

A Framework of SCOR Model Based on Systematic Literature Review: Case Study in Micro and Small Industries in Indonesia

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ABSTRACT

One of the factors that plays an important role to win a business competition is how the company manages its supply chain. This is because in winning the competition, the goods must arrive in the hands of consumers faster, cheaper and of course with better quality. Hence, the company needs to establish a Supply Chain Strategy and importantly need to measure its performance as well. One of the most common tools to measure SCM performance is the SCOR (Supply Chain Operations Reference). This paper presents a literature review study on the SCOR Model. The objective of this review study was to investigate the overall application of the SCOR method to several companies and compare its implementation results between a company and other. The papers that are reviewed were discussed the use of SCOR in several different companies. Different in terms of the type of business, their products and in terms of company size, including micro and small and medium industries. The results of the literature review study depicts that the SCOR method can be integrated with other methods according to company objectives and goals. The results of the literature review study depicts that the SCOR method can be integrated with other methods according to company objectives and goals, among others are SSCM (Sustainable Supply Chain Management), TLS (Traffic Light System), and Lean Supply Chain.

Keywords–Literature Review, Retail, Manufacturing, and Services Industry, SCOR, SSCM, Traffic Light System, Lean Supply Chain

INTRODUCTION

Nowadays, business competition is getting more fierce. Competition does not only come from the same scale and line of business but also because of many factors that cause that business competition. Those factors have an important role in ensuring that products can reach consumers faster, right on time, cheaper and obviously, the product itself should have a higher product quality level than competing products. In order to achieve those targets, an integrated and efficient supply chain system is needed. (Putri et al., 2019).

The basic principle of a supply chain is a network between a company with its supplier, in the context of any activities to ensure the end customer receives the products as they wish. This network also mostly involves distributors, retailers, logistics companies, and forwarders.

To win the business competition, the company needs to apply the right strategy in managing its supply chain. For this reason, an integrated supply chain performance measurement system is needed. With this performance measurement, the company will be able to monitor its supply chain system and ensure that the supply chain process runs according to the planned strategy. (Hasibuan et al., 2018).

The government makes regulations, namely Law No. 3 the year of 2014 about the industry's obligation to make plans for the use of natural resources starting from product design, production processes, waste treatment, and optimization of product waste. Based on existing regulations and demand levels, then Sustainable Supply Chain Management (SSCM) needs to be applied. SSCM is an integration of sustainable

environmental, financial and social aspects in the supply chain (Waaly et al., 2018).

The SCOR (Supply Chain Operations Reference) method is a method for measuring the performance of a corporate's supply chain. SCOR splits the supply chain process becomes five processes, namely the planning process (plan), procurement process (source), production process (make), delivery process (delivery), and return process (return) (Hasibuan et al., 2018). The SCOR model consists of five main performance attributes, namely reliability, responsiveness, agility, cost, and asset management (Ikatinasari et al., 2020).

Micro and Small Medium Enterprises (SME) need to be flexible in terms of production volume and distribution since most SMEs rely on made-to-order business schemes. Therefore SMEs need to take an appropriate precautious plan in their supply chain system. Improper planning of supply chain systems can result in high production costs, which are caused by losses due to disruptions in the production process. In this context, the SCOR method is very useful for anticipating risks in the supply chain process (Helmi and Masri, 2017 ; Chakabva et.al., 2020 ; Naude, et.al., 2020). Besides that risks, Micro and SMEs also need to reach their economic value, especially for high consumable products such as food and beverages together with its upstream raw material products. In vegetable products, the production process also has a unique complexity. It is unique because it does not only involve farmers but also involves landowners, plant seeds providers, fertilizer producers, harvest collectors, and finally crop processing factories. Not to mention that the agricultural industry is generally affected by weather conditions and the risk of pests. The SCOR method was also used to measure the performance level of agriculture business practitioners in achieving the economic values of their business (Pratiwi et.al., 2019).

This study's aim is to discuss the application of SCOR (Supply Chain Operations Reference) model in the retail, manufacturing, and service industries in Indonesia, particularly within micro and SMEs. Also as a reference in determining research gaps in further research. The end part of the paper depicts a framework for integrating the SCOR model with other tools, such as SSCM (Sustainable Supply Chain Management) methods, KPI (Key Performance Indicators), AHP (Analytical Hierarchy Process), TLS (Traffic Light System), and Lean Supply Chain. The performance indicators in the monitoring system are divided into five categories, i.e.: poor (<40), marginal (40-50), average (50-70), good (70-90), and excellent (>90).

MATERIALS and METHODS

The literature review that is presented in this study was carried out on 52 articles that were listed in Google Scholar. The literature review framework is depicted in Fig. 1 below:

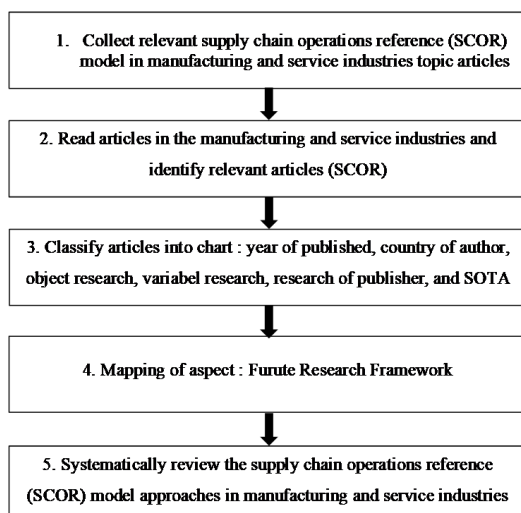


Fig 1. Study Framework of SCOR Model

The steps of systematic literature review (SLR) were used in this literature review. The process flow of SLR is shown in Figure 1. The complete methodology of this study follows six steps that include collecting relevant of the SCOR (Supply Chain Operations Reference) model and reading relevant articles (The SCOR model-based). Classify articles become the chart, map of aspect future research framework, and make systematically review of the SCOR (Supply Chain Operations Reference) model.

RESULT and DISCUSSION

The systematic literature review in this article was conducted to identify the development of the SCOR (Supply Chain Operations Reference) model in the retail, manufacturing, and service industries in Indonesia. In this table 1, each manuscript has been analyzed using different factors like paper identity, research object, and result.

Now, The SCOR (Supply Chain Operations Reference) model is widely used across corporates in retail, manufacturing, and services industries in Indonesia. The SCOR model analyzes their supply chain performance systematically, improves communication among members in the supply chain, and designs better supply chain networks.

Table 1. Mapping Project of SCOR

No	Paper Identity	Research Object	Result
1	(Kusrini et al., 2018)	in a Retail in Indonesia	Halal indicators consist of 22 valid performance metrics. Supply chain performance is included in the excellent category (91.4). The corporate still has to make improvements, especially in terms of flexibility and reliability.
2	(Hasibuan et al., 2018)	PT. Shamrock Manufacturing Corpora	The indicator consists of 12 valid performance metrics. Supply chain performance of PT. Shamrock Manufacturing Corpora is included in the good category (50-100). Attribute responsiveness (0.649) is a priority for improvement because it has the highest weight.
3	(E. Kusrini et al., 2019)	A Leather SME	The indicator consists of 48 valid performance metrics. The supply chain performance of this corporate is in the average category (54.29). The agility attribute is a priority for improvement because it has the performance lowest value attribute (9,09).
4	(Waaly et al., 2018)	A Leather Tanning Industry	The indicator consists of 8 valid performance metrics. This corporate's supply chain performance is in the marginal category (44.37). the responsiveness attribute is a priority improvement because has the highest weight value (0.257).
5	(Saputra et al., 2020)	at Table Tennis Table Manufacturer	The indicator consists of 21 valid performance metrics. The corporate's supply chain performance is in a good category (72.09). The cost attribute is a priority for improvement because it has the lowest attribute performance value (6.93).

No	Paper Identity	Research Object	Result
6	(Pulansari & Putri, 2020)	Steel Corporate	The indicator consists of 16 valid performance metrics. The corporate's supply chain performance is in the average category (67.73). The reliability attribute becomes a priority for improvement because of the value of its own lowest normalization (38).
7	(Rakhman et al., 2018)	Automotive corporate	The indicator consists of 9 valid performance metrics. The supply chain performance of this corporate is in a good category (76). The cost attribute is a priority for improvement because it has the highest weight value (71).
8	(Wulandari et al., 2021)	Producer of Catfish Frozen Food	The indicator consists of 19 valid performance metrics. The corporate's supply chain performance is in the excellent category (91.24). The asset management attribute is a priority for improvement because it has the lowest attribute performance value (0.033).
9	(Djatna et al., 2020)	Palm Oil Industry	The indicator consists of 18 valid performance metrics. This corporate's supply chain performance is categorized as poor (64). The agility attribute becomes improvement priority because it has the lowest weight value lowest (4).
10	(Kusrini et al., 2019)	In Supermarket	The indicator consists of 28 valid performance metrics. The corporate's supply chain performance is in a good category (80.64). The responsiveness attribute is a priority improvement because it has a normalized value lowest (50).
11	(Ranggadara & Sfenrianto, 2020)	A Fashion Trade Business	The indicator consists of 10 valid performance metrics. The corporate's supply chain performance is in the average category (62.61). The asset management attribute is a priority for improvement because it has the lowest attribute performance value (0.067).
12	(Effendi et al., 2019)	Sugar industries	The indicator consists of 17 valid performance metrics. The corporate's supply chain performance is in the average category (56.12) the waste management attribute is a priority for improvement.
13	(Novar et al., 2018)	Indonesian Bureau of Logistics	The indicator consists of 17 metrics valid performance. The corporate's supply chain performance is in the average category Industry marginal category (67.56). The reliability attribute becomes a priority for improvement because it has the highest weight value (0.593).
14	(Sutoni et al., 2021)	PT. BRS	The indicator consists of 32 valid performance metrics. The supply chain performance of this corporate is in a good category (80.48). the reliability attribute becomes a priority for improvement because it has the lowest attribute performance value (5.42).

No	Paper Identity	Research Object	Result
15	(Kusrini et al.,2019)	SME Producing Sports Clothes	The indicator consists of 27 valid performance metrics. The corporate's supply chain performance is in a good category (77.89). the cost attribute is a priority for improvement because it has the lowest attribute performance value (40).
16	(Fauziyah et al., 2020)	Food and beverage corporates	The indicator consists of 15 metrics valid performance. The corporate's supply chain performance is in a good category (72.73). The responsiveness attribute is a priority improvement because it has the lowest attribute performance value (70.78).
17	(Immawan & Nugraha, 2020)	Oil and gas upstream industry	The indicator consists of 17 metrics valid performance. The corporate's supply chain performance is in a good category. The reliability attribute is a priority for improvement.
18	(Anham et al., 2019)	The Maintenance Repair and Overhaul (MRO) Industry	The indicator consists of 35 valid performance metrics. The corporate's supply chain performance is in a good category (89.23). the agility attribute becomes a priority for improvement because it has the highest weight value (0.363).
19	(Yuniaristanto et al., 2020)	The Lithium Battery Factory	The indicator consists of 26 valid performance metrics. The corporate's supply chain performance is in the average category (65.13). the responsiveness (50) and agility (50) attribute become a priority for improvement because it has the lowest attribute performance value.
20	(Sudrajat et al., 2020)	Manufacturers of coated and painted steel	The indicator consists of 28 valid performance metrics. The corporate's supply chain performance is in a good category (88.14). the responsiveness attribute becomes a priority for improvement because it has the lowest attribute performance value (57).
21	(Makkarennu et al., 2020)	Palm Sugar Industry	The indicator consists of 19 valid performance metrics. The corporate's supply chain performance is in the marginal category (46). the flexibility attribute becomes a priority for improvement because it has the highest weight value (0.194).
22	(Hasibuan & Dzikrillah, 2018)	Indonesia Chemical Industry	The indicator consists of 28 valid performance metrics. The supply chain performance of this corporate is in the good category (60-80). responsiveness attribute becomes a priority for improvement because it has the lowest attribute performance value (37).
23	(Defrizal et al., 2020)	Rice Milling Unit	The indicator consists of 9 valid performance metrics. The corporate's supply chain performance is in the average category (64). The reliability attribute becomes a priority for improvement because it has the highest weight value (0.99).

No	Paper Identity	Research Object	Result
24	(Alfaliansyah & Maswadi, 2020)	The Coconut Industry	The indicator consists of 6 valid performance metrics. The corporate's supply chain performance is in the average category (64). The reliability attribute becomes a priority for improvement.
25	(Handayani & Setyatama, 2019)	Green Avenue Apartments of East Bekasi	The indicator consists of 17 valid performance metrics. The corporate's supply chain performance is in a good category (75.44). The reliability attribute becomes a priority for improvement.
26	(Maulidah et al., 2018)	Potato Agro-Industry	The indicator consists of 18 valid performance metrics. The corporate's supply chain performance is in the average category (55.7). Asset management attributes are a priority for improvement
27	(Desparita et al., 2020)	Large Scale Rice Refineries	The indicator consists of 19 metrics valid performance. The corporate's supply chain performance is in the average category (53.95). The cost attribute is a priority improvement because it has the lowest attribute performance value (4.10).
28	(Wahyuni et al., 2021)	Tempeh crackers	The indicator consists of 15 metrics valid performance. The corporate's supply chain performance is in the marginal category (45.94). The reliability attribute is a priority improvement because it has the lowest normalized value (0).
29	(Suseno & Sulistyowati, 2018)	Produces batteries	The indicator consists of 9 metrics valid performance. The corporate's supply chain performance is in the average category (69.18). The asset management attribute is a priority improvement because it has the lowest attribute performance value (2.18).
30	(Anthara & Damayanti, 2018)	The shoe industry	The indicator consists of 13 valid performance metrics. The supply chain performance of this corporate is in a good category (75). The asset management attribute is a priority for improvement because it has the lowest attribute performance value.
31	(Susanto et al., 2021)	A Batik Corporate"	The indicator consists of 25 metrics valid performance. The corporate's supply chain performance is in the average category (69.98). The reliability attribute is a priority improvement because it has the lowest attribute performance value.
32	(Miharja et al., 2020)	Borondong Industry SMEs	The indicator consists of 12 metrics valid performance. The corporate's supply chain performance is in the average category. The asset management attribute is a priority improvement because it has the lowest attribute performance value.
33	(Raga et al., 2021)	Pharmaceutical Corporate	The indicator consists of 51 metrics valid performance. The corporate's supply chain performance is in the excellent category (96.51). The cost attribute is a priority improvement because it has the lowest attribute performance value (25).

No	Paper Identity	Research Object	Result
34	(Dianawati & Zamzamy, 2021)	Automotive corporates	The indicator consists of 29 metrics valid performance. The corporate's supply chain performance is in the average category (82.14). The reliability attribute is a priority improvement.
35	(Kodrat et al., 2020)	Passion fruit agro-industry	The indicator consists of 9 metrics valid performance. The corporate's supply chain performance is in the average category (78.69). The reliability attribute is a priority improvement because it has the highest weight value (0.38).
36	(Prasetyaningsih et al., 2020)	A Plastic Corporate	The indicator consists of 28 metrics valid performance. The corporate's supply chain performance is in the average category (68.23). The reliability attribute is a priority improvement because it has the lowest attribute performance value (0).
37	(Afianto et al., 2019)	The Soybean Agroindustry	The indicator consists of 7 metrics valid performance. The corporate's supply chain performance is in a good category (85.67). The cost attribute is a priority improvement because it has the highest weight value (0.286).
38	(Putridewi et al., 2021)	the Cement Industry	The indicator consists of 18 metrics valid performance. The corporate's supply chain performance is in a good category (77). The reliability attribute is a priority improvement because it has the lowest attribute performance value (-1.93).
39	(Ramadheena et al., 2020)	At SME Tosuka Coffee	The indicator consists of 24 valid performance metrics. The corporate's supply chain performance is in a good category (86.24). Asset management attributes are a priority for improvement because they have attribute performance values lowest (4).
40	(Henry & Nusraningrum, 2020)	the leading fast-moving consumer goods (FMCG) corporates	The indicator consists of 13 metrics valid performance. The corporate's supply chain performance is in the average category (67.95). The reliability attribute is a priority improvement because it has the lowest attribute performance value (8.92).
41	(Suryaningrat et al., 2021)	Ribbed Smoke Sheet Industry	The indicator consists of 24 metrics valid performance. The corporate's supply chain performance is in a good category (72.03). The reliability and flexibility attribute is a priority improvement because it has the lowest attribute performance value (9.67).
42	(Wibowo et al., 2019)	Building construction project	The indicator consists of 4 metrics valid performance. The corporate's supply chain performance is in the marginal category (49). The reliability and responsiveness attribute is a priority improvement because it has the lowest attribute performance value.
43	(Kuswandi et al., 2018)	Leather Tanning Industry	The indicator consists of 13 metrics valid performance. The corporate's supply chain performance is in a good category (80.09). The cost attribute is a priority improvement because it has the lowest attribute performance value (11).

No	Paper Identity	Research Object	Result
44	(Taptajani et al., 2019)	Business Red Press	The indicator consists of 12 metrics valid performance. The corporate's supply chain performance is in a good category (74). The asset management attribute is a priority improvement because it has the lowest attribute performance value (60).
45	(Nuraina et al., 2021)	a dairy farmer cooperative	The indicator consists of 9 metrics valid performance. The corporate's supply chain performance is in the excellent category (98.94). The responsiveness attribute is a priority improvement because it has the lowest attribute performance value (11.73).
46	(Permata et al., 2018)	Oil Palm Biomass	The indicator consists of 13 metrics valid performance. The corporate's supply chain performance is in the average category (67.83). The reliability attribute is a priority improvement because it has the lowest attribute performance value (41.4).
47	(Adriant et al., 2021)	Defense Corporate	The indicator consists of 19 metrics valid performance. The corporate's supply chain performance is in a good category (86.54). The reliability attribute is a priority improvement.
48	(Husna et al., 2020)	the Skipjack Tuna fishing industry	The indicator consists of 18 valid performance metrics. The corporate's supply chain performance is in the average category (64.2). The cost attribute is a priority for improvement.
49	(Kusrini et al., 2019)	Sugar Corporate	The indicator consists of 45 metrics valid performance. The corporate's supply chain performance is in a good category (70.94). The asset management attribute is a priority improvement.
50	(Asrol et al., 2021)	Sugarcane Agroindustry	The indicator consists of 14 metrics valid performance. The corporate's supply chain performance is in a good category (79.01). The asset management attribute is a priority improvement because it has the highest weight value (1.26).
51	(Murumaa et al., 2021)	the Skipjack Tuna fishing industry	The research was focus on measuring customer satisfaction level which indicated through Key Performance Indicators (KPIs) for supply chain reliability improvement using The Supply Chain Operations Reference (SCOR) model. The case study was carried out in one of the companies in garmen industry. It was proposed that the model developed is adaptable to the small and medium enterprise (SMEs).
52	(Rajaratnam and Sunmola, 2021)	Sugar Corporate	COVID-19 pandemic challenges the company's strategy. especially for micro and small enterprises, there are also challenges in the supply chain system. The case study was on the airline catering supply chain organization, where supply chain performance measurement using the SCOR method can more accurately measure production and operation efficiency.

Figures 2,3,4,5,6,7, and 8 are the results of a review of 52 articles in a graphic form consisting of the year the article was published, the article publisher, the object of research, the level of supply chain performance

in industry in Indonesia, research variables, priority performance attributes that need to be improved, and the methods used in previous research.

The year of publication for the 52 articles reviewed consists of 2018-2021 for the country of Indonesia. Article publishers consist of 36 publishers, with the majority coming from IOP Conference Series: Materials Science and Engineering. The reviewed papers are mostly based on case studies in 3 types of industries, i.e. retail, manufacturing, and service industries. Some of them are categorized as micro and small industries. From those cases studies it shows that in the majority, the supply chain performance in Indonesia is in a good level of performance.

The research variables consist of 28 variables, with the majority of the 5 variables often used in the SCOR model, namely plan, source, make, deliver, and return. The performance attribute priority that needs to be improved is the reliability attribute. The method used by previous research is 17 methods consisting of Supply Chain Operations Reference (SCOR), AHP (Analytical Hierarchy Process), KPI (Key Performance Indicator), TLS (Traffic Light System), GSCM (Green Supply Chain Management), Fuzzy AHP, Lean Supply Chain, DMAIC, OMAX, SSCM (Sustainable Supply Chain Management), System Dynamics Modeling, Dematel, ANP (Analytical Network Process, IPA (Importance Performance Analysis), Fuzzy HOR, and OWA (Ordered Weighted Average). This method can be used as an illustration to see how the SCOR model can collaborate with other methods.

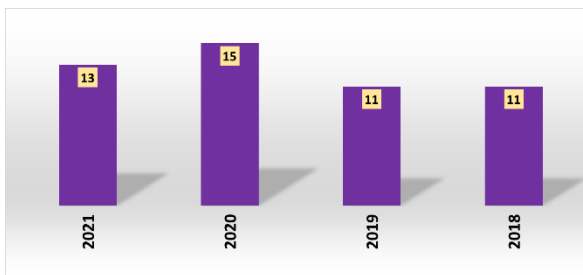


Fig 2. Year of Published

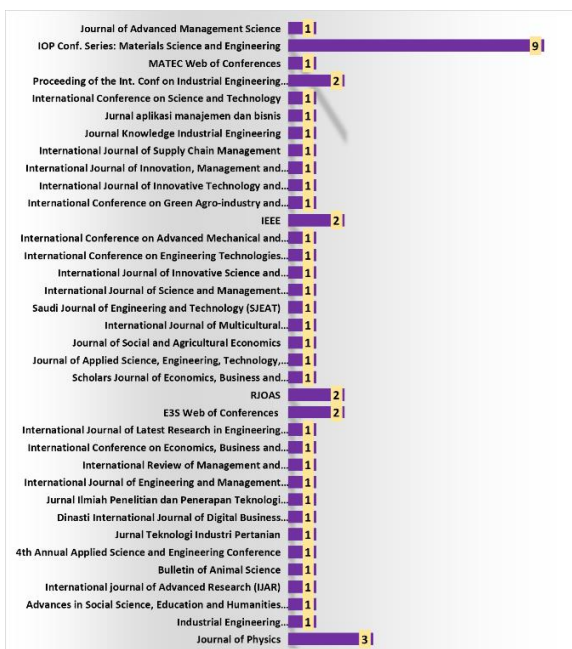


Fig 3. Research of Publisher

Based on the paper that is being reviewed, shows that the usage of the SCOR model is an effective approach for companies to identify the performance of their supply chain process. Also to determine their strategy not only for their material inventories and products distributions but also the strategy for the whole corporate business.

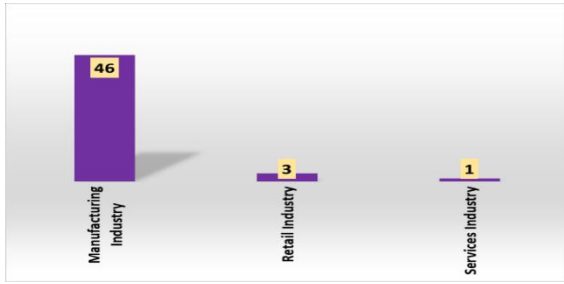


Fig 4. Object Research

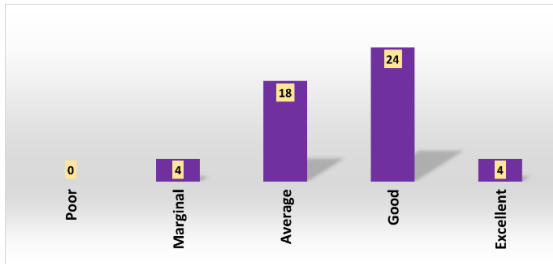


Fig 5. The Level of Performance Supply Chain in Indonesia

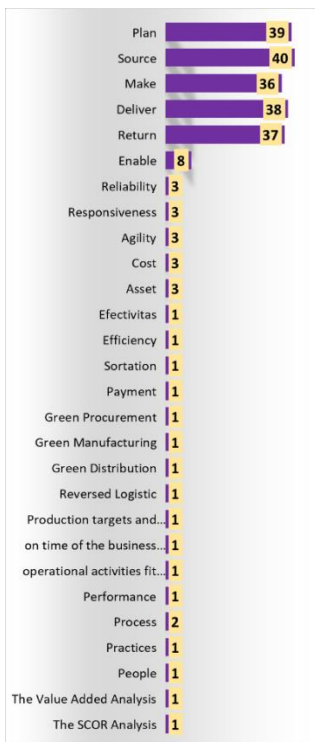


Fig 6. Variable Research

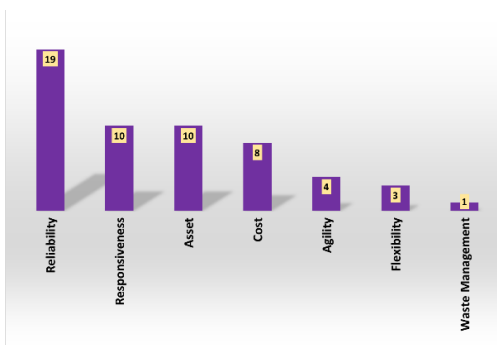


Figure 7. Priority Improvement

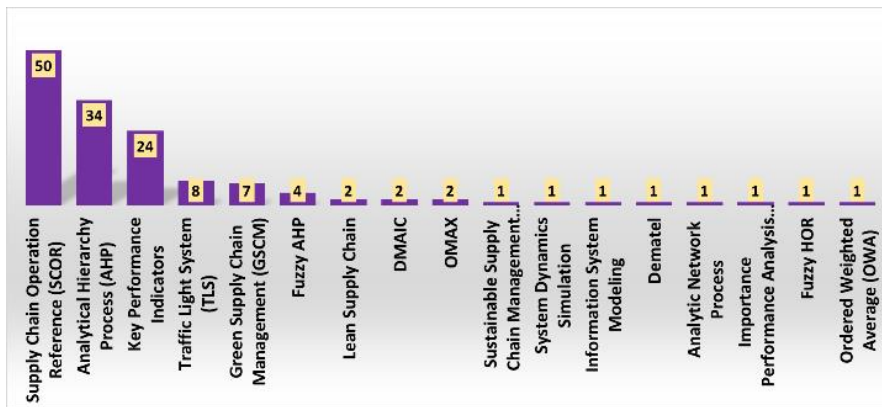


Figure 8. The Method Used in Previous Research

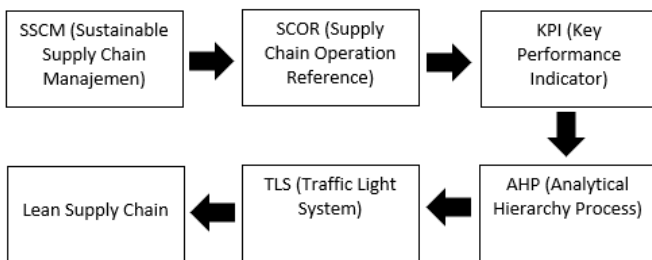


Fig. 9 Future Research Framework

This study found a research gap that can be used for further research. Results. The research is in the form of a framework regarding the application of the SCOR model that can be collaborated with other methods. The SCOR model can collaborate with SSCM (Sustainable Supply Chain Management).SSCM is the integration of sustainable financial, environmental and social aspects of an organization’s achievements through its business processes to improve its economic performance and supply chain. (Waaly et al., 2018).

Regulations and changes require the industry to implement aspects of SSCM (Sustainable Supply Chain Management). The application of SSCM requires determining the goals that the corporate wants to achieve for the application of a sustainable supply chain. Stakeholders are tasked with determining the corporate’s goals based on the corporate’s needs. The SCOR model contains a mapping of three hierarchical levels (considering sustainability aspects), namely level 1 in the form of business processes, level two in the form of attributes, and level 3 in the form of metrics.

The SCOR model produces a sustainable Key Performance Indicator (KPI) to monitor and measure the corporate’s performance in sustainable application. Sustainable KPIs are determined to measure the corporate’s achievements in implementing sustainable supply chains. Ongoing KPIs are verified to determine Valid and invalid KPIs. A valid sustainable KPI is the KPI that will be used because it is relevant to the corporate’s conditions. KPIs that can be applied in the industry are then weighted using the AHP (Analytical Hierarchy Process).

The weighting of KPIs is calculated using Snorm De Boer performance by normalizing each KPI. After knowing the performance of the corporate’s supply chain, the TLS (Traffic Light System),is used to identify KPIs that need improvement. The Traffic Light System is green for results above 80 (>80), yellow for results between 60-79, and red for results below 60 (<60). Colored lights the red flag can be used as a benchmark for KPIs that need to be improved (Sudrajat et al., 2020).The proposed improvement strategy recommendations are based on Lean Supply Chain principles. Lean can improve production processes not only on the shop floor but also in design and development by applying process rigor (Anham et al., 2019).

CONCLUSIONS

The systematic literature review in this study was to analyze the SCOR (Supply Chain Operations Reference) model practice in measuring Supply Chain Performance in several types of industries in Indonesia including micro and small industries. The results depict that the application of the SCOR model can be aligned with other methods. The SCOR model can be aligned with SSCM (Sustainable Supply Chain Management) methods, KPI (Key Performance Indicators), AHP (Analytical Hierarchy Process), TLS (Traffic Light System), and Lean Supply Chain.

Figures 2,3,4,5,6,7, and 8 are the results of a review of 52 articles in a graphic form consisting of the year the article was published, the article publisher, the object of research, the level of supply chain performance in industry in Indonesia, research variables, priority performance attributes that need to be improved, and the methods used in previous research.

The application of the SCOR model based on a literature review study showed varying results. All industries can find out how big the corporate's supply chain performance is and know the performance attributes that are priority improvements to improve supply chain performance in industries in Indonesia.

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