

An Empirical Exploration of Supply Chain Performance Evaluation Models Used by the Moroccan Industrial Sector

El Gharbaoui Mohammed,

PhD student, Laboratory of Management Sciences, ENCG Kenitra,
Ibn Tofail University, Morocco

Doi:10.19044/esj.2020.v16n10p331 [URL:http://dx.doi.org/10.19044/esj.2020.v16n10p331](http://dx.doi.org/10.19044/esj.2020.v16n10p331)

Abstract

The search for performance is a continuous process and a natural need for survival for each organization or company, taking into account the constraints linked, in particular, to globalization and the competitiveness of markets. Performance and its evaluation can be considered as necessary conditions for the success of an organization, they constitute a field of research oriented by a strong demand from practitioners to develop best practices to improve the overall performance of the company. Supply Chain Management is a key strategic factor in rising corporate success in a global economy, challenging and complex climate. As consequence, supply chain performance evaluation has become one of the most interesting research areas focused on providing guidance to practitioners in selecting the appropriate performance model for the supply chain management. This article presents the results of the questionnaire survey, which aimed at identifying the most relevant supply chain performance assessment models used by the Moroccan industrial sector. To achieve the main propose of this study, the methodology used includes an empirical survey analysis using a questionnaire and statistical tools. The empirical survey was conducted among a sample of 120 Moroccan industrial companies during October, November and December 2019. Data gathered through an e-mail survey, face-to-face interviews and telephone interviews to approach companies by using a structured questionnaire. This study follows the design survey research methodology. Thus, we initially approach the selection and presentation of the adopted methods. Then, we present the sample selection phase, the mode of questionnaire administration and the data collection, and finally, the interpretation of research results. The findings showed that the lack of unanimity among Moroccan industrial companies on the appropriate approach to assessing supply chain performance, justified by the complexity of their own supply chains as organizational configurations, coupled with the complexity of their management approaches.

Keywords: Moroccan industrial sector, questionnaire survey, supply chain, performance evaluation models

Introduction

Supply chain management plays a strategic role in the process of achieving performance for any company. Thus, the evaluation of supply chain performance provides the necessary and useful information for managers at the strategic, tactical and operational levels to assess the company's level of performance and identify the levers for its improvement.

In the early 1990s, (Lee and Billington, 1992) asserted that no model for assessing supply chain performance had existed, performance assessment was primarily focused on a single process or organization, but gradually, (Beamon, 1998) stated that the emphasis shifted to assessing the performance of the entire supply chain as a system of interdependent activities. Today, there are varieties of models that take into account the specificity of the supply chain (Rafele, 2004).

Recent research in the field of supply chain management is increasingly focused on performance based on the belief that to evaluate is to manage. Over the last twenty-five years, (Ravelomanantsoa et al., 2018) state that there have been more than thirty-five performance evaluation approaches developed by researchers and practitioners.

A continuous quest for performance that started by looking for models, systems and methods to first assess it and locate the drivers of supply chain performance later on and finally decide on good supply chain management practices that can ensure continuous performance improvement and value creation.

Therefore, supply chain performance models have been used in recent research studies (e.g. (Estampe et al., 2013); (Kusrini et al., 2014); (Hugos, 2018)). Several different types of measurement systems are proposed, such as Balanced Scorecard (BSC), Supply Chain Operations Resource (SCOR[®]), Global Supply Chain Forum (GSCF).

While there is a large amount of published literature explaining supply chain performance, there is a relative lack of empiric studies examining supply chain performance practises (Swanson et al., 2018). For that reason, this work embraces the long path of research on supply chain performance through the identification and analysis of the practices exercised by Moroccan companies in the evaluation of supply chain performance.

Research Framework

This research follows the quantitative approach, i.e., the questionnaire survey. The aim is therefore to provide insight into the practices of Moroccan industrial companies in the area of supply chain performance management.

The purpose of this exploratory survey research is to collect unavailable basic information on a certain phenomenon or issue, on the basis of which it would be possible to formulate a hypothesis and tests it at a later date (Gimenez, 2004). This study is preliminary research used to explore basic issues of the supply chain in the Moroccan industrial context.

The research question guiding the present study evaluates, how Moroccan industrial companies manage the performance of their supply chains? The two most important research opportunities (sub-research questions) for this study evaluates, which models used in the Moroccan industrial sector to evaluate the supply chain performance?, and what are the key factors in evaluating the performance of the supply chain in the Moroccan industrial sector?

Thus, the hypothesis for this study is that Moroccan industrial companies are deploying practices to assess the performance of their supply chains as some use globally known reference models and others are developing their own methods. Moreover, the evaluation of supply chain performance can be based on three main perspectives: 1. Resource measures (usually costs) 2. Output measures (usually responsiveness of the customer) and 3. Flexibility (ability to respond to changing environments) measures.

To examine the research question of this study, a survey method is chosen rather than a case study method, because while case study research is used to explore definitions, to generate hypotheses and to examine a phenomenon in-depth, but not to generalize, survey research allows hypotheses to be tested and typically allows findings to be generalized from the sample to the population and to construct a theory (Kotzab, 2005). Figure 1 provides an overview of the research process.

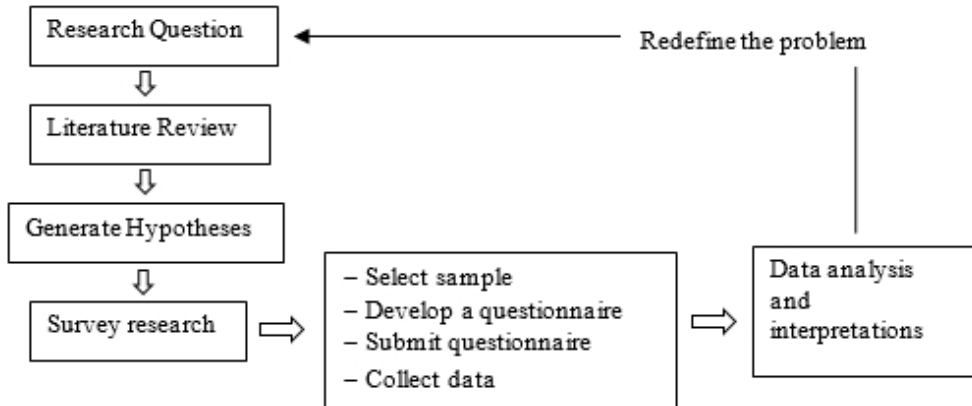


Figure 1: Research process

This paper is prescribed as follows. This segment acts as an introduction guide to supply chain performance evaluation. The requirement of research methodology in the next section. The results and discussion will be reported in the third section. In the last sections of this article, the conclusion will be presented.

The Requirement of the Empirical Study

In recent years the supply chain management field has changed significantly. However, questions of how empirical research should be conducted are rarely addressed (Seuring et al., 2005).

This empirical study is carried out using the following steps:

1. Measuring instrument construction
2. Sample Selection of the base population
3. Design and develop the questionnaire
4. Submit questionnaire
5. Data collection
6. Data analysis and interpretations

Measuring instrument construction

The data collection method chosen for this study is the questionnaire. The questionnaire is the tool for collecting, recording, and storing information. This type of method is generally associated with exploratory and descriptive research, which is also the methods that have been adopted in most of the studies reviewed on supply chain management (Kotzab, 2005). The aim of explorative research is to obtain information on a phenomenon, to find new ideas and potential research problems. Existing information is collected and sorted out in exploratory research. The objective of descriptive research is to

provide as accurate an image as possible of an individual, a group, a situation, or a phenomenon. The research focuses not on the clarification of the connections between phenomena or factors interpreting behaviour but only on the description of a situation (Baumard and Ibert, 2014).

As a data collection method, the questionnaire survey offers a multitude of advantages including

- Rapidity, flexibility, high degree of objectivity regarding the ability to access information that is not directly observable such as demographic information, attitudes, opinions and practices (Churchill and Iacobucci 2005).
- In our case, large amounts of information can be collected from a large number of companies over a short period of time and in a relatively cost-effective manner.
- In our case, the results of the questionnaires can usually be quantified quickly and easily either by a researcher or by using a software package.
- Once data has been quantified, it can be used to compare and contrast with other research and can be used to assess progress (Ackroyd and Hughes, 1981).

Sample Selection of the target population

Sampling plays a key role in the investigation of the phenomenon under exploration. This requires choosing, according to predefined parameters, a certain number of individuals from among those making up a defined set, in order to carry out measurements or observations on them, which will make it possible to generalize the findings to the first set.

The description of the target population is essential in order to produce clear results. In our case, the target population of the study consists of Moroccan industrial companies. This definition gives rise to two conditions for the collection of our sample: Companies operating in the industrial sector and those operating in the territory of Morocco and legally defined under the Moroccan legal framework.

The target population list was determined by compiling data obtained from several sources including the Ministry of Industry, the Ministry of Economy and Finance, the Regional Investment Centre of the Rabat-Salé-Kénitra zone and the Regional Investment Centre of the Tangier Tetouan Al Hoceima zone.

After determining the requirements for defining the population of our case, we will select a sample from the companies in our possession in the list using sampling techniques that can be divided into two types: Probability samples or non-probability sampling (Roussel, 2005).

As the objective of this article is not to generalize the results but to understand the practices used by companies in assessing supply chain performance, the non-probability sampling technique is used to draw from the target company’s list located in two free economic zone (Figure 1): The Tanger-Free Zone (Over 400 companies) and the Atlantic free Zone (21 companies).



Figure 2: The Atlantic and Tanger Free zone’s
(from <http://www.zonesindustrielles.ma/fiche-zone>)

According to (DEPF, 2019), the Tanger Tetouan al-Houceima region, which hosts the Tanger-Free Zone, is the second-largest contributor to the creation of industrial added value in Morocco and the region ranks second in terms of export volume, accounting for 25% of national industrial exports in 2013. The Rabat Sale Kénitra region, which hosts the Tanger-free zone, is the second-largest economic power in Morocco with a contribution of 15.2% of Gross Domestic Product (GDP) in 2017, representing 3% of the national industrial manufacturing.

Referring to the different studies in the literature review (De Beuckelaer and Wagner, 2012), the sample size is a maximum of 110 units in supply chain management research where the theoretical aspect is dominant. The probability sampling technique is used to randomize the core sample of the survey, so a sample of 120 units is slightly above the usual recommendations concerning the minimum sample size to be used.

Design and develop the questionnaire

The main objective of this study is to explore the use of supply chain performance assessment models by industrial enterprises in Morocco.

To achieve such an objective, a bibliography has been compiled on the basis of the work carried out by [(Lambert and Pohlen, 2001), (Chan, 2003), (Huang et al., 2004), (Gunasekaran and Kobu, 2007), (Sardana, 2009), (Poluha, 2016)].

On the basis of a literature review, it can be noticed that the researchers find the question of measuring the performance of the supply chain from different angles. For example, the SCOR® model (Supply Chain Operations Reference Model) is used to evaluate the supply chain performance using four

performance attributes: Reliability, responsiveness, agility, cost management, asset management (Huang et al., 2004). The Balanced Scorecard organizes the supply chain indicators into four perspectives (Chang et al., 2013): Financial perspective (shareholders’ view), customer perspective (value-adding view), internal perspective (process based view) and learning and growth perspective (future view).

In addition, many authors agree that three perspectives should be used for the measurement system: flexibility, resource and output. Resource measures can help to minimize costs and maximize the use of resources. They aim to ensure a high level of cost efficiency. The output perspective, which analyses the outputs of the supply chain, aims to provide the means to optimize performance. Flexibility perspective is used to assess the capacity of the supply chain to deal with demand and timetable fluctuations on the part of consumers and suppliers.

According to Beamon, (1999), the supply chain measurement system has to focus on three different types of performance measures: 1. Resource measures (usually costs) 2. Output measures (usually responsiveness of the customer); and 3. Flexibility (ability to respond to changing environments) measures. Each of these three types of performance measures has different purposes. Resource measures include inventory levels, personnel requirements, equipment utilization, energy use and costs. Output measures include responsiveness of the customer, quality and quantity of the final product produced. Flexibility measures the ability of the system to accommodate the volume and schedule fluctuations of suppliers, manufacturers and customers.

Thus, the questionnaire for the survey is based on three generic perspectives for assessing supply chain performance: (1) Resource, (2) Output and (3) Flexibility. Moreover, the questionnaire consisted of forty-two questions (Table 1) addressed on the basis of the research objectives and the literature review. It covers both open-ended and closed questions.

| Part of the questionnaire | Number of questions | General description |
|---------------------------|---------------------|---|
| Demographic Data | 3 | To obtain enough information about our respondents |
| Specific Statistics | 3 | In order to obtain any basic information on the entire supply chain of the respondent, for example, the experience of performance assessment for those respondents who operate on the output of the supply chain on a daily basis, the introduction of performance measurement systems in the supply chain. |

| | | |
|----------------------------------|-----------|--|
| Attributes | 12 | To attain the practices related to performance evaluation according to the 3 perspectives mentioned: resources, output and flexibility. For each perspective, attributes have been associated and their degree of integration in supply chain performance has been detailed. |
| Attribute Status | 12 | |
| <i>Total number of questions</i> | <i>30</i> | |

Table 1 : Composition of the questionnaire for the survey

The pretest of the questionnaire is vital (Churchill and Iacobucci 2005). In our case, before launching the survey, a pre-testing of the questionnaire was necessary in order to detect any problem that could lead to biased answers such as misinterpretation of questions or inability to answer a question. The pretest was carried out by consulting a group of researchers and experts in supply chain management in a scientific conference about Moroccan industry “the 3rd edition of industry meeting day Morocco: 2019.”

The questionnaire was, also, tested on five respondents who provided feedback on the understandability and clarity of the questions as well as the accuracy and alignment of the questionnaire with the Moroccan context. This made it possible to improve the initial version of the questionnaire, in particular by reformulating certain questions and by changing the order of certain questions.

The questionnaire concludes with a word of thanks and a guarantee of respect for the anonymity and confidentiality of the data provided, the aim of which is to leave the respondent with the impression that his contribution was both appreciated and confidential.

Submit questionnaires and data collection

Regarding the methods of questionnaire submission, the researcher has several options including face-to-face, telephone interview, fax, e-mail or on-site survey (Cobanoglu et al., 2001). As each of these methods has its own strengths and weaknesses, it makes sense to combine different methods. It is important to multiply the chances of getting the maximum number of responses among the 120 companies contacted. By doing so, the researcher can take advantage of the benefits of the combined methods while minimizing the limitations. In the case of this research, we opted for three means of data collection: the e-mail method, the face-to-face submission method, and the telephone interview method.

- We sent 120 e-mails containing the questionnaire to facilitate the company’s response to our sample in the two industrial zones in the City of Kenitra and the City of Tangier.

- We conducted twelve interviews with the supply chain managers of the companies.
- We conducted five telephone interviews with the supply chain managers to complete the questionnaire.

After three months of the study, thirty-seven answers received by e-mail, twelve face-to-face questionnaires, and give questionnaires done by telephone calls. In summary, we were able to collect fifty-four completed questionnaires, which shows an initial response rate of 45%. Verification of the questionnaires received via e-mail showed that there was a lack of data in 8 answers; as a result, the effective response rate is 38.33%. Finally, data, including 46 companies, was analysed.

The response rate of our study is higher than the average response rate of 32.87% reported in empirical research on the supply chain by and this is due to compliance with the recommendations made by (Melnyk et al., 2012) to improve the response rate in empirical studies, which are, for example

- Follow-up: Several waves of mailings/reminders are crucial to motivating responses.
- Method of survey delivery through different means: e-mail, telephone, personal interviews.
- Length of the questionnaire: 30 questions in the survey, a response time estimation in 20 to 30 minutes. Period survey: three months.

Data Analysis and Interpretations

For obvious reasons of confidentiality, we are not in a position to reveal the exact content of the answers, but we can provide a few illustrations, in addition to the questions on the organization itself, i.e., the size, market profile, location, products. The questionnaire included 30 questions on the perception of the supply chain performance, the extent of deployment, the approaches used relevant to it. The findings described below illustrate the most important elements of the Supply Chain Performance Assessment used by our sample of the Moroccan industrial sector.

The Performance Measurement in a Supply Chain:

According to the 46 results, 40 companies have introduced performance measurement systems in their supply chain, 6 companies have not adopted performance measurement systems in their supply chain. This finding made it possible for us to draw conclusion suggesting that 89.95% of companies are aware of the importance of measuring performance in the supply chain, with the view that it is a tool for managing the supply chain and a tool for continuous improvement.

The performance measurement model for supply chain:

30 companies indicate the use of their own supply chain performance assessment models, 7 companies indicate that they use a set of standard performance assessment indicators and 3 companies indicate that they use known models such as BSC and SCOR® partially in the performance assessment. Summing the findings, it can be inferred that 65, 21% of companies create their own supply chain performance assessment models to capture the context, requirements and objectives of their own supply chain. The use of standard indicators (By 15, 21% of the companies) may be due to the complexity of implementing the entire performance assessment model and is practically dependent on the maturity of the supply chain. Furthermore, the use of a model known (By 6, 52% of the companies) as BSC and SCOR® is justified by the need to minimize the costs associated with the design of the performance measurement system.

The main objective of assessing the performance of the supply chain: improve productivity and quality, lead time reduction, cost reduction, or improve supply chain flexibility

Fifteen companies have responded that the main objective of assessing the performance of the supply chain is time reduction. Twelve companies have stated that their main objective is to improve quality and productivity, 10 companies have testified that their objective is to reduce costs, while 9 companies are in favour of improving the flexibility of their supply chain. As a matter of fact, 32, 60% of the companies seems to be very conscious about how assessing the performance of the supply chain can contribute to a time reduction in their supply chain, 26, 08% of the respondents are more interested in improving quality and productivity, 21.73% are focused on reducing costs, and only 19.56% on improving the flexibility of their supply chain.

The level of relevance of the attributes: resource, flexibility and output in the supply chain

Table 2 shows the results of our research approach for three generic perspectives for assessing supply chain performance: (1) Resource, (2) Output and (3) Flexibility, motivated by the work of (Perakis et al., 2005) each response is assigned an index I which aims to measure the degree of concentration of the “small” or “large” variable values; The index:

$$I = \frac{\sum_{i=1}^{\lfloor \frac{k}{2} \rfloor + 1} W_i' \pi_i}{\sum_{i=\lfloor \frac{k}{2} \rfloor + 2}^k W_{k-i+1}' \pi_i} ;$$

- $w'_j = 2 \left(\frac{\left[\frac{k}{2} \right] - j + 2}{\left[\frac{k}{2} \right] + 2} \right), j = 1, 2, \dots, \left[\frac{k}{2} \right]$; indicate the weight of the j^{th} category of the “positive” (“negative”) answers. The value $j = 1$ corresponds to the “best positive” and the “worst negative” answer and $j = \left[\frac{k}{2} \right]$ corresponds to the “worst positive” and the “best negative” answer.
- $\pi_i (p_i), i = 1, 2, \dots, k$; indicate the true (observed) proportion of answers to each of the k categories, where $\pi_1 (p_1)$ refers to the “best” available to answer, and $\pi_k (p_k)$ to the “worst” one.

Table 2: Results and indices according to the three perspectives of supply chain performance

| Supply chain resource performance | | | | | | |
|--|------------------|-------------------------|----------------|-----------------------|---------------------------|----------|
| Attributes | 1 Unimportant | 2 Slightly important | 3 Important | 4 Highly important | 5 Critically important | Indice I |
| Total cost of resources used | 0.00% | 0.00% | 17.39% | 36.96% | 45.65% | 13,125 |
| Total cost of distribution, including transportation and handling costs | 0.00% | 10.87% | 21.74% | 30.43% | 36.96% | 4,450 |
| Total cost of manufacturing | 4.35% | 21.74% | 26.09% | 34.78% | 13.04% | 1,632 |
| Return on investment (ROI) | 0.00% | 13.04% | 56.52% | 28.26% | 2.17% | 1,447 |
| Supply chain output performance | | | | | | |
| Attributes | 1 Unimportant | 2 Slightly important | 3 Important | 4 Highly important | 5 Critically important | Indice I |
| Total sales value | 0.00% | 0.00% | 32.61% | 21.74% | 45.65% | 6,533 |
| Total revenue less expenses. | 26.09% | 6.52% | 21.74% | 23.91% | 21.74% | 1,192 |
| On-time deliveries | 0.00% | 0.00% | 26.09% | 39.13% | 34.78% | 8,000 |
| Customer complaints | 21.74% | 23.91% | 4.35% | 50.00% | 0.00% | 0.889 |
| Supply Chain Flexibility Performance | | | | | | |
| Attributes | 1 Unimportant | 2 Slightly important | 3 Important | 4 Highly important | 5 Critically important | Indice I |
| Flexibility of production volume | 0.00% | 0.00% | 41.30% | 26.09% | 32.61% | 4,632 |
| Flexibility of delivery | 0.00% | 0.00% | 21.74% | 41.30% | 36.96% | 9,900 |
| Flexibility of switching supply sources | 0.00% | 26.09% | 26.09% | 34.78% | 13.04% | 1,722 |
| Flexibility of changes in the variety of products and the introduction of new products | 0.00% | 0.00% | 56.52% | 28.26% | 15.22% | 2,808 |

The analysis of the data and indices from the questionnaire revealed the following interpretations:

- Respondents agreed that the resource use perspective dominates the assessment of supply chain performance, mainly through the

calculation of the total cost of the resources used by the supply chain. This can be sustained by the fact that the total cost of resources used index score (13,125) is the highest of all other attributes index scores in the three generic perspectives for assessing supply chain performance.

- The assessment of supply chain performance is secondly assessed by the flexibility of delivery from the perspective of supply chain flexibility. This may be confirmed by the evidence that the flexibility of delivery index score (9,900) is the second-highest index score.
- From the perspective of supply chain output, the assessment of supply chain performance is mainly considered by the on-time deliveries as the attribute has the highest index score (8,000) compared to the other attributes in supply chain output perspective.
- Respondents tend to argue that customer complaints cannot rely on the results of the supply chain. This can be sustained by the fact that the customer complaints index score (0.889) is the lowest of all other attributes index scores in the three generic perspectives for assessing supply chain performance.

Conclusion

This research identified the most relevant models of performance assessment of the supply chain used by the Moroccan industrial sector. This empirical study was carried out by questionnaire which was administered to a total sample of 120 Moroccan industrial companies. The response rate was 45% while the effective response rate was 38, 33%. Throughout the paper, the data were analysed to provide some conclusions such as the Moroccan manufacturing companies are aware of the importance of evaluating output in the supply chain, to consider it a tool to reduce time, improve quality and productivity and increase the flexibility of their supply chain. The majority of companies adopt their own supply chain performance evaluation models to take into account their own needs, the use of reference models such as BSC or SCOR[®] is very limited.

This research is in line with the research stream which analyses the performance of the supply chain based on the logic of enrichment and extension of the reflections on the generic and hybrid approach to the design of a system of determining factors for the performance of the supply chain adapted to the national context of Morocco. However, there were eventually some limitations affecting this a preliminary study such as; The limited scope of the reliability of the results specific only to the industrial sector in Morocco and the impossibility of reusing the data obtained by confidentiality clauses.

Future studies are more than encouraged to overcome these limitations. It is therefore necessary to carry out research across multiple sectors in order

to confirm the points of convergence and divergence in the practice of assessment of supply chain performance in other sectors of activity compared to the industrial sector.

References:

1. Ackroyd, S., & Hughes, J. A. (1981). *Data collection in context*. Longman.
2. Baumard, P., & Ibert, J. (2014). Quelles approches avec quelles données ? In R.-A. Thiétart et coll., *Méthodes de recherche en management* (4ème, pp. 105–124). Dunod.
3. Beamon, B. M. (1998). Supply chain design and analysis: Models and methods. *International Journal of Production Economics*, 55(3), 281–294.
4. Beamon, B. M. (1999). Measuring supply chain performance. *International Journal of Operations & Production Management*, 19(3), 275–292. <https://doi.org/10.1108/01443579910249714>
5. Chan, F. T. S. (2003). Performance measurement in a supply chain. *The International Journal of Advanced Manufacturing Technology*, 21(7), 534–548. <https://doi.org/10.1007/s001700300063>
6. Chang, H. H., Hung, C.-J., Wong, K. H., & Lee, C.-H. (2013). Using the balanced scorecard on supply chain integration performance—A case study of service businesses. *Service Business*, 7(4), 539–561. <https://doi.org/10.1007/s11628-012-0175-5>
7. Churchill, G. A., & Iacobucci, D. (2005). *Marketing research: Methodological foundations* (9th ed). Thomson/South-Western.
8. Cobanoglu, C., Moreo, P. J., & Warde, B. (2001). A comparison of mail, fax and web-based survey methods. *International Journal of Market Research*, 43(4), 1–15. <https://doi.org/10.1177/147078530104300401>
9. De Beuckelaer, A., & Wagner, S. M. (2012). Small sample surveys: Increasing rigor in supply chain management research. *International Journal of Physical Distribution & Logistics Management*, 42(7), 615–639. <https://doi.org/10.1108/09600031211258129>
10. DEPF. (2019). *Le rapport sur les profils des régions*. Ministère de l’Economie, des Finances et de la Réforme de l’Administration, La Direction des études et des prévisions financières, Maroc. <http://depf.finances.gov.ma/2019/12/17/profils-regionaux-decembre-2019/>
11. Estampe, D., Lamouri, S., Paris, J.-L., & Brahim-Djelloul, S. (2013). A framework for analysing supply chain performance evaluation models. *International Journal of Production Economics*, 142(2), 247–258. <https://doi.org/10.1016/j.ijpe.2010.11.024>

12. Gimenez, C. (2004). Supply Chain Management implementation in the Spanish grocery sector: An exploratory study. *International Journal of Integrated Supply Management*, 1(1), 98. <https://doi.org/10.1504/IJISM.2004.004600>
13. 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), 2819–2840. <https://doi.org/10.1080/00207540600806513>
14. <https://doi.org/10.1080/16258312.2009.11517216>
15. <https://EconPapers.repec.org/RePEc:eee:proeco:v:55:y:1998:i:3:p:281-294>
16. Huan, S. H., Sheoran, S. K., & Wang, G. (2004). A review and analysis of supply chain operations reference (Scor) model. *Supply Chain Management: An International Journal*, 9(1), 23–29. <https://doi.org/10.1108/13598540410517557>
17. Hugos, M. H. (2018). *Essentials of supply chain management (Fourth Edition)*. Wiley.
18. Kotzab, H. (2005). The Role and Importance of Survey Research in the Field of Supply Chain Management. In Kotzab, H., Seuring, S., Müller, M., & Reiner, G. (eds), *Research Methodologies in Supply Chain Management*. Physica-Verlag HD.
19. Kusriani, E., Subagyo, & Masruroh, N. A. (2014). Good criteria for supply chain performance measurement. *International Journal of Engineering Business Management*, 6, 9. <https://doi.org/10.5772/58435>
20. Lambert, D. M., & Pohlen, T. L. (2001). Supply chain metrics. *The International Journal of Logistics Management*, 12(1), 1–19. <https://doi.org/10.1108/09574090110806190>
21. Lee, H. L., & Billington, C. (1992). Managing supply chain inventory: Pitfalls and opportunities. *Sloan Management Review*, 33(3), 65–73.
22. Melnyk, S. A., Page, T. J., Wu, S. J., & Burns, L. A. (2012). Would you mind completing this survey: Assessing the state of survey research in supply chain management. *Journal of Purchasing and Supply Management*, 18(1), 35–45. <https://doi.org/10.1016/j.pursup.2011.12.002>
23. Perakis, M., Maravelakis, P. E., Psarakis, S., Xekalaki, E., & Panaretos, J. (2005). On certain indices for ordinal data with unequally weighted classes. *Quality & Quantity*, 39(5), 515–536. <https://doi.org/10.1007/s11135-005-1611-6>
24. Poluha, R. G. (2016). *The quintessence of supply chain management*. Springer Berlin Heidelberg.

25. Rafele, C. (2004). Logistic service measurement: A reference framework. *Journal of Manufacturing Technology Management*, 15(3), 280–290. <https://doi.org/10.1108/17410380410523506>
26. Ravelomanantsoa, M., Ducq, Y., & Vallespir, B. (2018). State of the art and generic framework for performance indicator system methods. *IFAC-PapersOnLine*, 51(11), 544–551. <https://doi.org/10.1016/j.ifacol.2018.08.375>
27. Roussel, P. (2005). Méthodes de développement d'échelles pour questionnaires d'enquête. In *Management des ressources humaines* (pp. 245–276). De Boeck Supérieur.
28. Sardana, G. D. (2009). Exploring the performance of a responsive supply chain. *Supply Chain Forum: An International Journal*, 10(2), 38–39.
29. Seuring, S., Müller, M., Reiner, G., & Kotzab, H. (2005). Is There a Right Research Design for Your Supply Chain Study? In Kotzab, H., Seuring, S., Müller, M., & Reiner, G. (eds), *Research Methodologies in Supply Chain Management*. Physica-Verlag HD.
30. Swanson, D., Goel, L., Francisco, K., & Stock, J. (2018). An analysis of supply chain management research by topic. *Supply Chain Management: An International Journal*, 23(2), 100–116. <https://doi.org/10.1108/SCM-05-2017-0166>