



## Measuring Supply Chain Performance

**Ahmad Esoud Alkhaldeh**

*Faculty of Business, Al al-Bayt University, Jordan.*

*Email: [balama1998@yahoo.com](mailto:balama1998@yahoo.com)*

### Abstract

The purpose of this study is to review the theoretical framework in performance measurement systems in the context of the supply chain. This study provides a review of the literature related to performance evaluation criteria for supply chains: indicators, challenges, and the various classifications available for them. Finally, the study results are presented, through which some key recommendations are proposed.

**Keywords:** Challenges, Performance measuring indicators, Performance measuring, Supply chain performance indicators, Supply chain.

### 1. Introduction

With the increasing intensity of competition in today's business environment, many organizations have increasingly realized that their innovative capabilities in enhancing the performance of their supply chains and partners have become an integral part of strategic success and long-term survival. Companies must regularly review performance measurement indicators to determine whether procedures and steps are being followed satisfactorily, which necessitates focusing on appropriate performance indicators for each business unit.

The importance of supply chains lies in the fact that they are an integral part of most businesses, whether commercial, industrial, or service-oriented. They are essential for the success of companies and achieving beneficiary satisfaction, in addition to reducing operational costs and improving the financial situation of the organization.

The problem of the current study lies in the performance of supply chains in business organizations today, which now face a complex environment with intense competition and increasing environmental uncertainty. Organizations are no longer the basis of competition; rather, competition has expanded to become between supply chains.

### 2. Theoretical Framework

#### 2.1. The Concept of Supply Chain Performance

Significant pressures and challenges accompanied globalization and rapid technological developments, and the intensity of competition in global markets has expanded from being centered on organizations to being between the supply chains of organizations (McCarter & Northcraft, 2007). Supply chains vary according to the industry, and we can assess a supply chain based on its performance (Chan, 2003). The concept of supply chains emerged in the 1960s (Sosa et al., 2019, 11). Stevens (1989) defined the supply chain as a series of interconnected activities related to the planning, coordination, and control of materials, starting from raw materials until they reach the customer as a product. The supply chain is defined as all parties involved, directly or indirectly, in achieving customer satisfaction. The supply chain includes not only the manufacturing organization and suppliers but also transportation organizations, warehouses, retailers, and even the customers themselves (Chopra et al., 2013, 1). Today, supply chains have become an important aspect of competitiveness; this has necessitated increased attention from business organizations to evaluate and track supply chain performance to prevent failure or weakness in achieving their strategic goals (Sosa et al., 2019, 69). With the beginning of the third millennium, interest in supply chain practices and the trend towards linking them to performance dimensions has increased (Abu Khashabah, 2019). Organizations use performance measurement to determine whether tasks or activities have achieved their objectives. In short, performance can be described as a measure of the success and failure of all tasks, including productivity and profitability (Lee et al., 2022).

Supply chain performance is defined as the results of the supply chain's ability to meet the desires of the end consumer and to efficiently convey consumer desires (Hong et al., 2019). Zhou and Benton (2007) define it as the actions taken by the supply chain that extend to fulfilling the demands of the end customer. Because the supply chain focuses on managing operations both inside and outside the organization, its performance measurement is essential for controlling and ensuring the effectiveness of operations (Olugu & Wong, 2009). To maintain continuous oversight from the organization and ensure the integrity and performance level of its supply chains, performance measurement is necessary. Many studies, such as Chan (2003), emphasize that performance measurement is information or feedback regarding activities related to meeting customer expectations and

achieving strategic objectives. At the same time, it reflects the need for improvement in underperforming processes, which will positively impact quality efficiency.

The researcher believes, based on the above, that evaluating supply chain performance is closely related to efficiency and effectiveness, and that it is a necessary and ongoing process to ensure that objectives are met and to understand customer needs and desires. Furthermore, evaluation is one of the elements of continuous improvement sought by today's business organizations.

### *2.2. The Importance of Measuring Supply Chain Performance*

Performance measurement systems are an integral part of any organization's operations, and their good performance depends on the selection of measurement indicators, which often represent a challenge in many organizations. Therefore, assessing the effectiveness and efficiency of the supply chain means linking performance indicators to performance goals, such as costs, agility, flexibility, sustainability, reliability, commitment, cooperation, and integration (Sosa et al., 2019, 84). Regardless of the organization, whether service-oriented or industrial, it needs to evaluate the performance of its supply chains and design its supply chains to support the competitive priorities of its services or products, which can only be achieved by ensuring two characteristics of those chains: efficiency and responsiveness (Efficient supply chains and responsive supply chains). One of the potential reasons for the failure of supply chains is that managers do not understand the nature of the demand for their services or products, making it obvious that designing supply chains that cannot meet those demands is ineffective (Krajewski & Malhotra, 2022, 537).

Ahi and Searcy (2015) argue that performance measurement allows organizations to control progress and monitor the implementation of their goals, highlight achievements, better understand key processes, anticipate potential problems, and identify opportunities and improvement actions. A study by Azim et al. (2015) emphasized the importance of performance measurement as a means to sustain organizational control and ensure the implementation of the organization's strategies that lead to achieving its overall goals and objectives. This means that measuring the performance of supply chains also allows for identifying all existing gaps in the chain, as well as determining ways to address them and monitoring the implementation of proposed remedies and recommendations until the planned goals are achieved.

### *2.3. Principles of Measuring Supply Chain Performance*

Many studies have addressed the general principles of performance measurement (Gunasekaran et al., 2001; 2004; Sillanpää & Kess, 2012; Agami et al., 2012). While Adams et al. (1995) reached a set of necessary requirements for measuring performance

- The metrics should be derived in alignment with the organization's strategy: The ability of the performance measurement system to clearly convey the strategy throughout the organization is a critical factor in determining business success.
- Performance metrics should respond to developments in business activities and processes.
- Performance metrics should be dynamic: the ability to keep pace with changes in strategies, processes, and the competitive environment of the organization.
- The metrics should have a team-based approach: the team must include individuals responsible for the activities to be measured.

The study of Gunasekaran et al. (2001; 2004) emphasized the need for the performance measure to embody the essence of organizational performance, and that the performance measurement system facilitates the selection of the most appropriate measure, and that the measurement system balances performance between financial and non-financial indicators. The study by Quraishi and Bouabdallah (2022) addressed two main principles in performance measurement: that the system should be understood by all employees, and that there should be incentives for good performance. Al-Kawashi (2015) emphasized the necessity for performance indicators to be accurate, truthful, easy to understand, measure, and represent, and available at a reasonable cost. The study by Akyuz and Erkan (2010) pointed out important requirements for a supply chain performance measurement system, most notably that it should be capable of accurately measuring partnership, collaboration, agility, flexibility, information, and productivity at a lower cost, be valid and reliable, simple and easy to use, and linked to strategic, tactical, and operational levels for decision-making.

### *2.4. Difficulties In Measuring Supply Chain Performance*

The study by Lee and Billington (1992) concluded that measuring supply chain performance is difficult and that there is no perfect metric. While the issue of evaluating and assessing performance may seem simple theoretically, it is actually quite complex in practice, due to the numerous evaluation indicators adopted by organizations (Al-Kawashi, 2015), as well as the various stakeholders involved (shareholders, workers, customers, suppliers, etc.) (Beamon, 1998). One of the greatest difficulties is choosing the appropriate method for supply chain performance for two reasons: one is that flaws in evaluation will lead to high costs, and the other is that many performance indicators in measuring supply chains are qualitative rather than quantitative, such as quality, flexibility, and satisfaction levels, which are subject to judgment and personal opinion, thus affecting the assessment of supply chain performance (Chan, 2003).

The study conducted by Gunasekaran et al. (2004) mentioned that SCM plays a significant role in gaining a competitive advantage to enhance organizational productivity and profitability; therefore, it is essential to have an effective performance measurement. The study confirmed that currently, many organizations continually neglect continuous improvement in the supply chain. One reason for the poor performance of organizations' supply chains is primarily due to the failure to identify metrics and performance indicators for supply chains, which is a challenge in itself due to its importance and the resulting negative or positive outcomes. On his part, Ambe (2014) summarized, as shown in table 1, a set of difficulties in identifying performance indicators for supply chains.

**Table 1.** Difficulty in Defining and Collating What Supply Chain Indicators Are

<b>Difficulty</b>	<b>Description of Difficulty</b>
View of SCM	<ul style="list-style-type: none"> <li>• Performance measurements had not viewed supply chain as a whole entity</li> <li>• It is difficult to evaluate performance with multiple inputs and outputs to a system</li> </ul>
Focus of Measures	<ul style="list-style-type: none"> <li>• Organisation focuses on traditional financial measures despite the need to provide a balanced approach to performance measurement</li> <li>• Too much reliance on the use of costs as a primary indicator</li> </ul>
Complexities in Categorisation	<ul style="list-style-type: none"> <li>• Complexity of supply chain metrics</li> <li>• Disagreement over an appropriate categorisation</li> </ul>
Lack of a Balanced Approach	<ul style="list-style-type: none"> <li>• Lack of a balanced approach to integrate financial and non-financial measures</li> <li>• Lack of a system thinking</li> <li>• Absence of an approach for developing and designing supply chain performance measures</li> </ul>
Orientation	<ul style="list-style-type: none"> <li>• Measures tend to be historically oriented and not focused on providing a forward-looking perspective</li> </ul>
Strategic Nature and Alignment	<ul style="list-style-type: none"> <li>• Measures do not relate to important strategic, non-financial performance, like customer service/loyalty and product quality</li> <li>• Measures do not directly link to operational effectiveness and efficiency</li> </ul>

Some difficulties arise in performance measurement due to complexities, some of which are technical (the difficulty of understanding and controlling dynamic characteristics, and the multiple contextual forms of performance) and others are social (the difficulty of reaching a consensus on the concept of performance, its dimensions, and its measurement) (Quraishi and Bouabdallah, 2022). In the same context, Panayides et al. (2018) see that the greatest challenge in measuring logistics performance is in areas where goods are at risk or where there is a high level of uncertainty.

The researcher believes that despite the difficulties faced in the performance measurement of supply chains, this does not diminish the importance of performance measurement as both an evaluative and improvement tool, in line with the famous saying, "What cannot be measured cannot be improved." Organizations should adopt both financial and non-financial performance indicators to clearly and accurately reflect overall performance. Furthermore, the success of the performance measurement task depends on the accuracy and appropriateness of the selected indicators, as well as their measurability and calculability to achieve the desired purpose.

*2.5. Supply Chain Performance Metrics*

It is evident in theoretical literature that performance measurement standards evolve in both scope and significance. For example, there is a shift in focus from traditional cost accounting methods to techniques that consider the cost of activities and their impact on other functions such as customer service, asset utilization, productivity, and quality, in order to emphasize the overall performance of the supply chain (Gunasekaran et al., 2001). Traditionally, performance metrics were based on price differences, rejected materials upon receipt, and on-time delivery, and they remained for many years. The selection and trade-off process was primarily based on price competition, with less attention paid to other standards such as quality and reliability. Recently, the approach to evaluation and performance measurement has undergone a radical change (Gunasekaran et al., 2004).

Performance metrics for supply chains have evolved in two phases: the first phase, which is temporally linked to the period before the 1980s, focused on financial indicators such as profitability and return on investment. These quantitative measures were insufficient to assess supply chain performance, as they overlooked non-financial (intangible) aspects such as customer satisfaction, the time value of time, and opportunity costs (Sosa et al., 2019, 73; Tan, 2002). The second phase began in the late 1980s as a result of changes in the global market. This phase focused on intangible metrics dominated by a strategic approach, coinciding with the emergence of new management concepts such as Total Quality Management (TQM), Supply Chain Management (SCM), Just-In-Time (JIT) production, Flexible Manufacturing Systems (FMS), and Optimal Production Technology (OPT) (Ghalayini & Noble, 1996).

Researchers have differing views on the dimensions of measuring supply chain performance. Some categorize them into qualitative indicators (quality, flexibility, visibility) and quantitative indicators (innovation, costs, resource utilization) (Beamon, 1998; Chan, 2003). Some studies have adopted measuring supply chain performance through efficiency and effectiveness (Adaileh et al., 2022; Abu Nimeh et al., 2018; Abdallah et al., 2014), while others classified them into financial metrics (productivity and production costs) and non-financial metrics (quality, flexibility, time) (Toni & Tonchia, 2001). The study by Abdallah et al. (2021) adopted eight dimensions for performance measurement: quality, cost, flexibility, shipping, responsiveness, lead time, and market access. The study by Abu Difallah and Al-Sha'ar (2017) used four dimensions to measure supply chain performance, represented by responsiveness and collaboration, economic cost, consumer satisfaction, and supplier relationships.

Later, models for measuring supply chain performance emerged, such as the Supply Chain Operations Reference (SCOR) model, the Balanced Scorecard model, and the Analytic Hierarchy Process (AHP) model (Saleheen et al., 2018). Reddy et al. (2019) found in their critical study of the literature on performance measurement, which covered more than 450 studies focused on measuring supply chain performance from 1998 to 2018, that the most widely used performance measurement model was the Balanced Scorecard (BSC), which constituted 35% of the studies, followed by the Supply Chain Operations Reference model (SCOR), as shown in Figure 1.

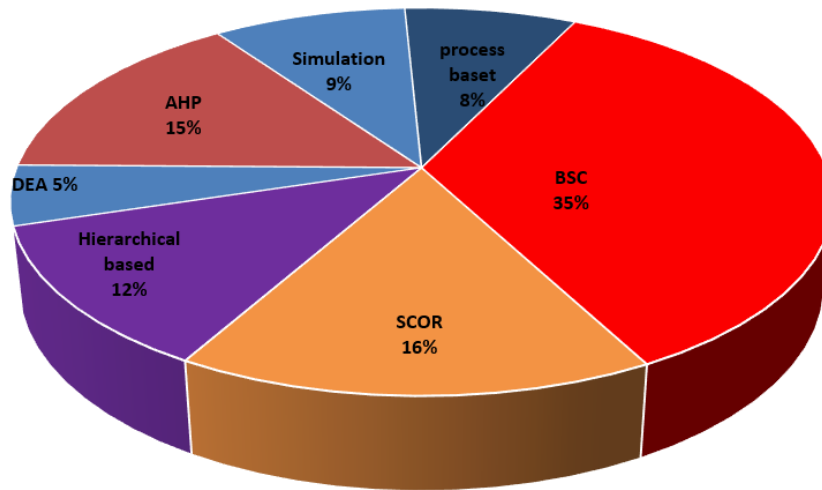


Figure 1. Classification of researchers according to supply chain performance metrics.

The study by Gunasekaran et al. (2001) proposed indicators for measuring supply chain performance according to strategic, tactical, and operational levels. Meanwhile, the study by Le (2020) addressed two dimensions for measuring supply chain performance: financial efficiency and environmental efficiency. Customer satisfaction is of utmost importance in modern supply chains, and good service must be provided to any customer. A supply chain strategy cannot be considered effective without a satisfied customer. This emphasizes that supply chain performance measures should be based on customer satisfaction (Gunasekaran et al., 2001). As is well known, there is no perfect measure for supply chain performance (Lee & Billington, 1992).

The study by Gunasekaran and Kobu (2007) identified nearly 90 indicators for measuring supply chain performance. This is clearly demonstrated through the review of numerous studies that adopted various measures, which have evolved and diversified over the past decades, focusing initially on financial and quantitative measures, and later adopting non-financial and qualitative measures. The most important of these metrics are:

First: Efficiency and Effectiveness Measure

Despite the diversity and variety of writings that have addressed performance measurement, the performance concept presented by Anthony (1965) with its two dimensions of efficiency and effectiveness is the most widely circulated and accepted (Qureshi and Abdullah, 2022). The concept of supply chain performance refers to the level of efficiency and effectiveness in achieving tasks related to supply chain objectives (Mentzer & Konrad, 1991; Neely, 2007, 135), where effectiveness refers to the extent to which planned goals are achieved, while efficiency pertains to how resources are utilized (Lai et al., 2002).

Second: Balanced Scorecard (BSC)

This model was developed in 1996 by Kaplan and Norton as a tool for measuring organizational performance in both financial and non-financial aspects. The scorecard translates the organization's vision and strategies into objectives and includes four perspectives: financial perspective, customer perspective, internal processes perspective, and learning and growth perspective (Kaplan and Norton, 1996). The Balanced Scorecard has gained acceptance as a measurement tool and has extended to the evaluation of supply chain performance, with an increase in scholarly papers on this explicitly in recent years (Sousa et al., 2020).

Third: Supply Chain Operations Reference Model (SCOR)

This model is considered a benchmark for evaluating and improving supply chain management at the organizational level. It was introduced in 1996 by the Supply Chain Council (SCC) and includes five dimensions: reliability, responsiveness, flexibility, cost, and asset management. This model provides a standardized framework for analyzing, designing, and improving supply chains. It consists of a set of key processes that include: plan, source, make, deliver, and return (Manay et al., 2022; Santoso & Heryanto, 2022; Wong & Wong, 2008). Recently, some studies have added two new dimensions to the model: Information Systems and Digital Technology in response to globalization (Ayyildiz & Gumus, 2021).

Fourth: Analytic Hierarchy Process (AHP)

It is one of the multi-criteria decision models developed by Saaty in 1970 and is classified among the quantitative mathematical indicators used when measuring supply chain performance. The AHP method is based on multi-criteria analytical comparisons and helps managers make appropriate decisions regarding the monitoring and analysis of supply chain performance results, thereby improving future performance. Especially since performance measurement processes in the twenty-first century rely on forecasting and making future estimates to measure performance (Al-Danaf, 2022; Aqasim & Laraj, 2015).

Fifth: According to the levels

Gunasekaran et al. (2001) presented a review in the theoretical literature on supply chain performance measures, proposing performance dimensions at three levels: the strategic level, the tactical level, and the operational level, with each level having financial metrics and non-financial metrics. Some have classified them into quantitative and qualitative measures, financial and non-financial, and according to competitive priorities such as quality, cost, delivery, flexibility, and others.

### 3. Conclusions

The researchers in the literature on supply chain performance identified several challenges related to the assessment and evaluation of supply chain performance. They considered the evaluation of supply chain performance to be particularly difficult due to the inclusion of many components such as suppliers, manufacturers, wholesalers, retailers, and customers. Additionally, the researchers noted that evaluating supply chain performance



is one of the critical issues, especially with the difficulty of maintaining customer satisfaction due to competition and rapid changes in markets and business environments.

There is no agreement on a unified definition of performance metrics, as there is a discrepancy among researchers and thinkers regarding the indicators and criteria that can be used to measurement the performance of supply chain.

The researcher sees, after this extensive induction on supply chain performance measures, that there is no comprehensive, complete measure and that performance measures are diverse and multiple, with no single measure capable of addressing all aspects related to performance. It is necessary that when choosing a performance measure, it should fit the nature of the organization's work, whether it is service-oriented or production-oriented.

#### 4. Recommendations

Based on the results obtained, the following recommendations can be made:

- The necessity of using non-financial indicators alongside financial indicators, and linking them together in a comprehensive and integrated system to evaluate the performance of supply chain management;
- The necessity of publishing supply chain management reports and evaluating their performance through public seminars and conferences, while urging universities to teach a course titled Supply Chain Management, and addressing indicators, systems, and models for evaluating the performance of modern supply chain management;
- Focusing on the alignment of performance evaluation indicators for supply chain management with the activities and specificities of the supply chain and the organization in general.

#### References

- McCarter, M., & Northcraft, G. (2007). Happy together? Insights and implications of viewing managed supply chains as a social dilemma. *Journal of Operations Management*, 25(2), 498–511. <https://doi.org/10.1016/j.jom.2006.05.005>
- Chan, F. (2003). Performance measurement in a supply chain. *The International Journal of Advanced Manufacturing Technology*, 21(7), 534–548.
- Stevens, G. C. (1989). Integrating the supply chain. *International Journal of Physical Distribution & Materials Management*, 19(8), 3–8.
- Chopra, S., Meindl, P., & Kalra, D. (2013). *Supply Chain Management: Strategy, Planning, and Operation* (6th ed.). Pearson Education.
- Sosa, L., Alcaraz, J., & Macías, A. (2019). *Evaluation of Supply Chain Performance: A Manufacturing Industry Approach*. Springer International Publishing.
- Abu Khashabah, M. (2019). The mediating role of sustainable supply chain practices in improving the environmental and financial performance of the organization: An application on a sample of Egyptian industrial organizations. *Alexandria University Journal of Administrative Sciences*, 3(56), 123–152.
- Lee, K., Romzi, P., Hanaysha, J., Alzoubi, H., & Alshurideh, M. (2022). Investigating the impact of benefits and challenges of IoT adoption on supply chain performance and organizational performance: An empirical study in Malaysia. *Uncertain Supply Chain Management*, 10(2), 537–550.
- Hong, J., Liao, Y., Zhang, Y., & Yu, Z. (2019). The effect of supply chain quality management practices and capabilities on operational and innovation performance: Evidence from Chinese manufacturers. *International Journal of Production Economics*, 212, 227–235. <https://doi.org/10.1016/j.ijpe.2019.01.036>
- Zhou, H., & Benton, W. (2007). Supply chain practice and information sharing. *Journal of Operations Management*, 25(6), 1348–1365. <https://doi.org/10.1016/j.jom.2007.01.009>
- Olugu, E., & Wong, K. (2009). Supply chain performance evaluation: Trends and challenges. *American Journal of Engineering and Applied Sciences*, 2(1), 202–211.
- Krajewski, L., & Malhotra, M. (2022). *Operations Management: Processes and Supply Chains* (13th ed.). Pearson Education.
- Ahi, P., & Searcy, C. (2015). An analysis of metrics used to measure performance in green and sustainable supply chains. *Journal of Cleaner Production*, 86, 360–377. <https://doi.org/10.1016/j.jclepro.2014.08.005>
- Azim, M., Ahmed, H., & Khan, S. (2015). Operational performance and profitability: An empirical study on the Bangladeshi ceramic companies. *International Journal of Entrepreneurship and Development Studies*, 3(1), 63–73.
- 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.
- Gunasekaran, A., Patel, C., & McGaughey, E. (2004). A framework for supply chain performance measurement. *International Journal of Production Economics*, 87(3), 333–347. <https://doi.org/10.1016/j.ijpe.2003.08.003>
- Sillanpää, I., & Kess, P. (2012). The literature review of supply chain performance measurement in the manufacturing industry. *Management and Production Engineering Review*, 3, 79–88.
- Agami, N., Saleh, M., & Rasmay, M. (2012). Supply chain performance measurement approaches: Review and classification. *Journal of Organizational Management Studies*, 1–20. <https://doi.org/10.5171/2012.872753>
- Adams, S., Sarkis, J., & Liles, D. (1995). The development of strategic performance metrics. *Engineering Management Journal*, 7(1), 24–32. <https://doi.org/10.1080/10429247.1995.11414823>
- Quraishi, H., & Bouabdallah, S. (2022). Performance evaluation of supply chain management: An exploratory study of performance evaluation indicators. *Journal of Economic and Administrative Research*, 16(1), 219–238.
- Al-Kawashi, M. (2015). The forms of financial and non-financial indicators for evaluating the performance of institutions. *Administrative Studies*, 8(15), 81–109.
- Akyuz, A., & Erkan, E. (2010). Supply chain performance measurement: A literature review. *International Journal of Production Research*, 48(17), 5137–5155. <https://doi.org/10.1080/00207540903089536>
- Lee, H., & Billington, C. (1992). Managing supply chain inventory: Pitfalls and opportunities. *MIT Sloan Management Review*, 65–73.
- Beamon, B. (1998). Supply chain design and analysis: Models and methods. *International Journal of Production Economics*, 55(3), 281–294.
- Ambe, I. (2014). Key indicators for optimizing supply chain performance: The case of light vehicle manufacturers in South Africa. *Journal of Applied Business Research*, 30(1), 277–290.
- Panayides, P., Borch, O., & Henk, A. (2018). Measurement challenges of supply chain performance in complex shipping environments. *Maritime Business Review*, 3(4), 431–448. <https://doi.org/10.1108/MABR-07-2018-0021>
- Tan, K. (2002). Supply chain management: Practices, concerns, and performance issues. *Journal of Supply Chain Management*, 38(4), 42–53.
- Ghalayini, A., & Noble, J. (1996). The changing basis of performance measurement. *International Journal of Operations & Production Management*, 16(8), 63–80.
- Adaileh, M., Alrwashdeh, M., Abu Alzeat, H., & Almatarneh, N. (2022). The antecedents of supply chain performance: Business analytics, business process orientation, and information systems support. *Uncertain Supply Chain Management*, 10(2), 399–408. <https://doi.org/10.5267/j.uscm.2021.12.012>
- Nimeh, H., Abdallah, A., & Sweis, R. (2018). Lean supply chain management practices and performance: Empirical evidence from manufacturing companies. *International Journal of Supply Chain Management*, 7(1), 1–15.
- Abdallah, A., Obeidat, B., & Aqqad, N. (2014). The impact of supply chain management practices on supply chain performance in Jordan: The moderating effect of competitive intensity. *International Business Research*, 7(3), 13–27. <https://doi.org/10.5539/ibr.v7n3p13>

- Toni, A., & Tonchia, S. (2001). Performance measurement systems – Models, characteristics, and measures. *International Journal of Operations & Production Management*, 21(1/2), 46–71. <https://doi.org/10.1108/01443570110358459>
- Abdallah, A., Rawadiah, O., Al-Byati, W., & Alhyari, S. (2021). Supply chain integration and export performance: The mediating role of supply chain performance. *International Journal of Productivity and Performance Management*, 70(7), 1907–1929. <https://doi.org/10.1108/IJPPM-02-2021-0076>
- Abu-Difallah, M., & Al-Sha'ar, I. (2017). The impact of enterprise resource planning (ERP) systems on supply chain performance: An applied study on the Jordanian pharmaceutical companies. *Jordan Journal of Business Administration*, 13(2), 281–306.
- Saleheen, F., Habib, M., & Hanafi, Z. (2018). Supply chain performance measurement model: A literature review. *International Journal of Supply Chain Management*, 7(3), 70–78.
- Reddy, J., Rao, N., & Krishnanand, L. (2019). A review on supply chain performance measurement systems. *Procedia Manufacturing*, 30, 40–47. <https://doi.org/10.1016/j.promfg.2019.02.007>
- Le, T. (2020). Performance measures and metrics in a supply chain environment. *Uncertain Supply Chain Management*, 8(1), 93–104. <https://doi.org/10.5267/j.uscm.2019.8.003>
- Gunasekaran, A., & Kobu, B. (2007). Performance measures and metrics in logistics and supply chain management: A review of recent literature (1995–2004) for research and applications. *International Journal of Production Research*, 45(12), 2819–
- Anthony, R. (1965). *Planning and control systems: A framework for analysis*. Harvard University.
- Mentzer, J., & Konrad, B. (1991). An efficiency/effectiveness approach to logistics performance analysis. *Journal of Business Logistics*, 12(1), 33–62.
- Neely, A. (2007). *Business performance measurement: Unifying theories and integrating practice* (2nd ed.). Cambridge University Press.
- Lai, K., Ngai, E., & Cheng, T. (2002). Measures for evaluating supply chain performance in transport logistics. *Transportation Research Part E: Logistics and Transportation Review*, 38(6), 439–456. [https://doi.org/10.1016/s1366-5545\(02\)00019-4](https://doi.org/10.1016/s1366-5545(02)00019-4)
- Kaplan, R. S., & Norton, D. P. (1996). Using the balanced scorecard as a strategic management system. *Harvard Business Review*.
- Mañay, R., Pradas, I., & Perez, I. (2022). Measuring the supply chain performance of the floricultural sector using the SCOR model and a multicriteria decision-making method. *Horticulturae*, 8(168), 1–19.
- Santoso, S., & Heryanto, R. (2022). Green Supply Chain Performance Measurement using Green SCOR Model in Agriculture Industry: A Case Study. *Jurnal Teknik Industri*, 24(1), 53–60.
- Wong, W., & 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>
- Ayyildiz, E., & Gumus, A. (2021). Interval-valued Pythagorean fuzzy AHP method-based supply chain performance evaluation by a new extension of SCOR model: SCOR 4.0. *Complex & Intelligent Systems*, 7(1), 559–576. <https://doi.org/10.1007/s40747-020-00221-9>
- Al-Danaf, M. (2022). Towards building an index for measuring supply chain performance of the organization through the integration of the reference framework for supply chain operations and the hierarchical analysis method: A case study. *Alexandria University Journal of Administrative Sciences*, 59(3), 267–316.
- Aqasim, O., & Laraj, N. (2015). An analytical study of indicators and models for measuring the performance and effectiveness of the supply chain. *Economic and Administrative Research*, 18, 197–214.