Information Sharing Aspects In Supply Chain:
A Systematic Literature Review

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ABSTRACT

This paper aims to identify and discuss the most important research aspects of information sharing in supply chains by structuring different results of different studies published in the peer-reviewed journals. To achieve this goal, a systematic literature review was conducted, combing a research and selection process. The research was performed in the field of logistics/production as well as marketing in management journals indexed 1 and 2, 3 in CNRS (ranking June 2017). The result is 146 studies analyzing aspects of information sharing in the supply chain: impact of IS on performance in SC, IS approaches, determinants, and barriers impacting quality of information shared and willingness to share.

Keywords: SCM, information sharing, performance, systematic literature review
1. Introduction

The growth of economic relations, high technologies, competition, and market uncertainty, make it increasingly difficult to do business. As a result, firms need to make closer integration based on effective collaboration and often share information (Jia et al., 2014).

Information sharing is a supply chain issue that companies need to address to ensure successful supply chain integration. It has been seen as important for delivering integration benefits. (Vieira et al., 2009) (S. P. Thomas et al., 2013).

This subject has been on the research agenda for several decades and continues to receive attention both from researchers and practitioners (Kembro et al. 2015). This interest is due to his role at the heart of the concept of the supply chain. It is the breadth of information exchanged in an interfirm relationship (Wiengarten et al., 2010) that is also a fundamental element in managing the flow of information in the supply chain process (Ye & Wang, 2013).

Through literature, different aspects of information sharing have been and continue to be studied.

The impact of information sharing on performance in the supply chain arouses significant interest. In this context, a quite number of studies prove his significant role in the process of improving the performance of supply chain management, and its pivotal role in supply chain relations (Banerjee & Golhar, 2017) (Jorn-Henrik Thun, 2004) (Xue et al., 2011). (Zaheer & Trkman, 2017) (Kembro et al., 2017).

To achieve this goal, the quality of information shared and the willingness to share information is discussed. Number are factors that affect those elements regrouped as well: factors derived from Social Exchange Theory, the IT infrastructure capability, and other factors such as culture and governance structure (Zaheer & Trkman, 2017).

Additionally, information sharing approaches or tools have been widely used in the manufacturing and retail industries (Pei & Yan, 2018), and begins to attract academic attention.

Despite the presence of positive drivers motivating firms to adopt information sharing, unfortunately, several barriers block or delay the process, which limits firms in their exporting efforts and performance (Jraisat, Gotsi, & Bourlakis, 2013).
Through this article, we try to summarize those aspects, using a systematic literature review based on studies published in the peer-reviewed literature. Our goal is to highlight, classify key themes, and point out some areas that require further development.

The rest of the paper is structured as follows. The next section describes and justifies the research methodology. While the third section presents the results of the structured review, including identified aspects of information sharing in supply chains. In the last two sections, we conclude by suggesting directions for future empirical research on information sharing in supply chains.

2. Methodology

We conducted a systematic literature review to ensure the research rigor and replicability of the study. By setting up a review protocol refining the research question and defining the search strategy of the literature review. Two steps devise this last: Literature search process and Literature selection process. (See figure 1).

**Figure 1: Literature search process and selection process for literature review.**
2.1. Literature search process

The field of study and the subject must be defined precisely based on the literature.

In this context, we began the bibliographic research based on the following title: "information sharing in supply chain management".

The results obtained from this title were immense and in many cases derive from other related subjects or even off-topic articles (especially in the last pages of research).

Therefore, it was necessary to rely on a list of keywords that have a direct or indirect relationship with the subject.

We cite in a non-exhaustive way: SCM; Information sharing; B to B collaboration, cooperation in SCM; bullwhip effect, supply chain integration; knowledge sharing; Information technology, RFID, EDI, QUIQ RESPONSE…

Based on this research, and a quick read of the abstract, the results were interesting but in some cases refer only to collaboration or integration but not information sharing. Therefore, it has been decided to spread those articles.

To be more specific, we decided to include various keyword combinations of the following groups: [share, exchange] [data, information, knowledge]; [supply chain, supply network, logistics]. (see table 1)

<table>
<thead>
<tr>
<th>(Share) or, (exchange)</th>
<th>and</th>
<th>(information) or (data) or (knowledge)</th>
<th>and</th>
<th>(supply chain) or (supply network) or (logistics)</th>
</tr>
</thead>
</table>

Table 1: keywords combinations for the systematic review

2.2. Literature selection process

By testing those keyword combinations in the title of the article, the search resulted in 623 articles.

In a second phase, and to further narrow down the sample, it was important to use a set of preliminary inclusion criteria, which include:

- Articles must be written in English
To understand the subject, we choose to include studies from 1994 to 2019.

Focus on B to B and Spread the B to C;

Search in recognized databases: Scopus, direct science, emeemerald Ebscost, sage ...etc

Search across all areas of the Supply chain.

Due to the nature of the subject, it is necessary to search for articles in the field of logistics/production as well as marketing in management journals indexed 1 and 2, 3 in the most known indexing bases. In this context, we have chosen the ranking of the CNRS (ranking June 2017). (Setable 2)

<table>
<thead>
<tr>
<th>Production and operations management field</th>
<th>ranking</th>
<th>Marketing field</th>
<th>ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Journal of Production Economics</td>
<td>1</td>
<td>Journal of Marketing</td>
<td>1</td>
</tr>
<tr>
<td>Journal of Operations Management</td>
<td>1</td>
<td>Journal of Consumer Psychology</td>
<td>1</td>
</tr>
<tr>
<td>Production and Operations Management</td>
<td>1</td>
<td>Journal of Consumer Research</td>
<td>1</td>
</tr>
<tr>
<td>International Journal of Operations and Production Management</td>
<td>2</td>
<td>Journal of Marketing Research</td>
<td>1</td>
</tr>
<tr>
<td>International Journal of Production Research</td>
<td>2</td>
<td>Marketing Science</td>
<td>1</td>
</tr>
<tr>
<td>Journal of Business Logistics</td>
<td>2</td>
<td>Industrial Marketing Management</td>
<td>2</td>
</tr>
<tr>
<td>Journal of Quality Technology</td>
<td>2</td>
<td>International Journal of Research in Marketing</td>
<td>2</td>
</tr>
<tr>
<td>Production Planning and Control</td>
<td>2</td>
<td>Journal of Business Research</td>
<td>2</td>
</tr>
<tr>
<td>Transportation Research Part E: Logistics and Transportation Review</td>
<td>2</td>
<td>Journal of International Marketing</td>
<td>2</td>
</tr>
<tr>
<td>Computers &amp; Industrial Engineering</td>
<td>3</td>
<td>Journal of Public Policy and Marketing</td>
<td>2</td>
</tr>
<tr>
<td>Journal Title</td>
<td>Year(s)</td>
<td>Other Journal(s)</td>
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<tr>
<td>International Journal of Logistics Management</td>
<td>3</td>
<td>Journal of Service Research</td>
<td></td>
</tr>
<tr>
<td>International Journal of Logistics: Research and Application</td>
<td>3</td>
<td>Journal of the Academy of Marketing Science</td>
<td></td>
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<tr>
<td>International Journal of Manufacturing Technology and Management</td>
<td>3</td>
<td>Marketing Letters</td>
<td></td>
</tr>
<tr>
<td>International Journal of Physical Distribution and Logistics Management</td>
<td>3</td>
<td>Recherche et Application en Marketing</td>
<td></td>
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<tr>
<td>International Journal of Project Management</td>
<td>3</td>
<td>Consumption, Markets &amp; Culture</td>
<td></td>
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<tr>
<td>International Journal of Quality and Reliability Management</td>
<td>3</td>
<td>Décisions Marketing</td>
<td></td>
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<tr>
<td>International Journal of Technology Management</td>
<td>3</td>
<td>European Journal of Marketing</td>
<td></td>
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<tr>
<td>Journal Européen des Systèmes Automatisés</td>
<td>3</td>
<td>International Journal of Advertising</td>
<td></td>
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<tr>
<td>Journal of Manufacturing Systems</td>
<td>3</td>
<td>International Journal of Retail and Distribution Management</td>
<td></td>
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<tr>
<td>Journal of Purchasing and Supply Management</td>
<td>3</td>
<td>International Marketing Review</td>
<td></td>
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<tr>
<td>Journal of Supply Chain Management</td>
<td>3</td>
<td>Journal of Advertising</td>
<td></td>
</tr>
<tr>
<td>Production and Inventory Management Journal</td>
<td>3</td>
<td>Journal of Advertising Research</td>
<td></td>
</tr>
<tr>
<td>Supply Chain Management: An International Journal</td>
<td>3</td>
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<tr>
<td>Journal of Business &amp; Industrial Marketing</td>
<td>3</td>
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<tr>
<td>Journal of Interactive Marketing</td>
<td>3</td>
<td></td>
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<tr>
<td>Journal of Marketing Management</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>Journal of Retailing and Consumer Services</td>
<td>3</td>
<td></td>
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<tr>
<td>Journal of Services Marketing</td>
<td>3</td>
<td></td>
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<tr>
<td>Marketing Theory</td>
<td>3</td>
<td></td>
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<tr>
<td>Psychology and Marketing</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>Quantitative Marketing &amp; Economics</td>
<td>3</td>
<td></td>
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</tbody>
</table>

Table 2: CNRS ranking (June 2017)

This research leads to 241 scientific articles:

- 210 articles from journals indexed according to the CNRS
- 31 articles from non-indexed journals according to the CNRS (excluded)

In the third phase, the 210 studies are integrated into the Nvivo11 application to extract information. To ensure our sample consistency, we used the « word cloud » technique in the keywords node, the top 10 most frequent words are the following:

![Figure 2: word cloud from Invivo11 application](image-url)
Results show that “supply chain management” is the combination of the most repeated words, which is normal since we treat the subject within the framework of the supply chain. Followed by the word "information" but this one is not always related to “sharing”, we speak about “information system”, “information value”, “information technology”, “information transfer”… etc. « Sharing » comes in 5th position even in some cases we speak about “profit-sharing, sharing values”.

Next, based on a diagonal reading of the full text, a classification has been adopted according to the relevance of the article and its relationship with the subject. Based on the Likert scale, articles are classified as follows:

<table>
<thead>
<tr>
<th>Relationship with the subject</th>
<th>Color/decision</th>
<th>Number</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>No relation</td>
<td>red</td>
<td>55</td>
<td>rejected</td>
</tr>
<tr>
<td>Indirect relation</td>
<td>orange</td>
<td>57</td>
<td>selected</td>
</tr>
<tr>
<td>Direct relation</td>
<td>bleu</td>
<td>98</td>
<td>selected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>210</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: classification of studies based on their relevance.

Finally, an in-depth examination of the full text of the remaining 155 papers (direct and indirect relation) was carried out.

As a result, applying the previously mentioned inclusion/exclusion criteria, 9 articles proved to have limited relevance to the aim of this research study.

The final sample, thus, consisted of 146 papers, each entered into an Excel database devised on several columns containing general publication details (title, authors, year of publication, journal, DOI, publisher, category, ranking) in addition to the main studies elements as, keywords, the purpose of the study, major finding, selection criteria. (Tranfield et al., 2003)

To enable structured examination and review of the papers, we create several in the Nvivo11 application, resuming the main aspects of information sharing in SCM. (kembro et al., 2014).
3. **Finding of the systematic review**

This section presents the findings of the systematic literature review in terms of identified aspects of information sharing in supply chains. By combining the outcomes of the performed analyses, it is possible to provide insights into the main areas investigated by the literature on information sharing in supply chains, related risks, and opportunities. This also allows for identifying the main directions for the future.

![Figure 3: number and distribution of articles published by year](image)

Figure 3 shows the distribution and number of articles published over time. The field under study experienced growth from 2005 and continues to attract academic attention. This may be explained by the advent of industry and massively connected systems (collichia et al. 2018). 79% of those studies are published in the Production and operations management field. Just 30 articles are published in marketing journals. This can be argued due to the application of the subject in the supply chain.

After a discussion with teamwork, we identified five areas or aspects of information sharing in supply chains, namely:

- How does Information sharing impact performance in SCM?
- Barriers to Information sharing implementation
- What determinants for Information sharing?
- Information sharing approaches
This figure demonstrates the important percentage of published studies analyzing the impact of information sharing in improving performance of SC, followed by articles that study the IS determinants.

**4.1. How Information sharing Impact performance in SC?**

In total, 60 papers from the sample (146) address the impact of IS on supply chain, which present almost 41% of the sample.

Authors often argue that the "need to share information" should be the primary focus of future SC management research. (Zaheer & Trkman, 2017) (Banerjee & Golhar, 2017) (Jorn-Henrik Thun, 2004) (Xue et al., 2011).

This importance is related to his significant role in the process of improving the performance of supply chain management, its pivotal role in supply chain relations.

Many researchers (Birendra, Srinivasan, & Xiaohang, 2007; Jeong & Leon, 2012) have attempted to maximize the profit feature measured under various sharing and non-sharing scenarios. Other authors used the cost function to determine the importance of exchanging information (Rached et al., 2015).

(S. Kumar et al., 2015) in his study, mentioned work of Cachon and Fisher in research the importance of exchanging demand and inventory information through the supply chain network of one manufacturer and N similar distributors using theoretical and simulation models. The findings suggest that knowledge exchange can lead to a decrease in inventories.
and increase cost savings for the producer that can have a significant impact on the performance of all SCs.

Similarly, (Zhang & Chen, 2013) cited (Lee et al. 2000) paper how studied the value of exchanging demand information in the supply chain model. As a result, information sharing plays and significant role in minimizing SC costs.

In general, information sharing offers a range of advantages and benefits: better allocation and use of logistic resources, enhanced production planning, lower inventory costs, better customer satisfaction and shortened lead times over the supply chain (Kembro et al., 2017).

Even, authors, like (Tong & Crosno, 2016) affirm that without exchanging these types of information, partnerships are unable to achieve the desired efficiencies and effectiveness.

4.2. Barriers for Information sharing implementation

Despite the potential benefits, information sharing is associated with certain risks that may discourage organizations to share information with their supply chain partners. (Jraisat, Gotsi, & Bourlakis, 2013).

From the sample, 14 articles are interested to this question, devised on testing problems of asymmetry information, information distortion, opportunistic behaviors and bullwhip effect. However, few studies raises the IT issue.

Even the sample is marginal, but this topic catch more and more interest these last decencies (between 2008–2019).

- Information leakage, asymmetry, opportunistic behaviors.

The information leakage is the dark side of information sharing; it was discovered originally in the music industry supply chain.

In the literature, this term is used to describe the way a retailer can infer the private information of his competitor based on the actions of the mutual manufacturer. (Anand and Goyal, 2009) also examined the issue of information leakage to show that a manufacturer may deliberately leak private information of a retailer to intensify the competition level at the retailers’ level. (Yam et al., 2015) in his paper, indicate that knowledge being leaked invite opportunism.
Similarly, Information asymmetry occupies an important place opening the door for opportunism (Tong & Crosno, 2016). It arises when one party is better informed than other parties about some aspects of the exchange. (Heide, 2003)

(Mittendorf et al. 2013) study the incentives of a retailer to share information with his manufacturer, when the latter can exploit this information to her benefit. In their work, (Mittendorf et al. 2013) weigh the trade-off between the retailer’s fear of being exploited and the ability of the manufacturer to increase the retailer’s demand. (Shamir, 2013).

- **IT issue.**

Regarding the IT difficulties, which is quite surprising that none of those papers address this question specifically. Some authors as (Fawcett et al., 2007b), (Gal-Or, Geylani, & Dukes, 2008) argue that the most noted challenge for small- and medium size companies is the cost and complexity of implementing advanced systems.

Indeed, a disruption (intended or not) of the shared information can have an important impact: conflicting schedules at each stage, and hence the overall efficiency of the supply chain tends to be reduced. (Pandey et al., 2007). Also that may have an impact on gains and benefits since it involves high costs. (Rached et al., 2015)

This reality cause substantial consequences for supply chain partners and affect the hall SC performance, almost all of those paper’s authors proved this result. Among the main consequences of the bad information sharing practice, is the bullwhip effect, that became an important observation in supply-chain management and cause a number of damages. (Ronget al 2008), (Dominguez et al 2014), (Boute et al, 2008), (Divesh Ojhaaet al, 2019).

### 4.3. What determinants for Information sharing?

This question take the second ranks, by 26%, analyzing factors that affect quality of information shared and the willingness to share information: this factors may be regrouped as well: factors derived from SET (trust, commitment and reciprocity); the psychological factor of individuals; and the IT infrastructure capability. (Zaheer & Trkman, 2017), (Monczka et al., 2005).

- **Social factors**
This theory admit that the commitment, confidence, degree of communication, reciprocity and willingness to work together in a common manner may facilitate the exchange of information and the coordination of buyer-suppliers relationships (Wu et al., 2014).

Number of authors like (Zaheer & Trkman, 2017), (S. P. Thomas et al., 2013) Defend win–win negotiations, this last is impacted by two factors: The first factor is related to reciprocity/rational self-interest (“I help you, if you help me”). Reciprocity predicts that positive actions from one firm will elicit favorable responses from another firm. The second factor relates to social and organizational context attitudes (“usual, correct and expected” information sharing behavior in the workplace). Witch mean that the more a person feels that information sharing is expected of them the more they are willing to share.

In the same order, they argued that trust is closely linked to information; high trust means a high degree of information sharing.

(Zaheer & Trkman, 2017) in there paper cited Many studies (e.g. Moramarco et al., 2013; (Romano and Formentini, 2013);( Hofer et al., 2012) identifying behavioral factors like trust and motivation for information sharing in a SC context.

Similarly, (Rached et al., 2015) studied the level of trust between different links in supply chains.

- IT alignment

Regarding the question of ( IT), again, (Zaheer & Trkman, 2017), (Ye & Wang, 2013) mentioned the importance of IT alignment which is a useful resource in realizing efficiency and effectiveness in information management (Wu et al., 2006). Seamless information sharing among supply chain partners needs IT infrastructure to support both existing applications and new initiatives”

Indeed to become more open and collaborative, the use of ICTs represents one of the more effective pathways to support actors in sharing information. (Scuotto et all, 2017) seed that the use of IT systems makes it possible to achieve greater precision and speed of the necessary information for the control of the supply process (Jorn-Henrik Thun, 2004).

Which is interesting, when the social factors theory is analyzed through literature, trust is the most important factors affecting information sharing, while IT alignment is less studied.

- Gouvernance structure and culture
In this context, and in order to correct the trust issue, number of authors as (Barney, 2001); (Ghosh and John, 2005) argue that the willingness to collaborate with other parties requires establishing effective governance structures),(Rodolfo Vázquez-Casielles and Victor Iglesias, 2013). this cannot be done without a contract between partners of the SC.

The contract serve as motivator for better coordination and close information sharing trough (i) incentive firms to reveal their information completely; (ii) incentive the retailer to choose the sale price (quantity) which maximizes the total profit of the supply chain; (iii) to divide the supply chain’s profit between SC members properly.(Zhang & Chen, 2013)

Close to this context, (Winklhofer et al., 2006) emphasized that for a firm to be relationship oriented, it must endeavor to create suitable internal culture which significantly influences supply chain integration(G. Kumar et al., 2016)

**other factors**

Other factors may apply other than we have already mentioned. On the one hand, in the absence of formal contracts, uncertainty can be a possible driver for information sharing between partners. (Jraisat et al., 2013). On the other hand, and quite surprising, information leakage may incentivizes the retailers to vertically exchange information because of their expectation that this information will later be leaked to their competitors. (Shamir, 2013). This bad attitude may be an extraordinary driver to share information but some time it work perfectly.

4.4. Information sharing approaches

Effective supply chain requires collaboration and information sharing among the various channel members. This cannot be done without a number of approaches, designed as tools such as vendor managed inventory (VMI), continuous replenishment planning (CRP), and customer relationship management (CRM), Quick Response (QR), Efficient Consumer Response (ECR), as collaborative planning, forecasting, and replenishment (CPFR) and electronic data interchange (EDI)...etc. All these approaches embed information sharing as the cornerstone of these programs(Li, Lin, Wang, & Yan, 2007) and have been widely used in the manufacturing and retail industries.(Pei & Yan, 2018).

4. **Conclusion and future implications**

This paper sets out to conduct a systematic literature review to answer the following research question: what are the predominant area studies of information sharing?
To respond to this question, we have identified 4 aspects that together present 96% of the identified instances. We found that the impact of IS in improving performance and IS motivators, present the major part of the studies. Mainly, by addressing the cost-saving and trust issues.

However, we would like to draw attention to several important areas for future research.

First, IT alignment and cost is an important question taking a marginal part in information sharing literature in SC, despite its important role in facilitating the process.

Second, future empirical research on information sharing in supply chains would give much more importance to IS tools and their application in the industrial field.

From the theoretical viewpoint, our work offers to the research community an investigation of information sharing in supply chains and related aspects from an original perspective.

On the other side, The approach adopted in this work presents some criticisms, the most important is that the scope of the data used was limited to SCs. Also, inclusion criteria exclude studying B to C relations which spread an important data analyzing the information sharing question.

References


Alignment of Internet-Based Information Technology and Global Supply Chain Integration". *Journal of Supply Chain Management, 46*(2).


