolutely in that set. When the grade of membership is 0, it means that the element is not in that set. Ambiguous cases are assigned values between 0 and 1.
Composite Metrics	A logical modeling approach that can be used to assess supply chain sustainability by creating and using composite measurements (Brandenburg et al., 2014; Hassini et al., (2012). There is an argument that composite metrics are more subjective and the results of are undesirably dependent on the specific weighting system (Singh et al., 2012). Aggregate measures are associated with unpredictability (Turnhout et al., 2007) and are considered effective and functional tools for policy prioritization, fundamental decision-making, and communication-based system performance	An arbitrary set of mathematical transformations based method	Provide misleading messages and lead to simplistic conclusions.	To summarize complex and multifaceted problems into one metric the composite metrics are used as practical tools.

5. Results and discussions

Among the selected papers 95.06% of them were published in the last six years with a growing trend, highlighting an increasing interest in the field by academics and researchers. All the articles have been thoroughly analyzed and studied to come out with as much information as possible on current research trends, about the several analytical aspects: journals, Methods & Approaches, Keywords, and Countries.

The following paragraphs demonstrate the results of the content analysis of the 82 selected papers.

5.1. Keywords and methods distribution

To ensure a better reading of the keywords retrieved from the collected articles, they have been categorized into four main categories: Evaluation/Assessment, Sustainability & SC, Approaches & Techniques, and Industries.

Table 7 shows the ranking by the importance of the four main categories: Key Evaluation / Assessment category first with a percentage of 30.15%.

Table 7: Keyword classes distribution

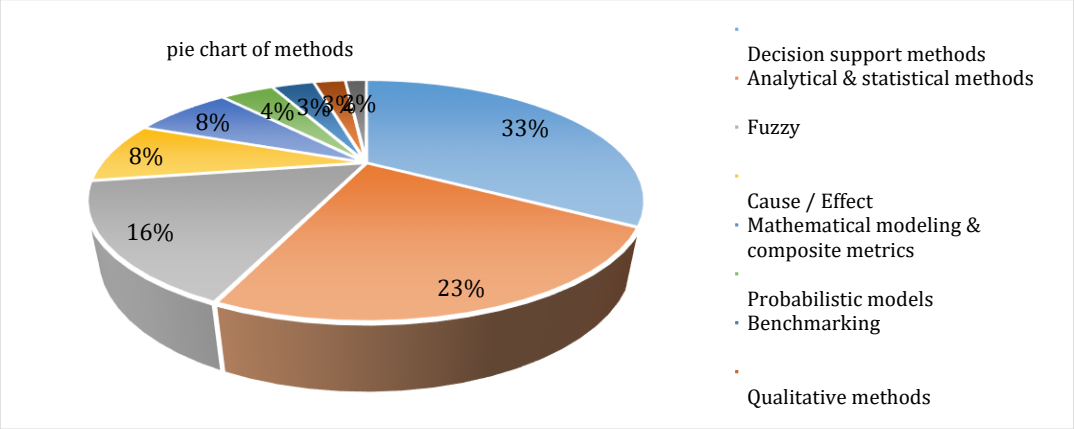
	Evaluation / Assessment	Approaches & Techniques s	Sustainability & S.C	Industries / Areas	Other
No	117	94	80	25	72
%	30.15	24.23	20.62	6.44	18.55

From the information in the table, it can be assumed that the statistical distribution of the keywords of the two categories Evaluation/Assessment Approaches & Techniques remains the most dominant and eminent compared to the Sustainability category. While the industry category is not too significant. The publication and scientific production are more and more numerous in this direction. This can be explained by the desire of researchers to fill an obvious lack in terms of tools and reproducible evaluation models.

The review of the literature revealed 40 various techniques & approaches - all included -. The authors have grouped all these methods into nine different categorizations detailed in fig. 3: Decision support method (33.33%), Analytical and statistical method (23.33%), Fuzzy (15.83%), Causal method

(7.5%), Mathematical Modeling & Composite Metrics (4.16%), Probabilistic model (4.16%), Benchmarking (3.33%), Qualitative method (2.5%), Weighting (1.66%).

Figure 4: Pie chart detailing the methods' distribution



The decision support methods, analytical and statistical methods are by far the most used. Fuzzy logic is also present in the literature as it is generally associated with one of the methods mentioned above. Comparative and qualitative methods are used very little**.** Such use of methods amounts to considering several criteria at the same time and to reducing the uncertainty and subjectivity of the data in the assessment of sustainability.

5.2. Prominent countries & Journals

The geographical analysis carried out by country and continent presents by decreasing classification the number of publications and total cumulative contributions.

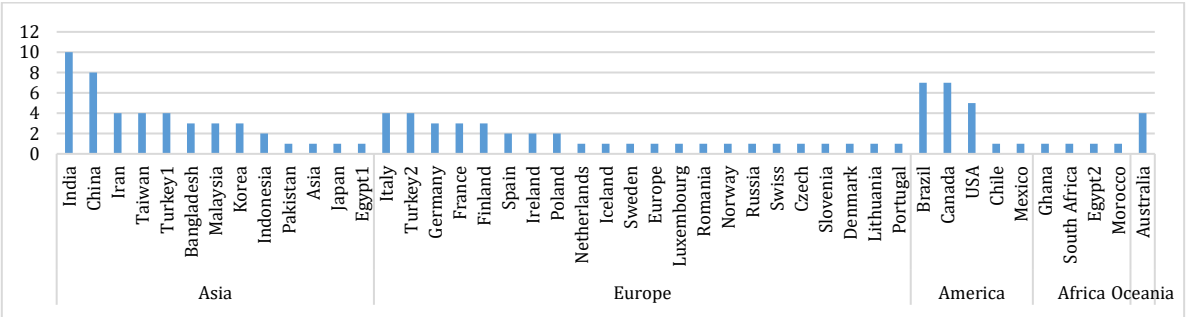
The Asian continent takes the upper hand with a percentage of 40.54% (with respectively 10 & 8 publications for India and China). Tables 8 and 9 below detail the list of continents whose countries record publications.

Table 8: Continents distribution

Continents	Countries	Total Times	%
Asia	13	45	40.5405405
Europe	22	37	33.3333333
America	5	21	18.9189189
Africa	4	4	3.6036036
Oceana	1	4	3.6036036

The histogram below Fig. 5 details the countries belonging to the continents that have published articles related to sustainability.

Figure 5: Distribution by country

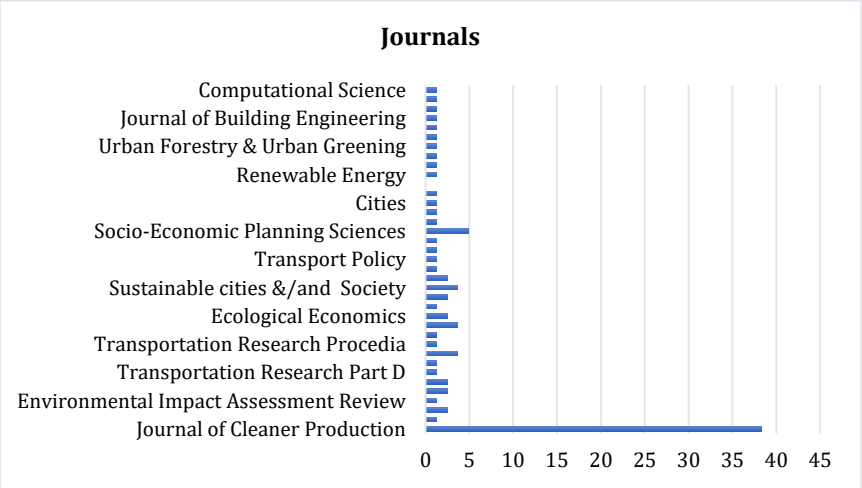


The continents of Asia and Europe remain those publishing the most articles with very important contributions (respectively 45 & 37). Come after the American continent with 21 publications. Publications from Africa and Oceania are minimal.

India and China remain the two most scientifically active countries. They are at the heart of all intellectual and scientific research and are very interested in initiatives in favor of sustainable measures and actions.

Fig.ure 4 shows the classification of these 82 documents by publication type. The selected journal articles were published in different kinds of journals, but a peak of publication occurs in «Journal of Cleaner Production» that has turned to be the recurrent Journal (38.27%), followed by «Socio-Economic Planning Sciences» (4.9%).

Figure 6: Journals' distribution according to the number of articles collected



However, the other newspapers remain without any dominance. The dominance of the "Journal of Cleaner Production" turns out to be logical, as it is a journal focusing on cleaner production, which is one of the main goals of sustainability.

6. Conclusion

Endurance and sustainability assessments are generally conducted to support decision-making and policy in a wide range of environmental, economic, and social contexts. From this perspective, sustainability has been a major goal for businesses, nonprofits, and governments for the past decade, but it measures the extent to which an organization is sustainable or striving for sustainable growth. It can be difficult to do.

The triple bottom line which presents that the business goal states are inseparable from the society and environment in which it operates. While short-term economic benefits can be achieved, these business practices are considered unsustainable without considering the social and environmental impacts of these efforts.

In this study, sustainable supply chain measurement tools to evaluate the sustainability performance of supply chains have been discussed and reviewed. However, the systematic literature review conducted in this paper shows that, from one hand, the literature review is seen from a different point of view than the traditional state-of-art literature, the case studies and research articles have contributed to the development of a new generic vision of sustainable performance measurement systems. From another, the added benefit of this paper is that the review presented an evaluation of the advantages and weaknesses of all the methods and approaches detailed in section 4, their distinctions, and their common features. We notice that the MCDM methods are by far the most used, especially for the advantages they present as they can improve over time, especially as more cases are added to the database. They can also adapt to changes in the environment with their database of cases.

Different from the previous literature reviews on the subject, which provide limited techniques for measuring specific aspects of sustainability or sustainability indicators, this article presents the different main characteristics of each of these techniques by explaining which ones are the most used,

in which countries the publications are more numerous. This analysis also made it possible to emerge with the industries that most apply the applications of our subject namely transport and manufacturing.

Taking as main bases the results of this systemic review, in our future research we intend to conduct a meticulous and in-depth investigation on the essential dimensions to the measurement of sustainability other than the 3P (Profit, People, Planet) commonly translated by the economic, social and environmental dimensions and on the most exact and least subjective method on this subject.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Citation information

Farchi, C., Touzi, B., Farchi, F., & Mousrij, A. (2021). Sustainable performance assessment: A systematic literature review. *Journal of Sustainable Development of Transport and Logistics, 6*(2), 124-142. doi:10.14254/jsdtl.2021.6-2.8

References

Abdallah, T., Farhat, A., Diabat, A., & Kennedy, S. (2012). Green supply chains with carbon trading and environmental sourcing: Formulation and life cycle assessment. *Applied Mathematical Modelling, 36*(9), 4271–4285. https://doi.org/10.1016/j.apm.2011.11.056

Ahi, P., & Searcy, C. (2013). A comparative literature analysis of definitions for green and sustainable supply chain management. *Journal of Cleaner Production, 52*, 329–341. https://doi.org/10.1016/j.jclepro.2013.02.018

Allaoui, H., Guo, Y., & Sarkis, J. (2019). Decision support for collaboration planning in sustainable supply chains. *Journal of Cleaner Production, 229*, 761–774. https://doi.org/10.1016/j.jclepro.2019.04.367

Anand, M., Sahay, B. S., & Saha, S. (2005). Balanced Scorecard in Indian Companies. *Vikalpa, 30*(2), 11–26. https://doi.org/10.1177/0256090920050202

Arena, M., Azzone, G., & Conte, A. (2013). A streamlined LCA framework to support early decision making in vehicle development. *Journal of Cleaner Production, 41*, 105–113. https://doi.org/10.1016/j.jclepro.2012.09.031

Asif, M., Searcy, C., Zutshi, A., & Ahmad, N. (2011). An integrated management systems approach to corporate sustainability. *European Business Review, 23*(4), 353–367. https://doi.org/10.1108/09555341111145744

Askariazad, M., & Wanous, M. (2009). A proposed value model for prioritising supply chain performance measures. *International Journal of Business Performance and Supply Chain Modelling, 1*(2/3), 115. https://doi.org/10.1504/ijbpscm.2009.030637

Badri Ahmadi, H., Kusi-Sarpong, S., & Rezaei, J. (2017). Assessing the social sustainability of supply chains using Best Worst Method. *Resources, Conservation and Recycling, 126*, 99–106. https://doi.org/10.1016/j.resconrec.2017.07.020

Bagloee, S. A., Shnaiderman, M., Tavana, M., & Ceder, A. (2015). A logit-based model for facility placement planning in supply chain management. *International Journal of Logistics Systems and Management, 20*(1), 122-147. https://doi.org/10.1080/03081060.2016.1266164

Bappy, M. M., Ali, S. M., Kabir, G., & Paul, S. K. (2019). Supply chain sustainability assessment with Dempster-Shafer evidence theory: Implications in cleaner production. *Journal of Cleaner Production*, 117771. https://doi.org/10.1016/j.jclepro.2019.117771

Beheiry, S. M., Chong, W. K., & Haas, C. T. (2006). Examining the Business Impact of Owner Commitment to Sustainability. *Journal of Construction Engineering and Management, 132*(4), 384–392. https://doi.org/10.1061/(asce)0733-9364(2006)132:4(384)

Beloff, B., Tanzil, D., & Lines, M. (2004). Sustainable development performance assessment. *Environmental Progress, 23*(4), 271–276. https://doi.org/10.1002/ep.10045

Beske-Janssen, P., Johnson, M. P., & Schaltegger, S. (2015). 20 years of performance measurement in sustainable supply chain management – what has been achieved?. *Supply Chain Management: An International Journal, 20*(6), 664–680. https://doi.org/10.1108/scm-06-2015-0216

Bonney, M., & Jaber, M. Y. (2014). Deriving research agendas for manufacturing and logistics systems: A methodology. *International Journal of Production Economics*, *157*, 49-61. https://doi.org/10.1016/j.ijpe.2013.12.007

Brandenburg, M., Govindan, K., Sarkis, J., & Seuring, S. (2014). Quantitative models for sustainable supply chain management: Developments and directions. *European Journal of Operational Research, 233*(2), 299–312. https://doi.org/10.1016/j.ejor.2013.09.032

Bullinger, H.-J., Kühner, M., & Van Hoof, A. (2002). Analysing supply chain performance using a balanced measurement method. *International Journal of Production Research, 40*(15), 3533–3543. https://doi.org/10.1080/00207540210161669

Chai, J., Liu, J. N. K., & Ngai, E. W. T. (2013). Application of decision-making techniques in supplier selection: A systematic review of literature. *Expert Systems with Applications, 40*(10), 3872–3885. https://doi.org/10.1016/j.eswa.2012.12.040

Charnes, A., Cooper, W. W., & Rhodes, E. (1979). Measuring the efficiency of decision-making units. *European Journal of Operational Research, 3*(4), 339. https://doi.org/10.1016/0377-2217(79)90229-7

Davis, E. W., & Spekman, R. E. (2004). *The Extended Enterprise: Gaining Competitive advantage through collaborative supply chains*. FT press.

Déprés, C., Vivien, F.-D., Lepart, J., & Pascal, M. (dir.). *L'évaluation de la durabilité - Versailles, Quae, coll.* «Indisciplines», 2013, 268 p., Économie rurale [En ligne], 349-350 | septembre-novembre 2015, mis en ligne le 15 décembre 2015, consulté le 24 septembre 2020. https://doi.org/10.4000/economierurale.4764

Dey, P. K., & Cheffi, W. (2012). Green supply chain performance measurement using the analytic hierarchy process: a comparative analysis of manufacturing organisations. *Production Planning & Control, 24*(8-9), 702–720. https://doi.org/10.1080/09537287.2012.666859

Di Pasquale, V., Franciosi, C., Iannone, R., Malfettone, I., & Miranda, S. (2017). Human error in industrial maintenance: a systematic literature review. In *Proceedings of the XXII Summer School "Francesco Turco"*, pp. 164-170.

Dyllick, T., & Hockerts, K. (2002). Beyond the business case for corporate sustainability. *Business Strategy and the Environment, 11*(2), 130–141. https://doi.org/10.1002/bse.323

Elkington, J. (1997). *Cannibals with Forks: the Triple Bottom Line of 21st Century Business*. Capstone, Oxford.

Erol, I., Sencer, S., & Sari, R. (2011). A new fuzzy multi-criteria framework for measuring sustainability performance of a supply chain. *Ecological Economics, 70*(6), 1088–1100. https://doi.org/10.1016/j.ecolecon.2011.01.00

Essajide, L., & Ali, R. (2017). Planning and modelling of Pharmaceuticals Wholesale-Distributors supply Chain using SCOR model: A Moroccan case study. *International Journal of Management Sciences and Business Research, 6*(3).

Faisal, M.N., 2010. Sustainable supply chains: a study of interaction among the enablers. *Business Process Management Journal, 16*(3), 508–529. https://doi.org/10.1108/14637151011049476

Farajpour Khanaposhtani, G., Jafari, S. S., Ariana, F., Alaie, A., & Salimi, H. (2017). Formulating the supply chain strategy of automotive industry in Iran using balanced Scorecard, System Dynamics, and Game Theory. *Marketing and Branding Research, 4*, 135-147.

Gallear, D., Ghobadian, A., Li, Y., O'Regan, N., Childerhouse, P., & Naim, M. (2013). An environmental uncertainty-based diagnostic reference tool for evaluating the performance of supply chain value streams. *Production Planning & Control, 25*(13-14), 1182–1197. https://doi.org/10.1080/09537287.2013.808838

Georgiadis, P., & Besiou, M. (2009). Environmental strategies for electrical and electronic equipment supply chains: which to choose?. *Sustainability*, *1*(3), 722-733. https://doi.org/10.3390/su1030722

Ghatari, A. R., Mehralian, G., Zarenezhad, F., & Rasekh, H. R. (2013). Developing a model for agile supply: An empirical study from Iranian pharmaceutical supply chain. *Iranian journal of pharmaceutical research: IJPR, 12*(Suppl), 193.

Glock, C. H., Jaber, M. Y., & Searcy, C. (2012). Sustainability strategies in an EPQ model with price- and quality-sensitive demand. *The International Journal of Logistics Management, 23*(3), 340–359. https://doi.org/10.1108/09574091211289219

Govindan, K., Mangla, S. K., & Luthra, S. (2017). Prioritising indicators in improving supply chain performance using fuzzy AHP: insights from the case example of four Indian manufacturing companies. *Production Planning & Control, 28*(6-8), 552-573. https://doi.org/10.1080/09537287.2017.1309716

Gunasekaran, A., Patel, C., & McGaughey, R. E. (2004). A framework for supply chain performance measurement. *International journal of production economics, 87*(3), 333-347. http://dx.doi.org/10.1016/j.ijpe.2003.08.003

Gunasekaran, A., Patel, C., & Tirtiroglu, E. (2001). Performance measures and metrics in a supply chain environment. *International Journal of Operations & Production Management, 21*(1-2), 71-87. https://doi.org/10.1108/01443570110358468

Hartmann, J., & Moeller, S. (2014). Chain liability in multitier supply chains? Responsibility attributions for unsustainable supplier behavior. *Journal of Operations Management, 32*(5), 281–294. https://doi.org/10.1016/j.jom.2014.01.005

Hassini, E., Surti, C., & Searcy, C. (2012). A literature review and a case study of sustainable supply chains with a focus on metrics. *International Journal of Production Economics, 140*(1), 69–82. https://doi.org/10.1016/j.ijpe.2012.01.042

Ho, W. (2008). Integrated analytic hierarchy process and its applications – A literature review. *European Journal of Operational Research, 186*(1), 211–228. https://doi.org/10.1016/j.ejor.2007.01.004

Hong, J., Zhang, Y., & Ding, M. (2018). Sustainable supply chain management practices, supply chain dynamic capabilities, and enterprise performance. *Journal of Cleaner Production, 172*, 3508–3519. https://doi.org/10.1016/j.jclepro.2017.06.093

Hubbard, G. (2009). Measuring organizational performance: beyond the triple bottom line. *Business Strategy and the Environment, 18*(3), 177–191. https://doi.org/10.1002/bse.564

Jaber, M. Y., Glock, C. H., & El Saadany, A. M. (2013). Supply chain coordination with emissions reduction incentives. *International Journal of Production Research*, *51*(1), 69-82. https://doi.org/10.1080/00207543.2011.651656

Jia, F., Zuluaga-Cardona, L., Bailey, A., & Rueda, X. (2018). Sustainable supply chain management in developing countries: An analysis of the literature. *Journal of Cleaner Production, 189*, 263–278. https://doi.org/10.1016/j.jclepro.2018.03.248

Kafa, N., Hani, Y., & El Mhamedi, A. (2013). Sustainability Performance Measurement for Green Supply Chain Management. *IFAC Proceedings Volumes, 46*(24), 71–78. https://doi.org/10.3182/20130911-3-br-3021.00050

Kainuma, Y., & Tawara, N. (2006). A multiple attribute utility theory approach to lean and green supply chain management. *International Journal of Production Economics*, *101*(1), 99-108.. https://doi.org/10.1016/j.ijpe.2005.05.010

Kaplan, R. S., & Norton, D. P. 1992. The balanced scorecard: measures that drive performance. *Harvard Business Review, 83*(7), 172.

Koberg, E., & Longoni, A. (2019). A systematic review of sustainable supply chain management in global supply chains. *Journal of Cleaner Production*, *207*, 1084-1098. https://doi.org/10.1016/j.jclepro.2018.10.033

Kot, S. (2018). Sustainable supply chain management in small and medium enterprises. *Sustainability*, *10*(4), 1143. https://doi.org/10.3390/su10041143

Laguna, J. M. (2014). *Institutional politics, power constellations, and urban social sustainability: A comparative-historical analysis*. Doctoral dissertation, The Florida State University.

Lin, L.-C., & Li, T.-S. (2010). An integrated framework for supply chain performance measurement using six-sigma metrics. *Software Quality Journal, 18*(3), 387–406. https://doi.org/10.1007/s11219-010-9099-2

Mani, V., Agrawal, R., & Sharma, V. (2015). Supply Chain Social Sustainability: A Comparative Case Analysis in Indian Manufacturing Industries. *Procedia - Social and Behavioral Sciences, 189*, 234–251. https://doi.org/10.1016/j.sbspro.2015.03.219

Mishra, P., & Sharma, R. K. (2014). Benchmarking SCM performance and empirical analysis: a case from paint industry. *Logistics Research, 7*(1). https://doi.org/10.1007/s12159-014-0113-0

Moktadir, M. A., Ali, S. M., Paul, S. K., & Shukla, N. (2019). Barriers to big data analytics in manufacturing supply chains: A case study from Bangladesh. *Computers & Industrial Engineering*, *128*, 1063-1075.. https://doi.org/10.1016/j.cie.2018.04.013

Nappi, V., & Rozenfeld, H. (2015). The incorporation of sustainability indicators into a performance measurement system. *Procedia CIRP*, *26*, 7-12. https://doi.org/10.1016/j.procir.2014.07.114

Neely, A., Mills, J., Platts, K., Richards, H., Gregory, M., Bourne, M., & Kennerley, M. (2000). Performance measurement system design: developing and testing a process-based approach. International *Journal of Operations & Production Management, 20*(10), 1119–1145. https://doi.org/10.1108/01443570010343708

Otto, A., & Kotzab, H. (2003). Does supply chain management really pay? Six perspectives to measure the performance of managing a supply chain. *European Journal of Operational Research, 144*(2), 306–320. https://doi.org/10.1016/s0377-2217(02)00396-x

Paulraj, A. (2009). Environmental motivations: a classification scheme and its impact on environmental strategies and practices. *Business Strategy and the Environment, 18*(7), 453–468. https://doi.org/10.1002/bse.612

Peng Wong, W., & Yew Wong, K. (2008). A review on benchmarking of supply chain performance measures. *Benchmarking: An International Journal, 15*(1), 25–51. https://doi.org/10.1108/14635770810854335

Pishvaee, M. S., & Razmi, J. (2012). Environmental supply chain network design using multi-objective fuzzy mathematical programming. *Applied Mathematical Modelling, 36*(8), 3433–3446. https://doi.org/10.1016/j.apm.2011.10.007

Popovic, T., Barbosa-Póvoa, A., Kraslawski, A., & Carvalho, A. (2018). Quantitative indicators for social sustainability assessment of supply chains. *Journal of Cleaner Production, 180*, 748–768. https://doi.org/10.1016/j.jclepro.2018.01.142

Pramod, V. R., & Banwet, D. K. (2011). Performance measurement of SHER service supply chain: a balanced score card – ANP approach. *International Journal of Business Excellence, 4*(3), 321. https://doi.org/10.1504/ijbex.2011.040108

Qazi, A., Dickson, A., Quigley, J., & Gaudenzi, B. (2018). Supply chain risk network management: A Bayesian belief network and expected utility based approach for managing supply chain risks. *International Journal of Production Economics, 196*, 24–42. https://doi.org/10.1016/j.ijpe.2017.11.008

Qorri, A., Mujkić, Z., & Kraslawski, A. (2018). A conceptual framework for measuring sustainability performance of supply chains. *Journal of Cleaner Production*, *189*, 570-584. https://doi.org/10.1016/j.jclepro.2018.04.073

Rasolofo-Distler, F., & Distler, F. (2018). Using the balanced scorecard to manage service supply chain uncertainty: Case studies in French real estate services. *Knowledge and Process Management, 25*(3), 129–142. https://doi.org/10.1002/kpm.1572

Reddy. K, J. M., Rao. A, N., & L, K. (2019). A review on supply chain performance measurement systems. *Procedia Manufacturing, 30*, 40–47. https://doi.org/10.1016/j.promfg.2019.02.007

Ross-Smith, K., & Yearworth, M. (2011, May). Dynamics of operational procurement: systems modelling for performance tracking and auditing. In *Proceedings of The 29th International Conference of the System Dynamics Society*.

Saint Jean, M. (2008). Polluting emissions standards and clean technology trajectories under competitive selection and supply chain pressure. *Journal of Cleaner Production*, *16*(1), S113-S123. https://doi.org/10.1016/j.jclepro.2007.10.009

Sari, K., & Suslu, M. (2018). A modeling approach for evaluating green performance of a hotel supply chain. *Technological Forecasting and Social Change, 137*, 53–60. https://doi.org/10.1016/j.techfore.2018.06.041

Sartori, S., Witjes, S., & Campos, L. M. S. (2017). Sustainability performance for Brazilian electricity power industry: An assessment integrating social, economic and environmental issues. *Energy Policy, 111*, 41–51. https://doi.org/10.1016/j.enpol.2017.08.054

Seuring, S. (2013). A review of modeling approaches for sustainable supply chain management. *Decision Support Systems, 54*(4), 1513–1520. https://doi.org/10.1016/j.dss.2012.05.053

Seuring, S., & Müller, M. (2008). Core issues in sustainable supply chain management–a Delphi study. *Business strategy and the environment*, *17*(8), 455-466. https://doi.org/10.1002/bse.607

Seuring, S., Brix-Asala, C., & Khalid, R. U. (2018). Analyzing base-of-the-pyramid projects through sustainable supply chain management. *Journal of Cleaner Production*. https://doi.org/10.1016/j.jclepro.2018.12.102

Singh, R. K., Murty, H. R., Gupta, S. K., & Dikshit, A. K. (2009). An overview of sustainability assessment methodologies. *Ecological Indicators, 9*(2), 189–212. https://doi.org/10.1016/j.ecolind.2008.05.011

Thakkar, J., Kanda, A., & Deshmukh, S. G. (2009). Supply chain performance measurement framework for small and medium scale enterprises. *Benchmarking: An International Journal, 16*(5), 702–723. https://doi.org/10.1108/14635770910987878

Thanki, S., & Thakkar, J. (2018). A quantitative framework for lean and green assessment of supply chain performance. *International Journal of Productivity and Performance Management, 67*(2), 366–400. https://doi.org/10.1108/ijppm-09-2016-0215

Trivedi, A., & Rajesh, K. (2013). A framework for performance measurement in supply chain using balanced score card method: a case study. *Int. J. Recent Trends Mech. Eng*, *4*(1), 20-23.

Tseng, M.-L., Wu, K.-J., Lim, M. K., & Wong, W.-P. (2019). Data-driven sustainable supply chain management performance: A hierarchical structure assessment under uncertainties. *Journal of Cleaner Production, 227*, 760–771. https://doi.org/10.1016/j.jclepro.2019.04.201

Turnhout, E., Hisschemöller, M., & Eijsackers, H. (2007). Ecological indicators: Between the two fires of science and policy. *Ecological Indicators, 7*(2), 215–228. https://doi.org/10.1016/j.ecolind.2005.12.003

Venkatesh, V. G., Zhang, A., Deakins, E., Luthra, S., & Mangla, S. (2019). A fuzzy AHP-TOPSIS approach to supply partner selection in continuous aid humanitarian supply chains. *Annals of Operations Research*, *283*(1), 1517-1550.. https://doi.org/10.1007/s10479-018-2981-1

Wan, X., Liu, X., Du, Z., & Du, Y. (2021). A novel model used for assessing supply chain sustainability integrating the ANP and ER approaches and its application in marine ranching. *Journal of Cleaner Production*, *279*, 123500. https://doi.org/10.1016/j.jclepro.2020.123500

Xia, D., Yu, Q., Gao, Q., & Cheng, G. (2017). Sustainable technology selection decision-making model for enterprise in supply chain: Based on a modified strategic balanced scorecard. *Journal of Cleaner Production, 141*, 1337–1348. https://doi.org/10.1016/j.jclepro.2016.09.083

Zhang, M., Tse, Y. K., Doherty, B., Li, S., & Akhtar, P. (2018). Sustainable supply chain management: Confirmation of a higher-order model. *Resources, Conservation and Recycling, 128*, 206–221. https://doi.org/10.1016/j.resconrec.2016.06.015

Zuniga, R., Icarte, G., Griffiths, J., Lopez, J., & Quezada, J. (2018, February). Modeling of critical products supply chain required to affected people on earthquakes and tsunamis through use of SCOR model. In *International Conference on Dynamics in Logistics* (pp. 53-57). Springer, Cham.

Journal of Sustainable Development of Transport and Logistics (ISSN: 2520-2979) is published by **Scientific Publishing House "CSR", Poland, EU** and **Scientific Publishing House "SciView", Poland, EU**
Publishing with JSDTL ensures:
• Immediate, universal access to your article on publication
• High visibility and discoverability via the JSDTL website
• Rapid publication
• Guaranteed legacy preservation of your article
• Discounts and waivers for authors in developing regions
Submit your manuscript to a JSDTL at https://jsdtl.sciview.net/ or submit.jsdtl@sciview.net