

## Role of information systems in supply chain management optimization

## Rôle des systèmes d'information dans l'optimisation de management de la supply chain

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### **Abstract**

The information system plays an important role in optimizing the supply chain management (planning and performance, platform and transport), in order to ensure good coordination between them, as well as allowing optimization of the supply chain (production, storage, and transport) (BOUROUBA 2013). This paper presents the role of information systems in optimization of the supply chain management and its application in CEVITAL Company.

**Key word: Supply chain management , information system.**

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## **I. Introduction**

Today, manufacturing companies can no longer afford to limit their market to the local level alone, they are doomed to respond to the demands of increasingly global markets. In an increasingly competitive environment, marked by globalization, the appearance of new markets, new customer requirements, and expectations. Likewise, it turns out that the strategies of companies focused on the production segment were limited (*Pierre al 2015*).

Supply Chain Management helps the supply chain to achieve these goals, SCM help to ensure coordination and control to help the company to be performance. Information System helped the company to sales forecasting, data synchronization between different company departments contributing to the logistics function, and finally management operational physical flows, from order management to warehouse management (*Kaya al 2012*).

In this context, our objective is to highlight the role of the system information in optimization of the supply chain management. In this article, I will focus the research on the CEVITAL Company In order to respond to this problematic (*BOUROUBA al 2013*).

In this article I will use Positivism paradigm in order to find the reality of my problematic, for this I will base on a hypothetico-deductive model of science. As such, identifying the structure and basis of positivism through the hypothetico-deductive lens is a useful place to start.

First I will discuss some conceptual background: Supply chain management, Information System and supply chain relationship, Information technology in supply chain management, Supply chain management architecture.

Then I will present the main goal of this paper: Role of information systems in optimising the supply chain management in CEVITAL Company.

## **II. Conceptual background**

### **1. Supply chain management (SCM):**

The CSCMP (Council of Supply Chain Management Professionals) defines the SCM as being: "*logistics management is this part of the supply chain management which foresees, sets up and efficiently controls the flows, counterfeits, and stocks of goods, as well as the associated*

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*services and information, their point of origin to their point of consumption, so as to meet the requirements of clients” ( Kaya al... 2012).*

In the case of CEVITAL, the objective of SCM is to ensure good coordination throughout the business chain from procurement to distribution (*BOUROUBA 2013*).

The activities of the SCM are integrated into the entire life of the company. She emphasizes customer satisfaction, flexibility, and reduction of wasted time and materials (cost reduction).

It was found that the challenge of SCM is to optimize the operation of the chain logistics, improve lead times, increase the quality of service, etc. these objectives are those of any logistics director or supply chain manager. But any project aimed at improving the efficiency of an organization, whatever its scope (supply, stocks of raw materials, warehousing, production, transport, return management, etc.) requires a prerequisite: you have to know how to measure before to optimize and it is often the measurement and its evolutions that will provide the axes and courses of action (*Kaya al... 2012*).

## **2. Information System and supply chain management relationship**

An information system is a formal that collect, process and store and distribute information, in the right place and in the right time and right whys, which helped to facilitate the sharing of information within supply chains (*Pierre al 2015*).

In the case of CEVETAL, the information system plays an important role in optimizing the supply chain management (planning and performance, platform and transport), in order to ensure good coordination between them, as well as allowing optimization of the supply chain (production, storage, and transport) (*BOUROUBA 2013*).

## **3. Information technology in supply chain management**

According to professor Charkaoui: SCM's tools rely on the production capacity information present in the company's information system. Thus the tools of the SCM are very strongly correlated with the integrated management software package.

Integrated business management systems (ERP) are integrated suites of software that automate business and management processes to optimize the use of business resources. They support activities at the level of accounting, finance, production, distribution, project

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management, and human resources. The purpose of such an implementation is to simplify business processes. A well-integrated business can compete better since, in principle, there is less capital invested in inefficient operations or dormant inventory. There are several advantages to using an ERP system. They provide a global vision of the company, they allow more flexibility and finally, real-time information processing.

The key element of such an implementation is change management which includes preparation as well as training. Considered a strategic approach to the management of information relating to the product, from its definition to the maintenance phases including manufacturing, PLM (Product Life cycle Management) is above all an industrial discipline. The PLM approach involves very strong interweaving with the company's ERP (inventory management, production, etc.), its CRM tools (user feedback on anomalies, analytical CRM), its fleet management policy (trains, vehicles), its marketing department, etc. It can therefore appear as a discipline that can or wants to manage, analyse, and control everything in the company, a sort of universal industrial ERP with ultimately very vague outlines. But PLM is limited to product-related information, admittedly interconnected with other data management systems, but focusing on the management of this information throughout the life of the product.

Thanks to better circulation of information in the company, to the reduction of the gap that can sometimes exist between design offices and production chains, to an upstream consideration of contingencies linked to product developments, PLM enables concrete improvements to be made in terms of the frequency of new products being released, resource management, information flow traceability (particularly with suppliers) and data rationalization (creation of a single repository). The purpose of EAI (Integration of Enterprise Applications) is the inter-polarity and organization of the flow of information between heterogeneous applications, to communicate the various applications of the company, even those of customers, partners, or suppliers. An EAI project, therefore, consists first of all in setting up an architecture in which the different applications communicate with each other. It is, therefore, a matter of developing connectors (middleware) to interface applications using different communication protocols. The EAI also makes it possible to define a workflow between applications and thus constitutes an alternative to ERP with a more modular approach.

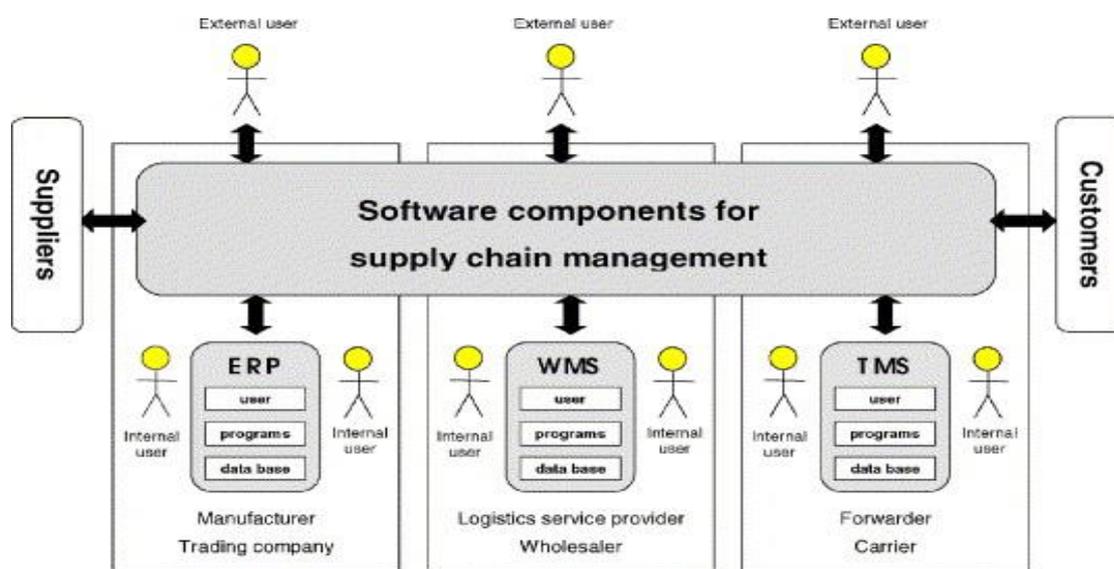
The EAI, the hub of the electronic value chain and the unifying element of the information system, is considered a vector of the extended enterprise, and its evolution towards Web Services (Charkaoui 2009).

#### 4. Supply chain management architecture

The supply chain management architecture is constituted by the basic systems in a supply chain provide specific functions for typical users: ERP systems (enterprise resource planning systems), WMS (warehouse management systems) and TMS (transportation management systems)

These systems consistent management of elementary business data, such as: customers and sales orders, items and prices, warehouses and bins, resources and work orders, suppliers and purchase orders (Verwijmeren 2004).

**Figure 1 . ERP, WMS and TMS in the supply chain management architecture.**



Source: M. Verwijmeren / Computers in Industry 53 (2004) 165–178

### III. Methodology:

The methodology used in this article is based on collected information about CEVITAL Company which was found in a case study (BOUROUBA 2013), that information relating to the deferent information system used by the company and the role that it play, along with some

limits of the company in system information that they can fix to improve more the optimization of supply chain management by the information system.

The purpose of using CEVITAL is to present a real example of the role of information systems in optimizing supply chain management.

#### **IV. Role of information systems in optimizing the supply chain management in CEVITAL Company :**

The information system plays an important role in the supply chain management (planning and performance, platform and transport), in order to ensure good coordination between them, as well as allowing optimization of the supply chain (production, storage, and transport).

The CEVITAL supply chain uses material resources and software for recording and managing information.

##### **➤ Technological equipment**

The hardware used in this direction in terms of computer technology essentially is:

- Microcomputers;
- Printers allowing the conservation of information on paper;
- Databases containing the results of the various activities.

##### **➤ Software**

The logistics department is based on the execution of its tasks on the WMS and Sage 1000 (inter-depot communication network). The Sage is software which is presented in a Windows environment like the most software; it allows automated and secure management of information. CEVITAL has implemented the sage 500 from its construction for the registration of data and information related to the management of raw material supplies, inventory management of finished products, and transport management.

In 2008, CEVITAL transferred the implantation from sage 500 to sage 1000, with the aim of broadening its application by the directions, thus its power in information automation.

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The planning and performance department which manages the chain logistics uses the sage 1000 in recording data related to certain functions such as:

- Shipping management
- Stock management;
- Transport management;
- Sales and commercial management.

The logistics department uses the WMS only at the storage depot level of BOUIRA which is called NUMILOG for the management of the transport of finished products.

Thus, the logistics department relies on software products (Utilities) from management: "Word 2007" for word processing (note, invitation, various documents, etc.). The "Excel 2007" spread sheet for the various calculations.

An information system in the logistics department contains four states. Those are the stages of its operation ranging from data entry to dissemination of information (*BOUROUBA 2013*).

➤ **Critical analysis of the management of the logistics chain and the Information System within CEVITAL**

Regarding the limits of supply chain and system management of information used at CEVITAL on site following elements:

- Logistics is too attached to transport techniques and stock management;
- Flow management is done only in the medium and short term (planning for moons and for a week)
- Long-term management (at the strategic level) is non-existent in this business;
- The lack of upstream logistics chain management (suppliers/procurement);
- CEVITAL does not have software allowing optimization and rationalization supply chain management (ERP, APS, TMS, etc.) (*BOUROUBA 2013*).

It was found that the information system in the logistics department remains traditional since its different tasks are carried out by conventional materials. Thus, the CEVITAL company does not have the software, which will help the company to integrate all the functions and their interconnection in order to better improve your productivity. More precisely, this software allows the optimization of supply chain management.

Given the shortcomings that we have noted previously, the company CEVITAL can improve its overall performance by acting on the improvement of the management of its logistics chain. We will try to present the following recommendations:

- Logistics has become part of modern management, so we must integrate the strategic level to determine the structure of the chain;
- Integrate all the company's partners: customers, suppliers, distributors, ...so that the goods are produced and distributed in the required quantity, at the right place and at the right time in order to satisfy its customers;
- CEVITAL is a company that retains its activities (manufacture of packaging and oil conditioning). To make available to all structures information and to be able to coordinate the processes together, the communication and management assistance tools;
- Taking into account the physical flows of supply, production and distribution remains insufficient; company managers must ensure the management of flows between the different functions;
- Designate a logistics chain manager who will drive all plans actions and activities aimed at improving the overall performance of the chain;
- Modelling of the logistics chain using the SCOR model to increase its overall efficiency (evaluates and compares chain activities and their performance);
- The implementation of a global information system to save the time required for the exchange of data related to procurement and delivery and reduces the cost of storage and consumption of resources by the use of computer media;

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- Use software that allows the optimization of the supply chain to different hierarchical levels: operational, tactical and execution. We hope that these recommendations can provide better clarification to improve performance in this business (*BOUROUBA 2013*).

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## V. Conclusion

In order to ensure overall SCM, these IT tools must in fact be supplied and operated by the various actors in the logistics chain, including business partners. Activity systems, which we can hardly save money to achieve significant and lasting productivity gains.

Despite the performance of IT solutions available on the market, the implementation of more streamlined SCM remains to be achieved for many companies. As for the company having already implemented optimization of their supply chain management via the information system, it should take into consideration the following points:

- Make the supply chain flexible so that it adapts to changing needs induced by changes in demand and modes of communication.
- Develop logistics risk management practices and tools: an unforeseen incident in the supply chain can quickly affect the whole of the company's activity.
- The risks therefore become interdependent, especially as the flows are tightened and optimized to the lean.

Indeed, technological advances have enabled companies to acquire a high-performance production tool and an information system architecture allowing connecting fairly quickly to its internal and external environment (*Pierre al 2015*).

However, the problems of assignment and synchronization of tasks in a company in a whole network of companies always remain current questions. The ERP or SCM tools do not yet have very powerful models for assignment of tasks. Moreover, the detailed study of these different points of view requires a multidisciplinary culture, which in some cases goes beyond the framework of modest memory. In addition, the supply chain design problem is multi-objective in nature. (Minimize costs, minimize delays, increase the service rate, etc.), it is important and grasps their interest and their difference (*Pierre al 2015*).

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