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Modeling the Logistics Performance in Developing Countries: An exploratory study of Moroccan context

Abdelkabir CHARKAOUI¹, ABDELLAH AIT OUAHMAN², BRAHIM BOUAYYAD³
¹PhD, Faculty of Science Semlalia, Cadi Ayyad University, ²ENSA, Cadi Ayyad University
³Faculty of Law Economics and Social (MARRAKESH, MOROCCO)
charkaoui.a@gmail.com, a.charkaoui@uca.ma

ABSTRACT:
Moroccan geographical position allows its companies to participate in international supply chains. Therefore, these companies are forced to raise their levels of logistics performance. This article is a research progress; it presents a literature review on the supply chain performance and proposes a research model that identifies factors explaining this performance for Moroccan SMEs.

Article Type: Research paper
Keywords: Supply Chain, SCMP, Technological Practices, Supply Chain performance, Morocco.

1. INTRODUCTION:
Logistic in Morocco is still at an embryonic stage, only international are equipped with visions and clear logistic strategies. Moroccan professionals of logistics explain this case by three types of handicap. (1) Structural (structures are not adapted to logistics, pyramidal structures…). (2) Organizational (bulk-heading of the functions, retention of information…). (3) Institutional (lack of reforms of levelling of the public corporations).

To surmount these handicaps, the Moroccan government and the CGEM (General Confederation of the Companies of Morocco) signed a contract-program in April 2010, which aims at levelling Moroccan logistics and improving its competitiveness to the international level. This contract is declined in five axes: (1) developing a national network integrated by multiflux logistic zones, (2) optimizing and gathering flows of goods, (3) levelling and incenting the emergence of integrated and powerful logistic actors, (4) developing competences through a national plan of training in the trades of the logistics and (5) installing a governorship framework of the sector and adapted measurements of regulation.

In addition, the strategic geographical location of Morocco urges all SMEs to raise their performance levels in logistics and to maintain their competitiveness at international scales. This underlines the question of the factors of this performance and raises the need to develop a conceptual model identifying the explanatory factors of logistic performance of Moroccan SME.

This work aims at being a prolongation of the study undertaken by Arumugam and Mojtahedzadeh (2011) which examined and tested the relation between the SCM (Supply Chain Management) practices and logistic performance in the Iranian context. Our work will be limited to agro alimentary SMEs of the region of Marrakech middle of Morocco.

The first paragraph presents review of the literature on performance of the supply chains whereas the second paragraph exposes the hypothetical model of research model. The last paragraph treats the implications of the research model, its limits and possible tracks of improvement.

2. Literature review on measuring the logistic performance:
According to Neely et al. (2005), measurement of the performance is defined as the process of quantification of effectiveness and efficiency of the action. In this direction, Shepherd and Günter (2005) specify that the evaluation tools of logistic performance must be able to quantify at the same time the effectiveness and the efficiency of the action of the supply chain. However, the majority of the supply chains suffer from an obvious lack in the availability of the shared databases (Ruth et al., 2011) which hinders the effectiveness of evaluating the logistic performance.

At the beginning, evaluation of logistic performance was limited to purely financial measurements (Cauvin and Bescos, 2005) based on the history of the logistic activities and classified as unable to evaluate objectively their logistic effectiveness (Antikson et al., 1997).

In 2000, Brewer and Speh count hundreds of metrics to evaluate the logistic performance and gather them in three categories: (1) measurements of services, (2) measurements of costs and (3) measurements of the output of the credit. Jobin and Friel (2001) on the other hand, analyze these three categories of measurements and introduce others: reactivity, agility, efficiency and intelligence.

Foggin et al. (2004), stipulate that in spite of the existence of several models for evaluating logistic performance (SCOR, Evalog, Aslog…) many of them are complex and their installations seem to be too complicated especially when it is about SME. As for Ruth et al. (2011), they compare these models of logistic performance evaluation and specify different characteristics of evaluation and lead to different results. Consequently, companies express an urgent need for a new tool to improve their logistic performance.

In addition, a detailed study of the literature stipulate two big families approaches of the logistic performance:
(1) global approaches and (2) partial ones. The first ones treat the performance of the supply chain as a whole, but agree neither on the method of evaluation nor on the result (Roth et al., 2008; Chow et al., 2008; Larson et al., 2007; Zhou and Benton, 2007). The second ones are interested in a part (upstream, intern or downstream), or in a link of this supply chain or treat the impact of some practices on performance (Paulraj et al., 2008; Van der Vart and Von Donk, 2008; Robb et al. 2008; Germain and Lyrer, 2006).

Li et al. (2009) and Chowa et al. (2008) specify that the logistic performance evaluation is complex (recourse to the partial models and the existence of a very great number of indicators). They specify that a conceptual confusion characterizes the concept of performance of the supply chains. This is due, partly, to the interdisciplinary nature of both the supply chain and the evaluation of its performance.

At this level, a bibliographical examination (table 1), makes it possible to retain four indicators whose combination for evaluation supply chain performance: (1) control of the costs, (2) the added-value, (3) customer satisfaction and (4) delivery periods.

Table 1: Logistics performance Indicators

<table>
<thead>
<tr>
<th>Operationalisation of logistics performance</th>
<th>References</th>
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<tbody>
<tr>
<td>Control of the costs</td>
<td>Chen et Paulraj, 2004; Shin et al. 2000; Brewer et Speh 2000</td>
</tr>
<tr>
<td>Added-value</td>
<td>Lambert et Pohlen 2001; Cox 2001</td>
</tr>
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3. **MODELING SCM PRACTICES EXPLANATORY OF LOGISTICS PERFORMANCE:**

The interdisciplinary origin of SCM reveals two insufficiencies (Li et al., 2006, Tan et al., 1998): (1) Conceptual confusion as for the concept of SCM and (2) the obvious lack of consensus around one clear unambiguous definition (Mentzer et al. 2008; Gibson et al. 2005).

In this article, SCM is defined in accordance with the authors Shimchi-Levi et al. (2002), Park and Krishnan (2001) and Li et al. (2006) who specify that SCM is the whole range of approaches used to effectively integrate suppliers, manufacturers, warehouses and stores, as well as the finished products distributed to the right quantity, the right place and the right moment, in order to minimize the costs and to fulfill the requirements of the customers.

Mentzer (2001) notes that a SCM orientation must be accompanied by a number of practices. Li et al. (2005) and Koh et al. (2007) define these practices as being the whole range of activities deployed in order to allow an effective management of the supply chain. In this direction, Sakka (2008) reminds that each company must be able to define its requirements in logistic performance in order to identify the best practices which answer its expectations, and finally, to define the suitable measurements and metric for the evaluation of this performance.

Mentzer (2001) specifies that a SCM orientation must be accompanied by the implementation of a number of practices. Li et al. (2005) and Koh et al. (2007) define these practices as being the activities deployed in order to allow a successful implementation of SCM. The analysis of more than 30 articles published between 2000 and 2010 returns to two principal reports: (1) the absence of works which treat the explanatory practices of the logistic performance as a whole, (2) the obtained results remain vague and fragmented, consequently, they do not make it possible to adopt only one conclusion. To fill these insufficiencies, we propose, a research model which federates the most quoted practices in literature, and that further performance of the supply chain (fig. 1).

The hypothetical research model (Fig. 1) highlights two types of logistics performance practices. The first one with a SCM character and called SCM practices, whereas the second, based on technology, is referred to technology practices.

![Fig. 1: Hypothetical research model](image)

3.1. **Technological Practices:**

The emergence of new organizational forms on the one hand, and the universality of manufacture and distribution, on the other hand, forces supply chains to develop technological practices (according to Mentzer, 2001) in order to guarantee a high and maintained level of performance.

Researches treating the impact of the technological practices on the performance of the supply chains (table 2) retain the following variables: (1) information share, (2) information quality, (3) information content, and (4) ICT use. Furthermore they allowed elaborating the following hypothesis: *The technical and technological practices influence positively the supply chain performance.*

Table 2: Technological Practices
This hypothesis can be divided into four sub-hypotheses:

- **Information share:**
  Sharing information means the communication between partners of the supply chain (Koh et al., 2007). It refers to the width and the intensity with which information is exchanged between the members of this chain (Li et al., 2005).

  In (2009) and Li et al., (2006) specify that the division of information is a catalyst for the integration of the supply chain. Their side, Sodhi and Its (2009) show that sharing information influences positively the strategic and the operational supply chain performance.

  \( H_{11} : \) **Sharing information influences positively the supply chain performance.**

- **Information quality:**
  Information quality of represents the degree to which the information exchanged between the companies meets their needs. It is measured by various criteria: content, exactitude, exhaustiveness, frequency, adequacy and credibility (Moberg et al. 2004). This multitude of criteria is due to the differences in perception of information by the members of the supply chain.


  \( H_{12} : \) **Information quality influences positively the supply chain performance.**

- **Information Content:**
  Information contents exchanged between supply chain members can take several aspects. Mentzer et al. (2001) and Moberg et al. (2002) distinguish between strategic information, operational and those which relate to the logistic activities (production capacity, level of stocks...). (Daugherty et al. 2002) raise the existence of other types of contents of information: relational information and rational information. The first is centered on the bond between two agents (subjective and imperfect), whereas the second is centered on the message (objectifies, perfect and storable). The author specifies that it is necessary to ensure the combined exchange of relational and rational information to reach the performance of the supply chains. Larson et al. (2007) and Zhao et al. (2008) and Paulraj et al. (2008) affirm that the contents of information influence the performance positively of both the supply chain and these members.

  \( H_{13} : \) **Information contents of influence positively the supply chain performance.**

- **Information and Communication technologies Use (ICT):**
  Sanders (2007) specifies that an effective management of the supply chains is generally associated with ICT use. The use of this later in the supply chains leads to the synchronization of physical flows and information (Flynn et al., 2010) as well as to the coordination in decisions making (Xue et al., 2005).

  In 2008, Paulraj et al., specify that the recourse to the ICT affects the performance of the supply chains positively. However, Roth et al. (2008) and Sanders (2007) specify that the extensive investment in these technologies alone does not lead directly to the performance, and that it must be accompanied by a reorganization by these chains.

  \( H_{14} : \) **ICT use influences positively the supply chain performance.**

### 3.2. Supply Chain Management Practices (SCMP):

Li et al. (2006) and Koh et al. (2007) define the SCMP as the whole range of activities undertaken in an organization to enhance an effective management of the supply chain.

Zhou and Beneton (2007) show the relation between SCMP and supply chain performance. Moreover, Davis-Sramek et al. (2006) specify that mistrust between the companies impacts SCMP negatively and disturbs the performance of the supply chain. Table 3 show three explanatory variables of the SCMP: (1) Integration, (2)
coordination and (3) collaboration. It also supposes the following assumption: *The SCMP influences positively the supply chain performance.*

**Table 3: SCM Practices**

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<thead>
<tr>
<th>SCMP identified</th>
<th>References</th>
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**- Integration:**
In a supply chain, “to integrate” is to carry out some changes in order to coordinate physical flows and information coming from multiple actors in order to manage the routing of the final product by a multitude of intermediaries (Christopher, 2005).


**H21:** Integration influences positively the supply chain performance.

**- Coordination:**
Logistic coordination is the whole range of actions carried out by a supply chain to orchestrate and to synchronize the release of flows in order to create an added-value for the customer (Lintukangas et al. 2010). According to Chan et al. (2004), the piloting of the logistic activities depends on an effective coordination between all partners. Moreover, Llerena (2003) stipulates that the performance of the supply chains rests on the coordination of their decisions and their activities. Lintukangas and Al (2010), Zhao and Al (2008) Yang and Al (2008) and Ritchie and Brindley (2007) affirm that coordination is the independent factor which makes it possible for the supply chains to reach logistic integration and to lead thereafter to the performance.

**H22:** Coordination influences positively the supply chain performance.

**- Collaboration:**
Collaboration is the long-term, continuous and durable partnership between companies to achieve mutual goals (Paulraj et al. 2008, Fawcett and Magnan, 2002). Roy et al. (2006) advance that the stake of collaboration in a supply chain is at the same time the satisfaction of the customer and the reduction of the costs. For Sodhi and Its (2009), Zhao et al. (2008), Yang et al. (2008) and Chen et al. (2007) collaboration influences the performance of the supply chain positively.

**H23:** Collaboration influences positively the supply chain performance.

4. **CONCLUSION AND PROSPECTS:**

The performance of the supply chains, in terms of quality, cost and times depend strongly on the collaborative device and the effort of information exchange between its members. This article proposes a modeling starting from a review of literature in the form of a model of logistic performance applicable by the Moroccan companies in order to improve their performances and participate actively so as to raise that of the supply chains in which they are implied.

The ambition of this article is to form a conceptual model around which Moroccan companies can build their logistic performance. This model was carried out on the basis of corpus of major works completed and tested on the ground by many researchers. Our model represents a reference frame of practices and factors contributing to the performance of the supply chains which we have gathered under two main practices: (1) technical and technological practices, and (2) SCMP.

This work is not fully completed. It would be interesting to test it on the ground and to discuss, thereafter, the possibility of enriching it with other assumptions and of studying other correspondences with other disciplines of logistic management. However it is not free from limits of reproaches that will constitute future tracks of research. The first stresses that the model is based on studies carried out in contexts different from the Moroccan one. The second is related to the existence of other factors that were not taken into account in our study and which are likely to influence supply chains performance in the Moroccan context, such as the report/ratio between members,
Using the Balanced Scorecard to measure chain information support for reverse logistics: the case of a supply chain exchanges.

REFERENCES