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The Reality of Supply Chain-Oriented Inventory of SMEs in an Emerging Country

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***Abstract*—** *The most important challenge for Supply Chain Management (SCM), nowadays, is to cope with the amplification and the complexity of flows between the different companies in the logistics network through the implementation of best practices as a strategic factor in its competitiveness. Also, under the current raising uncertainty level of business environment, the inventory management seems to be one the most critical functions that should be mastered in order to reduce costs and avoid stock out situations. Actually, all SC practices, including inventory management, are regularly reviewed to identify those that represent a competitive advantage or a risk factor. This article has for principle goal to assess the maturity of inventory management practices as a determinant factor of supply chain performance of an Algerian SME operating in the food sector. This assessment can be done by using reference models such as SCOR model, ASLOG, SCALE, OLIVER WEIGHT and Global EVALOG. Our choice is based on ASLOG Model that allows identify overall strengths and weaknesses of the inventory management practices, namely the logistics platforms and warehousing management, the inventory management, the activities and risks management, and finally, the staff and responsibilities in order to implement action plans that consists in consolidating strengths and developing solutions for weaknesses.*

***Keywords*—** *Inventory Management, Auditing, Supply Chain Standards, firm Performance.*

I. INTRODUCTION

In a context of trade globalization and hyper competition, characterized by growth in sales that follow a significant increase in consumption, has had major consequences on the amplification and complexification of flows among various actors in the economic system. Consequently, these flows have become difficult to rationalize. In other words, these developments have given rise to the concept of the Supply Chain constituting a powerful lever for competitiveness. Today, this concept has become a multidisciplinary science affecting almost all functions of the company.

As the concepts of Supply Chain reflects the ability of a company to manage perfectly the informational, financial and materials from suppliers' supplier to the final customer, the inventory management seems to be vital to achieve this goal with efficient and effectiveness. The inventory management represents a liquid that lubricates the supply chain wheels through maintaining an optimal level of stock, minimising overall supply chain costs, and facing uncertainty via responding in a timely manner to customer needs.

The inventory management issue is still attracting the attention of professionals and researches as well. Some of these researches deal with the use of wireless communication technologies, namely RFID and Internet of Things (IoT) to control the inventory and manage the storage process (Subrahmanya and Neeraja, 2018). Other researches are intrested in developing models to deal with the uncertainty and heteroskedastic demand in a supply chain to reduce Bullwhip effect and improve forecasting (Sanjita and Mahapatra, 2021). It is to notice that all the contributions in this topic turns around one objective, which is how to make the inventories meet the supply chain strategy requirements through ensuring materials flow continuity with minimum working capital and operational costs. In other words, the inventory management is SC function that ensure consistency among all functions.

The objective of this article is mainly to assess the inventory management from Supply Chain perspective of an Algerian SME operating in the food sector. In this type of sector, Supply Chain Management (SCM) is a strategic factor of competitiveness for companies, and determinant of their performance. In addition, the evaluation of inventory management function performance of could be accomplished using reference models such as: the SCOR model, ASLOG, SC Master, SCALE and the OLIVER WEIGHT model. These standards focus on all the strengths and weaknesses of the inventory management in order to set up progress plans.

Thus, the choice of this subject dealing with the problem of inventory management processes in an SME manufacturing and commercializing dairy products is justified by the fact that this company responds well to customer expectations in terms of product quality and cost. compared to its main competitors, but it risks losing this advantage because of the problems encountered in terms of flow management and inventory management. This auditing highlights areas that could lead to improved performance in terms of productivity, responsiveness to market changes, customer services and flexibility.

This article is organized as follows: we have defined, first, the different concepts around which our research is based, namely, Inventory management and Supply Chain Management. Also, the evaluation model adopted, namely the ASLOG model has been presented. Then, the studied company has been described. Afterwards, the results of interviews have been presented and analysed to identify the strengths and weaknesses still facing inventory management. These were then the subject of an in-depth discussion in order to understand the causes of the dysfunctions observed. Finally, an action plan had been developed to provide the company with solutions through which managers can optimize and improve inventory management processes towards excellence.

II. Supply Chain Oriented Inventory: A Leverage of Competitiveness

According to Wild (2017, P.01), The success of a venture is determined by the ability to provide right products and services to the right customers in the right time, and with the right price. On the other hand, the success is based on the ability to keep the costs low and profit high. Actually, accomplishing this mission successfully requires the involvement of many functions, namely, the marketing and commercial functions, research and development, purchasing and production functions. This evidence shows the importance of inventory management as a strategic weapon to accomplish this mission. The inventory management is a function that ensures a congruence all along the company functions. It coordinates the sourcing, manufacturing and distribution in order to ensure the availability of items to customers by the marketing function.

Actually, Singh and Firma (2018) highlight the scope of inventory management that covers many topics as follow: replenishment scheduling, managing costs of storage and inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space, quality management, replenishment, returns and defective goods, and demand forecasting. In fact, it is only through balancing these competing requirements that can lead to optimal inventory levels, which is an ongoing process as the business evolve continuously to meet the environment change.

As shown above, the inventory management has conflicting goals, on one hand, it should ensure items availability and serve customers perfectly, on the other hand, it should achieve operational efficiency through maintaining low inventories and not consuming a large amount of working capital. So, its vital role relies on how best to provide a balancing act and solve these conflicting requirements for the company interest and performance. Figure 1 highlight the triangle of reasons that justify the inventory management function importance as follow:

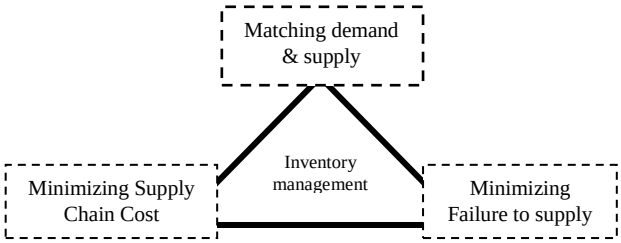

Fig. 1. Inventory Management Reasons.
Source: Provided by the researchers based on (Wild, 2017)

To confirm this conflicting missions, the APICS (American Production and Inventory Society) defines the inventory management as a part of management in charge of planning and controlling inventories (Toomy, 2000, P.01). This function allows to maintain the desired stock level in terms of raw materials or final products to meet perfectly the internal (Production) and external demand (Customers). Actually, the inventory management takes into account many aspects such to present high performance. First, it should keep pace with the environment change and collect information to deal with external uncertainty coming from suppliers and customers in order to reduce the Bullwhip effect. On the other hand, it should deal with the internal uncertainty related to the production system capabilities.

Inventory management is the building block of the supply chain house; it is the fluid that lubricates its wheels (Wild, 2017, P.02). Knowing this, it is important to get closer to this multidisciplinary concept, which Supply Chain Management. According to (Sanders, 2012, P.3), the Supply Chain is defined as a network of all the entities involved in the production and delivery of a finished product to the end consumer. This includes the sourcing of components and raw materials, manufacturing, production, product assembly, storage of goods in warehouses, order entry and tracking, distribution, and delivery to the end consumer. (Dan and Sanders, 2010, P.16) point out that the goal of each actor in this network is to work together (cooperation) to reduce overall costs and improve quality and delivery services. Regarding Supply Chain Management, according to (Russell and Taylor, 2011, P.8), this can be defined as the design and management of the flow of products, information, and financial flows through the SC. This involves the coordination and management of all activities of the SC. SCM is "a very complex business concept due to the nature and type of decisions involved" (Sanders, 2012, P.3). Thus, according to (Ayers 2006, P.4), it is important to focus on knowledge flows allowing learning for all partners.

SCM helps improve business performance through two main factors. The first factor, according to (Lambert, 2006), is the inter-functional integration of key business processes and information that add value to consumers and stakeholders and this through the network of firms involved in SC. The second factor, according to (Stadler, 2005), is the coordination of physical, information and financial flows in order to fulfill the demands of end consumers with the objective of improving the competitiveness of the SC as a whole. The contributions of the SCM, through the integration and coordination of flows, are manifold. Beamon (1999) and Bowersox et al. (2013, P.368) show that these contributions can be visible in financial terms such as the improvement of turnover, the optimization of investments as well as the improvement of efficiency through productivity and control of total costs (costs of storage, working capital, distribution, etc.). SCM also improves responsiveness and customer services (product quality, reliability of deliveries) as well as flexibility, including the ability of SC companies to respond to changes in the environment. These axis includes flexibility with regard to volume, variety of products, delivery dates, development of new products and services. It is to notice that any failure in managing inventories could generate hidden cost, which negatively influence the product cost through the SC.

Based on what mentioned above, it becomes important for companies to develop and adopt best practices related to inventory management, and to ensure their regular application. This verification of practices relevance can be ensured by a logistic auditing using logistics standards such as: ASLOG model, EVALOG, SCOR, etc.

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III. The Standards Adopted to Assess Supply Chain-Oriented Inventory

The ASLOG standards are designed to assess the overall Supply Chain. This allows the company, regardless of its size, to be assessed against a benchmark that ranges from basic practices to operational excellence. The ASLOG model, which was designed according to a process structure, presents several process axes, namely, management, strategy and planning, sourcing, manufacturing, transportation, inventory management, marketing, reverse logistics, performance indicators, etc (Zouaghi, 2013, P.99).

ASLOG has designed logistic standards based on the model developed by VOLVO in the 1990s. The ASLOG standards provides assistance to companies wishing to adopt a continuous improvement approach, with the main objective of achieve the level of excellence and implement good logistics practices. The first version of this Standards goes back to 1997. It then had 53 questions strongly oriented towards the product life cycle, but it did not sufficiently take into account the issue of downstream flow or other issues. The concept of the Supply Chain was introduced into the model in 2002. In our study, we used the 5th version, developed in 2008, which includes 124 questions.

IV. Results

The following lines will present the evaluation of different dimensions of inventory management, namely, logistic platforms implantation, warehouses and warehousing, inventory management, activities and risks, and finally staff and responsibilities. These results will show how mature are the company practices regarding these four dimensions.

A. Logistic Platforms Implantation, Warehouses and Warehousing

TABLE I. Evaluation of logistics platforms implantation and warehousing

Questions	Scores			
	0	1	2	3
• What implantation has been studied to ensure the warehousing operations?		√		
• How are filling rates managed?		√		
Total	**02 points**			

Actually, the location of the stores is rationally designed to avoid long trips and complicated handling. The circulation of flows is designed to avoid slowing down and the risk of accidents. Product locations are known, so FIFO and FEFO methods are easy to apply. The surfaces of the stores are satisfactory and make it possible to avoid saturation. So even in cases of overload, the company can handle the situation. The filling rate of the cold rooms is monitored in a daily manner.

B. Inventory Management

TABLE II. Evaluation of Inventory Management

Questions	Scores			
	0	1	2	3
• How is inventory management ensured?	√			
• How are stock levels worked?		√		
Total	**01 point**			

The company does not have any defined rule allowing trade-offs between stock levels or their coverage rate and the expected service rate or the breakdown rate. The company carries out a general statistical physical inventory twice a year (semi-annual inventory), with rotating inventories carried out for certain products. This inventory makes it possible to detect discrepancies between what is documented in the registers and in the information system and what actually exists in the stores. It should be noted that the company is not really not mature in terms of inventory management, and even the inventories it carries out are often not efficient. If supply, production and sales operations are not based on documented and formalized procedures and rigorous checks, it is obvious that the company will have deviations in its calculations. In other words, the company focuses on physical flows while the information flows that must follow them in parallel are not well-developed. The use of supporting documents in the movement of the material is very low such as documents about reception of supplied raw material, or about reception of finished products from production department, or about products shipment from sales department, etc.

C. Activities and Risks

TABLE III. Evaluation of Activities and Risks

Questions	Scores			
	0	1	2	3
• How are the means of handling and storage maintained?		√		
Total	**01 point**			

Indeed, the company does not have competent maintenance staff present during working hours. In the case of breakdowns, the company calls a specialized person who will fix it either on the company's site or in his garage. It is to say that the company doesn't have developed means of handling which require a staff of maintenance.

D. Staff and Responsibilities

TABLE IV. Evaluation of Staff and Responsibilities

Questions	Scores			
	0	1	2	3
• How are stock movements and transactions managed?		√		
Total	**02 points**			

Actually, responsibilities for executing inventory movements and transactions are not well defined. Sometimes these operations are performed by the procurement manager, other times by the production manager. This reality means that the information about flows are not synchronized with the physical flows. In order to avoid these problems, the company has launched an offer for a position of inventory manager which should be hired as soon as possible.

TABLE V. Summary of dimensions' evaluation.

Dimensions	Obtained Scores	Max Scores	%
Logistic Platforms Implantation, Warehouses and Warehousing	02	06	33%
Inventory Management	01	06	17%
Activities and Risks	01	03	33%
Staff and Responsibilities	00	03	0%
Total	**04**	**18**	**22%**

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V. DISCUSSIONS AND RECOMMENDATIONS

Going from the table above, a performance level of 22% seems to be very week. the creation of logistics department and the recruitment of an inventory manager is essential and represents an organizational priority. Also, it is true that the location of the stores was designed to avoid long trips, but the company can progress in terms of managing the stockrooms where the product is present through granting them appropriate zones. In the same line, a planning and regular review of areas to remove expired stocks and relocate stocks for existing and new products is necessary.

According to the inventory management, it is necessary that it should be managed by taking into account the couple (stock level and customer service rate). Thus, balancing between stock levels, service rates must be an ongoing practice. As the company is new in the food sector, it can lead a benchmarking study with similar and competing companies in terms of working capital in stocks, information and communication, handling techniques and tools, determination of provisions for depreciation of stocks, etc.

Regarding handling equipment, the company must schedule preventive maintenance to ensure the availability of equipment. Thus, it must make a list of the main fixers and suppliers of spare parts. Thus, the company must ensure that no physical movement can take place without the information system being informed. Responsibilities for stock adjustments should be clearly assigned and to find the deviations, the staff must help with research and analysis and participate in improvement actions.

Figure 2 presents a comparison between the required scores (Target) and the obtained scores.

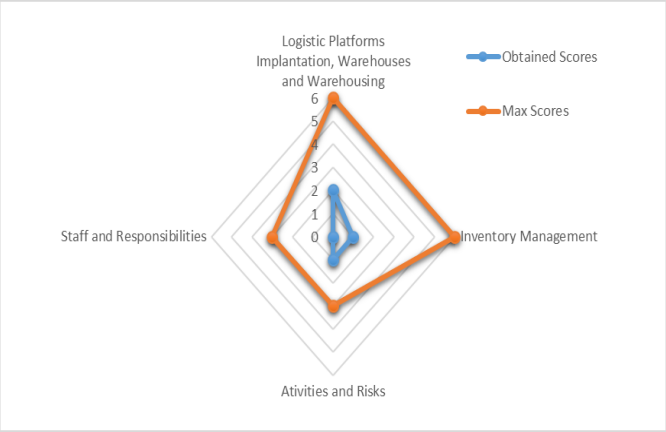

Fig. 2. Obtained scores against Max scores.

Figure 3 shows the global evaluation for all inventory management dimensions. Globally, compared to the best logistic practices, the company presents many weakness, especially with the staff and responsibilities, this reflects a weak organizational structure.

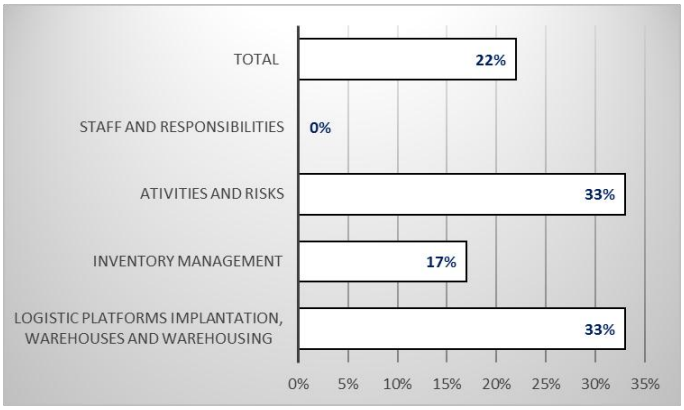

Fig. 3. Global evaluation of Inventory Management Dimensions

VI. CONCLUSION

In conclusion, the aim of this paper is to evaluate the performance of the inventory management from a Supply Chain perspective of small and medium enterprise operating in food sector in an emerging country that is characterized strongly by the informal market and the social networks. The assessment was based on ASLOG standards that have been readjusted to the context of the studied company's activity by eliminating some questions. This benchmark has enabled to identify sources of logistics performance that could help this SME to reduce costs and increase sales. finally, recommendations have been made to strengthen the weaknesses, reduce dysfunctions and improve logistics practices. Also, this article discusses the problems related to the organization of work, and in particular the lack of a clear assignment of logistical tasks among the managers as well as the lack of established procedures remain major problems in this society. Like any research work, this work has certain limitations, the first limitation is being of a methodological nature concerning the analysis of the interviews conducted with the managers and the evaluation points given to each inventory management dimensions. Indeed, another measurement scale that range from 1 to 7 could also be used in this auditing and which seems more relevant in the evaluation than 3 points scale. Finally, the design of a logistics dashboard and its implementation could be the subject of future research work.

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