A Reference Matrix for Information System in Supply Chain Management

Luiz Felipe Scavarda
Departamento de Engenharia Industrial, PUC-Rio, Rio de Janeiro, RJ, Brazil
E-mail: lfscava@ind.puc-rio.br

Alessandro B. de Carvalho
Departamento de Engenharia Industrial, PUC-Rio, Rio de Janeiro, RJ, Brazil and Hewlett Packard
E-mail: alessandro.carvalho@hp.com

Márcio da S. Vieira
Departamento de Engenharia Industrial, PUC-Rio, Rio de Janeiro, RJ, Brazil and Castrol/BP
E-mail: marcio.vieira@bp.com

Abstract
Considering the importance of information systems (ISs) in supply chain management (SCM), an attempt has been made in this paper to review the literature concerning reference models that organize the different ISs necessary for the success of a supply chain under a SCM perspective. These ISs are generally organized in a SCM matrix formed by two dimensions: decision levels (the vertical axis) and supply chain business processes (the horizontal axis). The goal of this paper is to conduct an exploratory study concerning SCM matrixes for IS in order to bring out pertinent factors that would support other researchers and practitioners in understanding the organization of ISs in SCM. Several reference models based on the SCM matrix were identified and analyzed and then used to form the basis of a general framework that was applied to two supply chain cases in Brazil.

Keywords: supply chain management (SCM), information system (IS), reference models, supply chain business processes

Introduction

Many definitions are offered in the literature for supply chain management - SCM (e.g. Shapiro, 2000; Simchi-Levi et al., 2004; Pires, 2004; Christopher, 2005). All of them highlight that SCM aims at maximizing the benefits obtained by adopting a single entity view of the supply chain rather than a fragmented-in-parts view. They also see SCM's main purpose as to serve end customers more effectively and efficiently, either by reducing costs across the whole supply chain or by enhancing customer value, satisfaction, and profitability, in order words, by providing the whole supply chain a competitive

advantage. The definition developed by the Global Supply Chain Forum and reported by Lambert and Cooper (2000) supports better the issues discussed in this paper. According to this definition - "SCM is the integration of key business processes from end user through original suppliers that provide products, services and information that add value for customers and other stakeholders".

SCM is considered the 21st century global operations strategy for achieving organizational competitiveness and requires an integrated set of information systems (ISs) for sharing and processing information on various value-adding activities along the supply chain. As a result, information technology has assumed a critical and strategic role in organizations (Compass Group, 1999). Within this context, organizations are attempting to find ways to improve their flzexibility and responsiveness and in turn competitiveness by changing their operations strategy, methods and technologies that include the implementation of SCM and of information technology (Gunasekaran and Ngai, 2004).

Therefore, the goal of the present paper is to conduct an exploratory study concerning SCM matrixes that host these ISs to bring out pertinent factors that would support other researchers and practitioners in understanding the organization of ISs in SCM.

The paper is organized as follows. First it provides a brief review of the literature on ISs and introduces SCM software. The details of the research methodology are presented next. Then the paper presents the SCM matrix for ISs with its two dimensions: decision level and supply chain processes. Seven reference models based on this matrix identified in the literature and one in the software market are also presented. Next, a general framework is offered based on the analyzed reference models and on interviews and it is applied to the supply chains of two companies in Brazil. Finally, final remarks about ISs applied to SCM are offered by the authors.

Information Systems

Practical developments in SCM are mainly due to advances in information technology infrastructure. This infrastructure means hardware and software around which information technology systems are built. These information systems, focus of this paper, can be divided in transactional and analytical systems.

Transactional systems are responsible for acquiring, processing, recording and transmitting-communicating information about the past and present of enterprises operations; and for compiling and disseminating reports summarizing this information (Shapiro, 1999; Kahl, 1999). With these systems it is possible to know what is going on in the supply chain, for instance, it is possible to know what products are available in the company's inventory or portfolio.

Analytical systems aid and improve supply chain decisions based on models constructed from an information data base. Optimization and simulation can be examples of these systems. While optimization uses algorithms to find solutions (optimal for exact and

sub-optimal for heuristic) to decision making problems, simulation creates models of a problem-situation and conducts experiments with the model to understand the behavior of this problem-situation. With analytical systems it is possible to know what to do about what is going on in the supply chain, for instance, it is possible to know what products should be in the company's portfolio given a specific scenario.

Before the introduction of ISs in specific functions (e.g. manufacturing), management techniques were manual, unfriendly, and time demanding. The advance of information technology associated with its cost reduction process allowed organization to use ISs to support their specific functions. The first ISs automated distinct day-to-day functions (e.g. finance, human resources, purchase order processes). Material requirement planning (MRP) and manufacturing resource planning (MRP II) can be considered examples for manufacturing functions.

MRP was introduced in the 1970's as a computerized inventory control system that would calculate the demand for component items, keep track of when they are needed, and generate work orders and purchase orders that take into account the lead time required to make the items in-house or buy them from a supplier. MRP II is much broader in scope than the original material planner, incorporating marketing and financial functions as well (Russell and Taylor, 1998). In the early 1990's, software vendors created wider transaction solutions that integrated these disparate functions into a common business model. These integrated solutions provided a comprehensive backbone that synchronized the various transactions that make up the business (Kahl, 1999). Enterprise resource planning (ERP) systems are a good example. ERP updates MRPII with relational database management, graphical user interface, and client/server architecture (Russell and Taylor, 1998). The capacity of ERP systems to integrate organizational business processes and share information across functional areas through a common database has prompted commentators to declare that they are a prerequisite for success in the XXI century (Davenport, 2000). The next step of this evolution came in the mid 1990's with the introduction of the information systems applied to SCM (SCM software). This software leverages knowledge to enhance and integrate the supply chain, in what Kahl (1999) calls automating relationships. Figure 1 synthesizes the evolution briefly described before.

In contrast to ERP, SCM software is not a transaction-processing system in the sense that it records data and process the day-to-day business tasks. Rather, through analytical systems that include sophisticated algorithms and scenario analysis, it empowers managers to streamline operations and to better understand the impact of their strategic decisions (Kahl, 1999). These analytical systems include functionalities for modeling and simulating the supply chain and for planning and optimizing schedules, quantities, and capacities across the supply chain under certain objectives and restrictions (Guenther and Laakmann, 2002). SCM software helps the production planner decide whether to accept an emergency order; it enables the transportation planner to determine

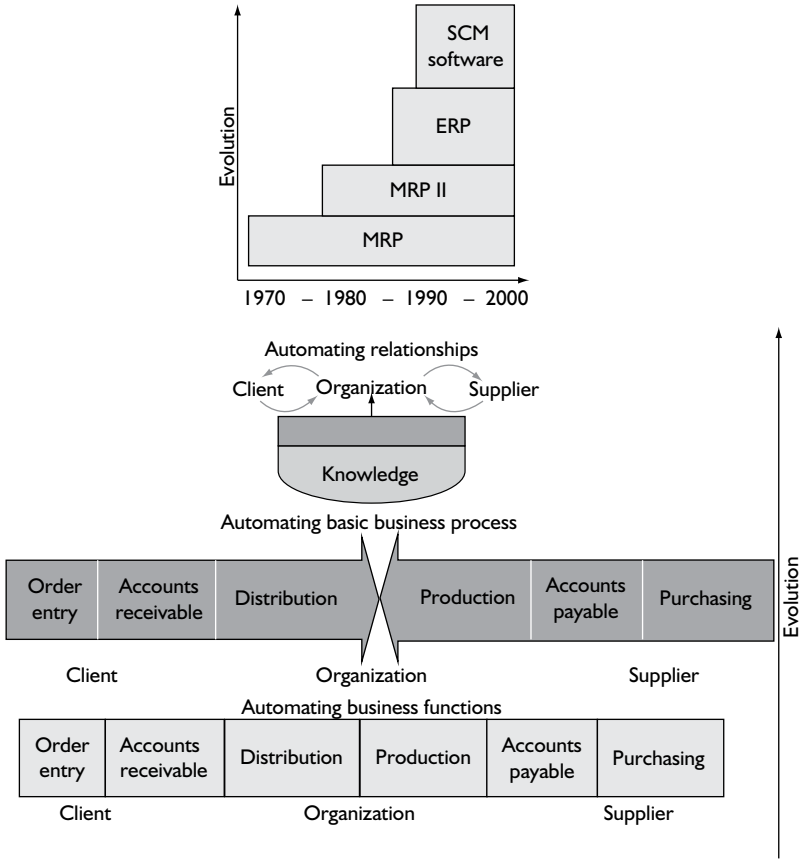


Figure 1 - Evolution of the ISs: from MRP to SCM software. source: adapted from Kahl (1999) and Hieber and Alard (1999)

the best mode of transportation; it helps the product manager forecast demand more accurately; and it allows the procurement manager to source components strategically (Kahl, 1999). SCM software can be classified into supply chain planning (SCP) supply chain execution (SCE) software. The first type helps to plan the supply chain and the second one helps to execute the plans efficiently and effectively. A brief description of each type found in Koch (2002) is given next.

SCP software supports the improvement of the supply chain flow and is entirely dependent upon information for its accuracy. Theoretically it is possible to assemble the needed information to feed the SCP applications from legacy systems, but it can be nightmarish to try to get that information flowing on a fast, reliable basis from all the areas of the company. ERP is the battering ram that integrates all that information together in a single application, and SCP applications benefit from having a single major source to go to for up-to-date information.

SCE software is intended to automate the different steps of the supply chain and to execute the SCP. SCE is less dependent upon gathering information from around the company, so it tends to be independent of the ERP decision. But chances are it should be needed to have the SCE software applications communicate with ERP in some fashion. It's important to pay attention to SCE software's ability to integrate with the Internet because the Internet will drive demand for integrated information.

Research Methodology

A literature review was the research methodology employed for the main part of this work. Based on this review, the authors identified and analyzed several reference models that organize into a matrix the different ISs (transactional and analytical) necessary for supporting a successful SCM: Shapiro (1999), Kahl (1999), Meyr et al. (2002), Hieber (2002), Laakmann et al. (2003), Chopra and Meindl (2003), and Taylor (2004). The main purpose of this literature review was to assemble meaningful information regarding at ISs for SCM. The inclusion of a significant software vendor SCM matrix was done just to show the proximity of academic and market models. This first part of the research also supported a preliminary version of a general framework that could synthesize into a suitable scheme the main aspects and characteristics included in a SCM matrix that could be used to analyze two cases in Brazil.

The preliminary version of the framework was improved and validated by non-structured interviews with 4 practitioners involved with the companies that were included in the cases and with 4 consultants/researchers of the SCM and ISs fields. These interviews restricted the list of business processes and ISs that were obtained in the literature review towards conducting the cases in Brazil. The framework was used to analyze ISs that were present in the supply chains of a lubricant manufacturer (*Castrol do Brasil Ltda*, part of BP) and of an electro-electronic (*Sony Brasil Indústria e Comércio Ltda*, one of Sony Corporation's subsidiaries in Brazil), from now on called in this paper as Castrol Brazil and Sony Brazil. These two different chains were chosen because the authors of this paper believe that they are complementary. While for Castrol Brazil the main focus are in the procurement and manufacturing processes, for Sony Brazil it is in the distribution process. As result, Castrol Brazil supply chain analysis included two significant suppliers and one logistic provider, companies that agreed to take part of this research. Sony Brazil was considered the focal company for its supply chain case and, as distribution is its main focus in Brazil, two logistic providers and a first tier customer (most representative retailer for Sony Brazil) were considered. Primary data were gathered in 2005 from each considered supply chain member by the authors using: 1) direct observations in locus (two manufacturing plants and five distribution centers were visited); and 2) interviews with managers from each of these members/companies (the authors interviewed 14 respondents in this research stage). These interviews were based on a questionnaire that was divided into two parts. The first

part embraced opened questions concerning ISs under each company's perspective limited to their organizations frontier. The second part embraced opened questions concerning ISs under a supply chain perspective. Both parts were applied to two managers of each focal company and to one manager of each of the chosen members of their supply chains. The results were validated by all respondents.

SCM Matrices for Information Systems

The literature offers many reference models that organize the different ISs necessary for the supply chain success under a SCM perspective. These ISs are generally organized in a matrix (called SCM matrix) which classifies them in two dimensions: decision levels (the vertical axis of the matrix) and supply chain business processes (the horizontal axis of the matrix). This section presents seven reference models offered in the literature: Shapiro (1999), Kahl (1999), Meyr et al. (2002), Hieber (2002), Laakmann et al. (2003), Chopra and Meindl (2003), and Taylor (2004); and one model offered by a software vendor (Oracle). The section describes first the two dimensions of the SCM matrixes, and then it describes the main ISs that fulfill these matrixes. This section provides next additional information regarding the reference models.

Decision Levels (First Dimension)

SCM embraces decisions associated to the different supply chain activities, processes, and companies, for instance, decisions concerning: product design; commercialization project; suppliers selection; marketing channels definition; procurement; inbound and outbound transport; inventory level of raw-material, working in process products, and finished goods; production capacity; sales; finance; among others. These decisions are supported by many ISs and cover the strategic, tactical, and operational levels. As a result, these decision levels are adopted as the vertical axis of the SCM matrixes of the reference models.

The strategic decision level has a long-term planning horizon and incorporates fundamental investment decisions that should be aliened with the organization's goals. These decisions aim normally the maximization of profits and return of investments using aggregated information (Shapiro, 1999). Different "what-if" planning scenarios can be simulated to compare possible locations for production facilities and warehouses or to evaluate alternative distribution and supply channels. Furthermore, the consequences of changes in a given supply chain can be assessed, e.g. a change of suppliers, the use of the new distributions channels, or the loss of a customer. Finally, this task includes the assignment design of products to production sites and distribution channels (Guenther and Laakmann, 2002). The output of this set of decisions is an optimized design

of the supply chain under a SCM perspective. This output serves as an input for the tactical and operational decision levels.

The tactical decision level has a mid-term planning horizon. Within the scope delimited by the strategic decisions, the tactical decisions emphasize the allocation or resources (such as materials and capacities) within the supply chain to meet the expected and forecasted demand in a cost-effective way. A strong information exchange on an inter-organizational level is necessary to acquire reliable and sufficient information. These tasks are currently mainly supported is isolation by each partner's ERP system (Guenther and Laakmann, 2002). Tactical decisions use less aggregated information than the ones used for strategic decisions.

The operational decision level has a short-term planning horizon and execution functionality. Once tactical decisions are defined, operational decisions specify the short-term plans and all the activities to execute and control these plans. These operational decisions use disaggregated information. Real-time communication between the supply chain partners at this level is very important to enable operation functionalities, for instance, track-and-trace.

Supply Chain Processes (Second Dimension)

Companies have been rethinking their internal organization, no longer concentrating their attention on the traditional functional model. Now they are turning to inter-functional coordination, aiming at the effective integration of product processes. This view of processes offers a systematic way of seeing the company, or better, its businesses. A process is defined as a structured and measured set of activities designed to produce a specific output for a particular customer (Davenport, 1990). It is a specific way of ordering work activities across time and place, with a beginning, an end, and clearly identified inputs and outputs.

Successful SCM requires a change from managing individual functions and activities into key supply chain business processes (Lambert and Cooper, 2000; Croxton et al., 2001; Chan and Qi, 2003; Scavarda et al., 2004; Aragão et al., 2004). This change should first happen within an organization. Once the processes are organized and integrated internally, the company can extend this integration to other supply chain members. Traditionally, both upstream and downstream portions of the supply chain have interacted as disconnected entities receiving sporadic flows of information over time. The company competitiveness may increase if its internal activities and its business processes are integrated with processes conducted by other companies that belong to the same supply chain (Lambert and Cooper, 2000). This is a basic tenet in SCM. With it, to rethink the organization of a company becomes also a matter of considering the processes of other companies, yielding inter-organizational processes with customers, suppliers, and service providers by means of the supply chain (Handfield and Nichols, 1999).

The integration of supply chain processes is supported by many ISs. As a result, supply chain processes are largely adopted as the horizontal dimension of the SCM matrixes. In spite of this, there is no consensus in the number and in the types of processes that should be included in reference models for ISs under a SCM perspective. Both number and type of processes vary from reference model to reference model according mainly to the scope that is given to SCM.

SCM Software

SCM software embraces a fractured group of different transactional and analytical ISs. For instance, Goletz (2001) identified in a market survey 720 products that had SCM functionalities. Many software vendors have attempted to assemble many of these different products into a comprehensive supply chain suite, but no one has yet a complete suite/package (Shapiro, 1999; Kahl, 1999; Koch, 2002; Worthen, 2006). This is why the term SCM software could be more precisely referred as "software (or information system) applied to SCM". The paper describes in this subsection the main ISs that fulfill the analyzed reference models.

These ISs aim different tasks and goals, but together and integrated they can determine the supply chain success. It is important to highlight here that the names of the same ISs covered in each of the reference models can vary from author to author, fact that also happens in the software market from vendor to vendor. Another point that should also be highlighted is that these ISs can comprise several others.

Table 1 presents, without being exhaustive, some of the main analytical ISs/modules offered in the models. There are also many transactional ISs included in the models, for instance, MRP, MRP II, distribution requirement planning (DRP) and ERP. We corroborate Shapiro (1999) in the sense that these last ISs are transactional, because they have very few analytical procedures, but there is not consensus in the literature concerning this issue, for instance, Meyr et al. (2002).

Reference Models

In this subsection we present the SCM matrixes of the analyzed reference models. As seen before, all of them incorporate the decision level dimension. The three main levels (operational, tactical, and strategic) can be directly correlated to the execution, planning, and design stages (Guenther and Laakmann, 2002). Differences are seen in the processes dimension, where different processes are used. The same happens with the ISs that fulfill each matrix. Anyway, the main philosophy covered in all these matrixes is the same. This main philosophy was used as the basis of the proposed framework to analyze the two supply chain cases, as seen later in this paper.

Table 1 - Main information systems/modules included in the reference models.

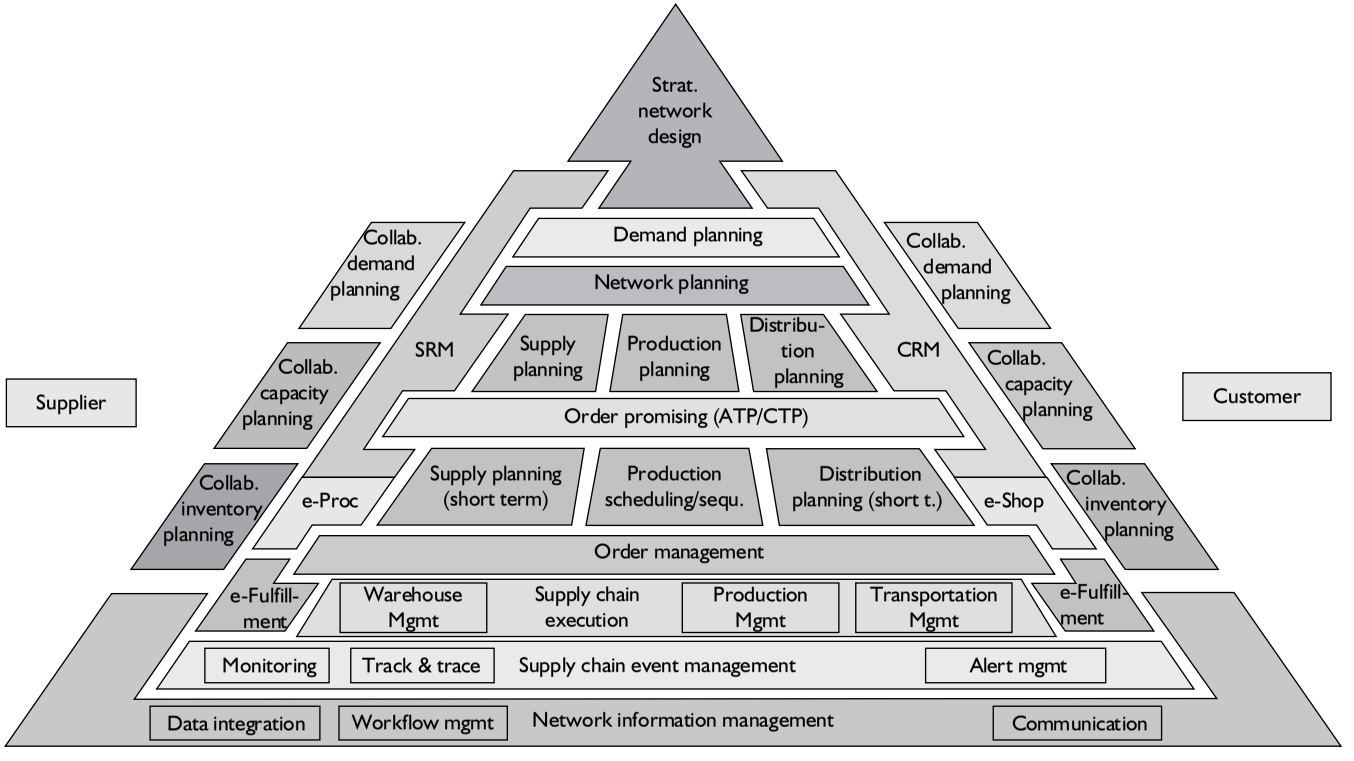
Information systems (ISs)	Description
Strategic planning and management	Is used to analyze strategic decisions, for instance: resource acquisition, site selection, production capacities, and market and distribution channels decisions (Kahl, 1999; Shapiro, 1999; Laakmann et al., 2003).
Network planning	Comprises the comprehensive co-ordination of the individual partners in the logistics network. In this case, different supply and distribution strategies are determined and a master production schedule is set up for the network in accordance with the pre-defined objectives of a company and the forecasted market demand. By taking into consideration all internal and external restrictions and capacities on a rough level, supply, production and distribution plans are set up for all locations. Simulation of different supply and production scenarios is also of great importance in the network planning (Laakmann et al., 2003).
Advanced planning and scheduling (APS)	Creates production plans and schedules in manufacturing plant (Kahl, 1999). Can optimize supply chains to reduce costs, improve product margins, lower inventories, and increase manufacturing throughput. APS necessitates deciding when to build each order, in what operation sequence, and with what machines to meet the required due dates (Lee et al., 2002). Includes strategic planning and network planning functionalities.
Manufacturing execution systems (MES)	Manages shop floor activities in a manufacturing plant (Kahl, 1999). It forges a link between business planning and management control system (Russel and Taylor, 1998).
Supplier relationship Mgt. (SRM)	Is a complete integrated suite that addresses the entire spectrum of interactions between a buyer and a supplier that drive price and value. Evaluates spend leading to a robust sourcing strategy, a right-sizing of the supplier base and a reduction of the overall material costs.
Purchasing planning	Allows analytical comparison between suppliers and between products, helping organizations to decide about what to buy and with whom (Meyr et al., 2002; Chopra and Meindl, 2003).
Component and supplier Mgt.	Administer data on component parts, suppliers, and the purchasing process. Strategically source parts (Kahl, 1999).
Logistic planning and optimization	Determines a logistics master plan for the entire supply chain that analyses how demand for all finished products in all markets will be met over the next quarter (Shapiro, 1999).
Inventory planning	Plan inventory required in each distribution point to meet demand (Kahl, 1999; Meyr et al., 2002).
CRM	Tracks and analyses explicit information about current customers and sales prospects. It matches customers' needs with product plans developing and implementing business strategies and supporting technologies that close the gaps between an organization's current and potential performance in customer acquisition, growth, and retention. Examples of its functionality are sales force automation, data warehousing, data mining, decision support, and reporting tools (Hendrick et al., 2006). CRM is the logical counterpart of SRM Taylor (2004).

Table 1 - Continued...

Information systems (ISs)	Description
Demand planning	Forecasts demand and measures forecasts accuracy through sophisticated algorithms (Kahl, 1999). These forecasts have to be set up on different aggregation levels of products, e.g. on stock keeping unit (SKU) level or on product group level for different regions, distribution channels, customers or market segments (Laakmann et al., 2003). Shapiro (1999) combines this IS with order management system, where this combination aliens data about current orders with historical data to produce requirements for finished products to be met by the operational, tactical and strategic plans. All causal factors such as seasonal influences, events, promotions, etc. have to be taken into consideration.
Customer asset Mgt.	Manages the customer interaction life cycle including sales force automation and customer support (Kahl, 1999).
Order Mgt.	Automates customer-centric order fulfillment processes (Kahl, 1999). See demand planning.
Transportation planning	Optimizes freight, selects modes, plans routes, and selects carriers (Kahl, 1999).
Transportation management systems (TMS)	Facilitates the procurement of transportation services, the short-term planning and optimization of transportation activities, and the execution of transportation plans (ARC, 2003). Can include everything from network-design tools for routing deliveries to operational applications for tracking shipments, scheduling drivers, and calculating how much it will cost to run a shipment between any two points (Taylor, 2004).
Warehouse management systems (WMS)	Manages inventory control, products placement, and picking in a warehouse (Kahl, 1999). Just like ERP and APS, it is highly modularized, with different sets of modules for managing supply, demand, and internal operations. The modules on the supply side automate the process of receiving incoming goods and assigning them to the appropriate storage locations. The ones on the demand side assist in assembling outbound orders and preparing them for shipment. There is usually an inventory management or materials-handling module to bridge the gap between the supply and demand modules (Taylor, 2004).
Product lifecycle Mgt. (PLM)	Manages (integrates and makes available) all of the information produced throughout all phases of a product's life cycle to everyone in an organization, along with key suppliers and customers (Sudarsan et al., 2005).

Taylor (2004) adopts in his matrix three processes: supply, production, and demand. The main ISs included are ERP (with the MRP, DRP, CRP - capacity requirement planning, MPS - master production scheduling modules), APS, WMS, and TMS.

Laakmann et al. (2003) model presented in Figure 2 does not seem a SCM matrix itself, but it could be represented as one as it emphasizes the supply, production, and distribution processes on the horizontal axis and the decision level on the vertical axis. The ISs hosted in the model can be classified into SCP and SCE, starting from the strategic network design level going to the supply chain execution level (WMS, TMS, and MES). The basis of the model is built with network information management and supply chain event management.



SRM = Supplier relationship management
ATP = Available to promise
CRM = Customer relationship management
CTP = Capable to promise

Figure 2 - Laakmann et al. (2003) reference model.

Laakmann et al. (2003) model also points-out three types of collaborative planning that should be integrated to SCM applications: capacity; demand, and inventory.

The collaborative capacity planning comprises the inter-enterprise planning of capacities based on the market demand or on the dependent demand. Besides internal capacities, all external capacities of the suppliers and customers are taken into consideration while planning, in order to avoid bottlenecks or supply shortages before they occur. The objective is to set up a feasible harmonized capacity plan. Therefore it is necessary to exchange the required data in an accurate and up-to-date manner. This is often realized by web-based systems in which all internal and external partners can enter their resource and capacity data themselves.

In a collaborative demand planning the forecast of the future demand is generated together with suppliers or customers. Suppliers or customers are involved in the demand planning process at an early stage, so that their market and product information can be integrated in the forecasting data as well. With the aid of web-based software solutions the relevant information can be exchanged between the partners of a supply chain. These collaboratively generated demand forecasts are the basis for further planning activities in a supply chain. The collaborative demand planning is derived from the philosophy of collaborative planning, forecasting and replenishment (CPFR).

The collaborative inventory planning comprises all supply strategies, in which the planning of customer's inventories is collaboratively executed by supplier and customer. It comprehends strategies such as continuous replenishment (CR) und vendor managed inventory (VMI).

Meyr et al. (2002) include in the horizontal axis their SCM matrix the same three processes of Laakmann et al. (2003), but they add one more: the sales process, as shown in Figure 3. For Meyr et al. (2002) the procurement, production, and distribution processes are driven by demand forecasts determined by the sales process. This justifies the inclusion

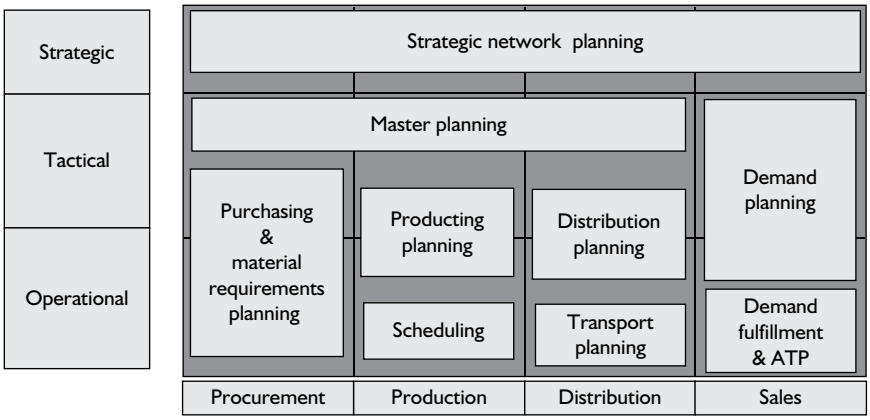


Figure 3 - Meyr et al. (2002) reference model.

of this fourth process into their horizontal dimension. Figure 3 also includes the main modules offered. More details of these modules can also be found in Stadtler (2005).

Shapiro (1999) also considers four processes in his SCM matrix: supply, operations, logistics, and demand, as shown in Figure 4. This model hosts many ISs that are called optimization modeling systems (OMS). A hierarchy of supply chain OMS includes six analytical ISs that are linked to overlapping supply chain decision databases created in large part from data provided by three transactional ISs and one hybrid IS.

In order to facilitate the visualization of the matrix, Shapiro (1999) separates the analytical systems from the transactional ones in two blocks. The analytical ISs cover all decision levels. The transactional block covers just tactical and operational issues. There is also a hybrid block for the forecasting and orders data management system.

In spite of the large use of supply chain processes in the horizontal axis, there are some exceptions. Chopra and Meindl (2003), for instance, adopt in the horizontal axis of their matrix the following supply chain stages in which the information is held: supplier, manufacturer, distributor, retailer, and customer, as shown in Figure 5. This does not change the main philosophy behind this matrix when compared with the other reference models.

Kahl (1999) and Hieber (2002) have a broader view for SCM. As a result, financial management, human resource management, and product lifecycle management have been added to their horizontal dimension. Figure 6 presents the model proposed in Kahl (1999).

The academic models presented here are similar with the ones that software vendors adopt in order to offer their products in the market The paper exemplifies this presenting at Figure 7 the supply chain matrix used by Oracle with its main ISs. The business processes used are three: buy, make, and move. Oracle includes separately the business intelligence solutions that aid the supply chain suite for ISs. The other reference models presented also include these solutions, but indirectly (combined or included in the ISs).

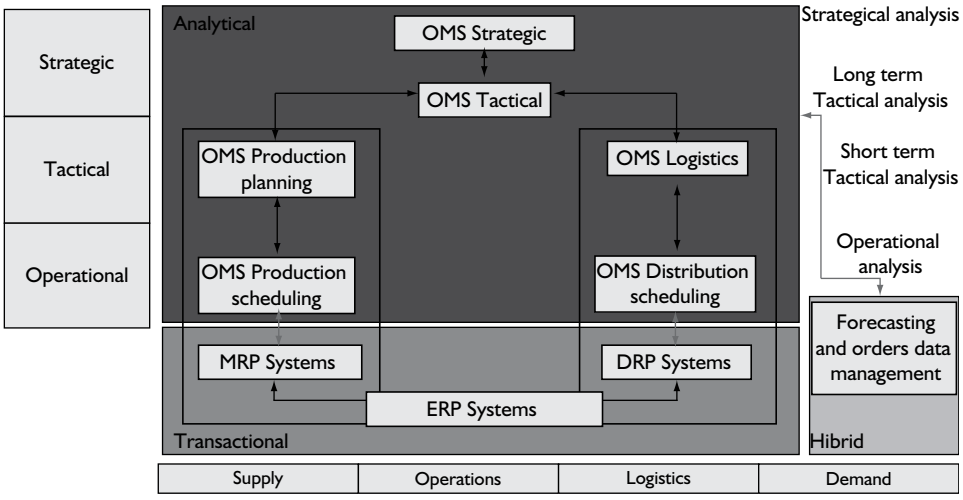


Figure 4 - Shapiro (1999) reference model.

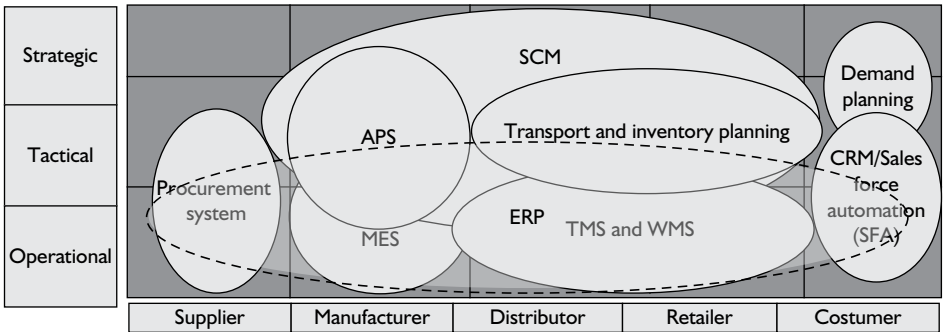


Figure 5 - Chopra and Meindl (2003) reference model.

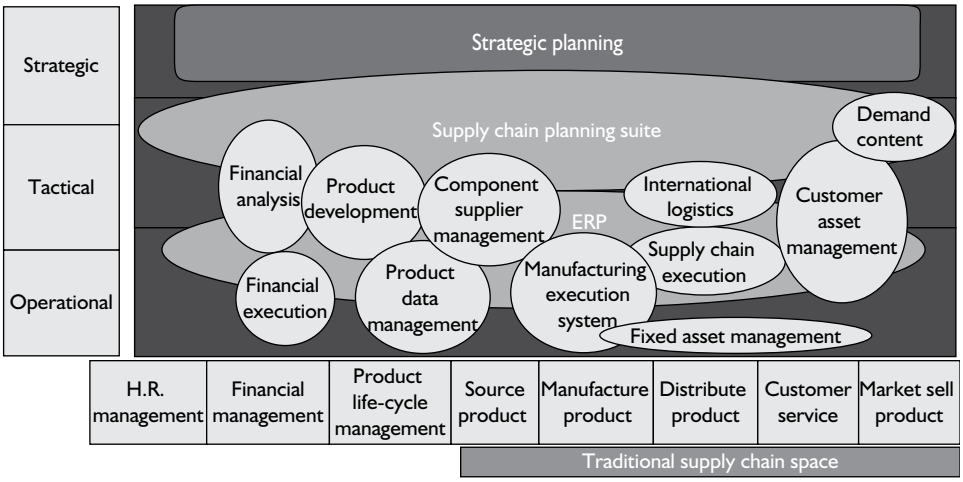


Figure 6 - Kahl (1999) reference model.

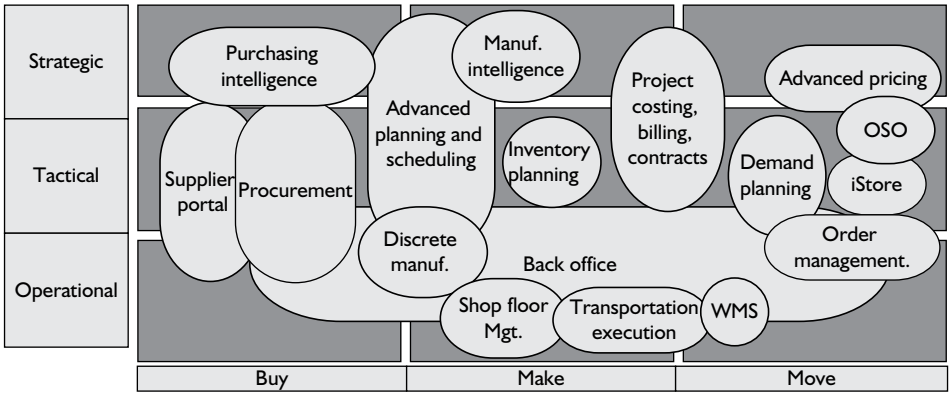


Figure 7 - Reference model for oracle.

Supply Chain Cases

In this section the paper offers a general framework that organizes the different ISs (transactional and analytical) necessary for supporting a successful SCM and applies it to two supply chain cases developed in Brazil.

General Framework

The proposed framework is organized in a matrix using the same two dimensions frequently found in the literature review: decision level (strategic, tactical, and operational) and supply chain processes. This framework is divided into two blocks, one of them embraces the analytical ISs and the other embraces the transactional ISs, just as Shapiro (1999). Both blocks have the decision level in their vertical axis. As transactional systems do not cover strategic decisions, its block includes just the operational and tactical levels. The analytical systems are grouped into SCP and SCE software, as Koch (2002). The ISs included in the framework resulted from the interviews conducted during its preliminary version improvement and validation phase (see the methodology section). The main transactional system introduced in the framework was ERP, but its main modules were considered in a disaggregated form during the cases` interviews. The horizontal dimension includes the following supply chain processes: research and development (R&D), procurement, manufacturing, inbound/outbound logistics, and marketing/sales. The R&D process was not directly included in the several SCM matrixes presented before, but as this process is considered very important, both in the literature (e.g. Lambert and Cooper, 2000; Croxton et al., 2001; Scavarda et al., 2004; Petersen et al., 2005) and in the industry (information obtained with the interviews), the process was incorporated separately to the framework. In spite of being important, both literature and industry pointed that there is not yet a significant analytical IS for this process under a SCM perspective. Figure 8 presents the framework.

The Castrol Brazil Case

Castrol Brazil started its operations in 1957 at Rio de Janeiro. Today it produces lubricants for many different industrial segments and covers all the Brazilian territory.

The company started the implementation of the ERP system of JDEdwards (Version A 7.3) in 1999. The company implemented all the modules, with exception of the human resources one. The implementation process took 18 months and was conducted by a multi-cultural time that embraced key employees of different areas of the company and by external consultants. The implementation included some customizations that attended specific aspects of Castrol Brazil. These customizations were done carefully in order to avoid future problems with upgrades of the ERP system. This new system replaced many isolated legacy systems and provided Castrol Brazil with all the benefits of an integrated

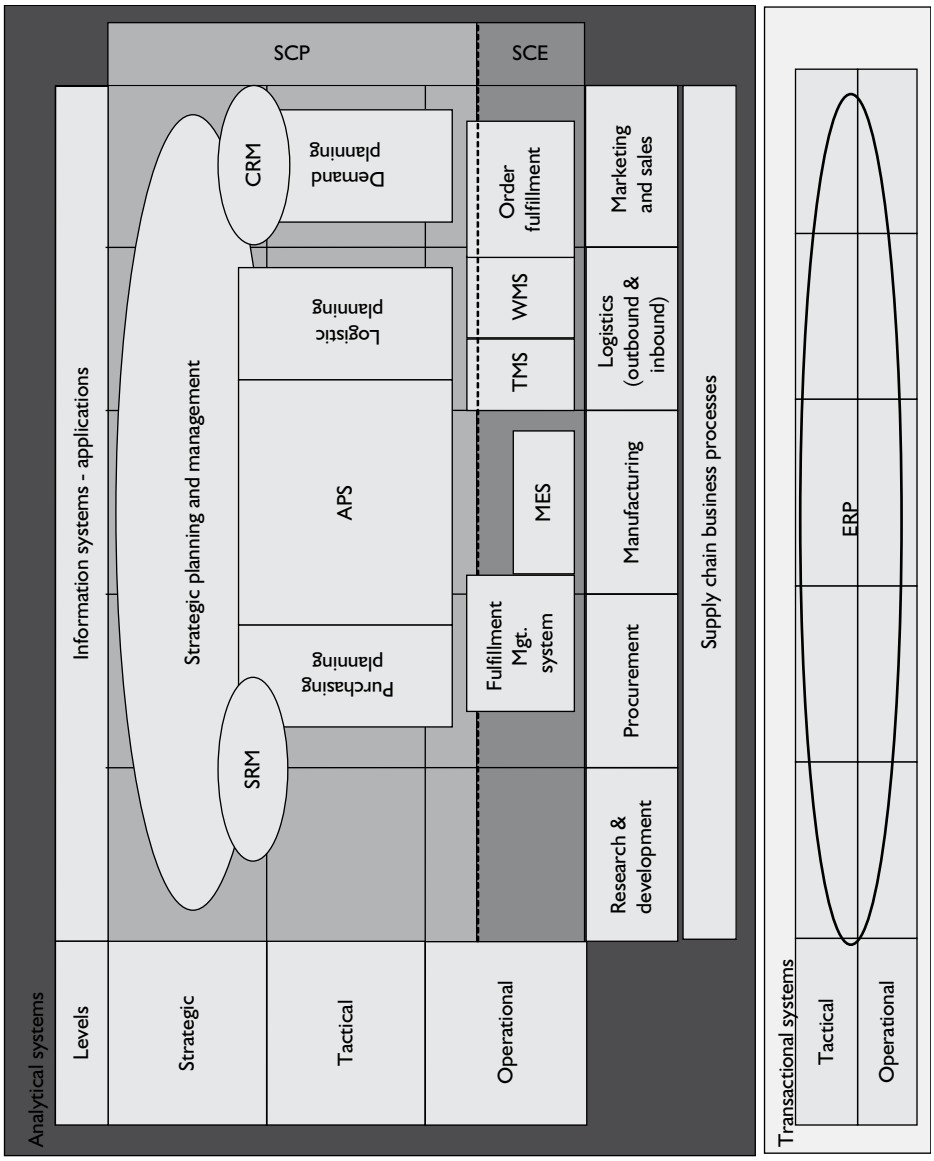


Figure 8 - Information systems matrix for supply chain management.

information platform. The employees were also trained to understand the new processes of the company and to use adequately the new system, once the lack of training can result in unsuccessful ERP implementations, as seen in Worthen (2002). At the moment this case was taking place (2005), Castrol Brazil was evaluating the implementation of some analytical systems such as MES, CRM, and TMS. This evaluation was being conducted together with a global team, as today the planning of new ISs is done under single IT architecture structure defined globally. Figure 9a presents the framework with the ISs of Castrol Brazil.

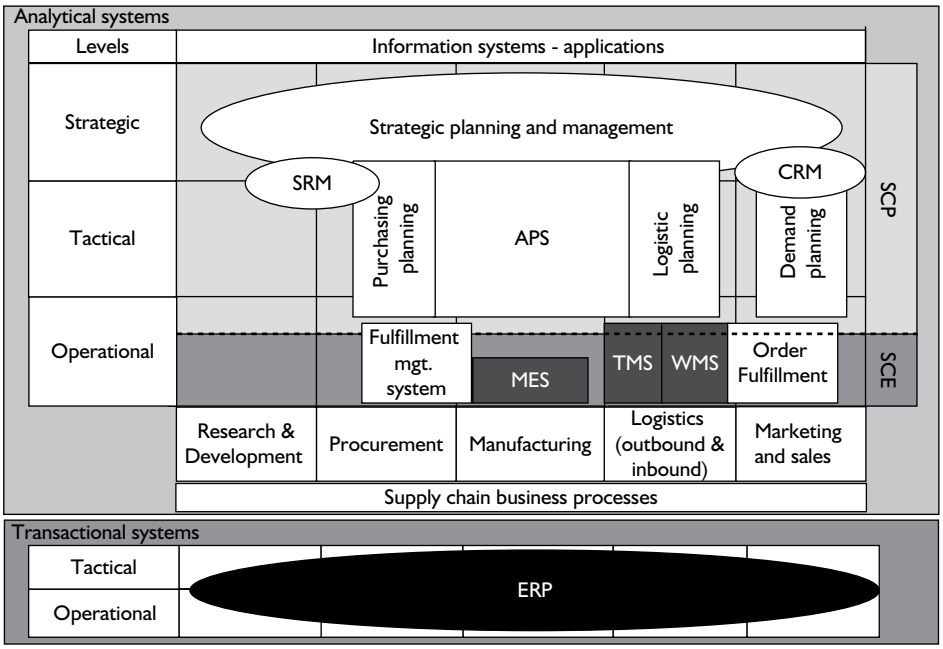
Three significant members of Castrol Brazil supply chain also took part of this case. Two of them were packaging suppliers, here called supplier A and supplier B. The third member was the logistic provider responsible for the logistics outbound, here called logistic provider A.

Supplier A is a subsidiary of a multinational company that, among other products, supplies packages. This supplier has a contract of in-house supply and has production activities inside the Castrol Brazil Plant at Rio de Janeiro. Before this partnership, Castrol Brazil was responsible for producing its own packages for small units (e.g. 1/2 and 1 liter). Today the partnership is considerate a success and reduced significantly Castrol Brazil costs. In 1999 this supplier implemented the SAP R/3 system (Version 4.6 C). This ERP system took eight months to be completely implemented at the parent company. In the Brazilian subsidiary the implementation time was two months following a "roll out" format. Many modules were implemented, among them: controlling (CO), accountability. material management (MM), production maintenance (PM), quality management (QM), sales and distribution (SD), and production planning (PP). The main business processes of Castrol Brazil supply chain that are integrated with this supplier are procurement and manufacturing. Figure 9b presents the framework with the ISs of this supplier.

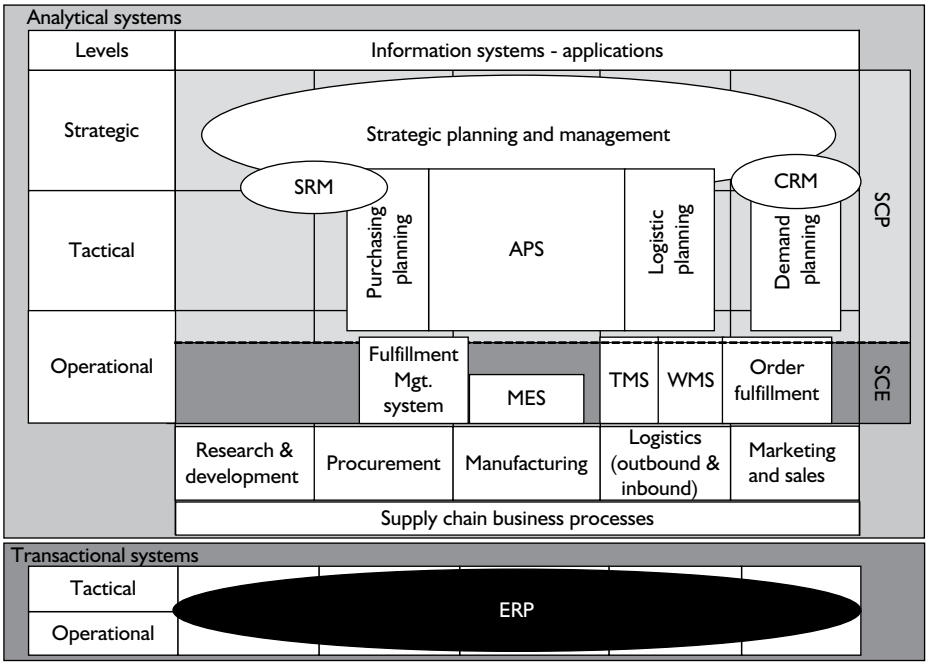
Supplier B was founded in 1944 and its capital is 100% brazilian. It supplies Castrol Brazil with packages of many liters of lubricants. As supplier A, the only implemented IS included in the framework is the ERP system. In 2003 this supplier implemented the SAP R/3 system (Version 4.6 C). The modules implemented were almost the same as the ones implemented by Castrol. All the modules were implemented together and the whole implementation process took one year. The main obstacle found in this implementation was the resistance for changes by the employees, but this was solved with training. The main business process of Castrol Brazil supply chain that is integrated with this supplier is procurement. The integration of this process has improved since this supplier implemented its ERP in 2003/2004, but it is still far from being completely integrated under a SCM perspective. This same point was also noticed in the supply chain link that embraced Castrol Brazil and supplier A. Figure 9c presents the framework with the ISs of supplier B.

Logistic provider A uses two distribution centers (DCs) to attend Castrol Brazil. One of them is located inside Castrol Brazil plant at Rio de Janeiro and the other one is located at São Paulo. The DC at São Paulo also attends other customers of logistic provider A, having as

(a)


Analytical systems
Levels
Information systems - applications
Strategic
Tactical
Operational
Strategic planning and management
SRM
CRM
Purchasing planning
APS
Logistic planning
Demand planning
SCP
Fulfillment mgt. system
MES
TMS
WMS
Order Fulfillment
SCE
Research & Development
Procurement
Manufacturing
Logistics (outbound & inbound)
Marketing and sales
Supply chain business processes
Transactional systems
Tactical
Operational
ERP

(b)


Analytical systems
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SCP
Fulfillment Mgt. system
MES
TMS
WMS
Order fulfillment
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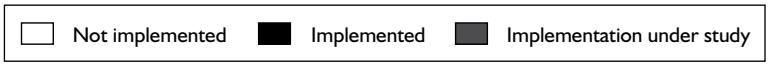
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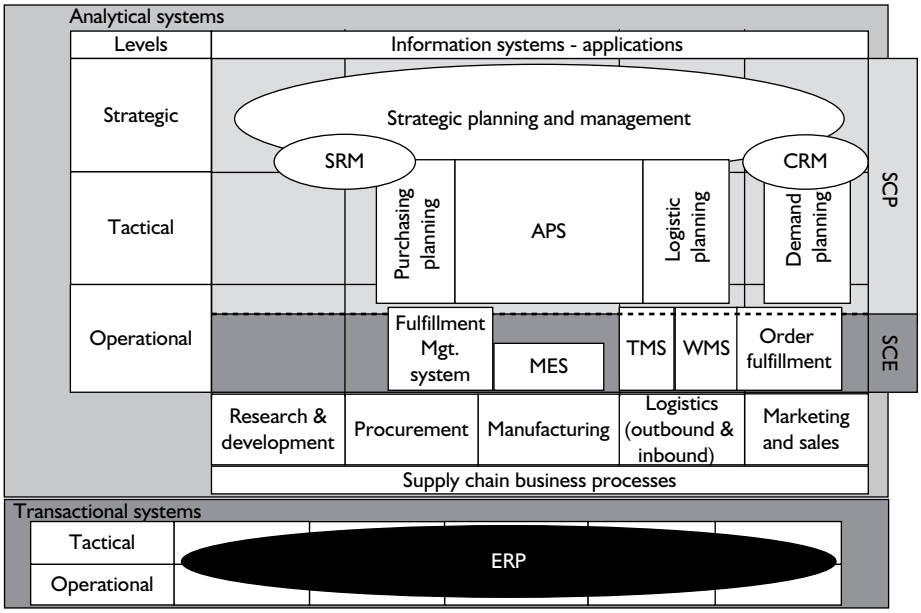

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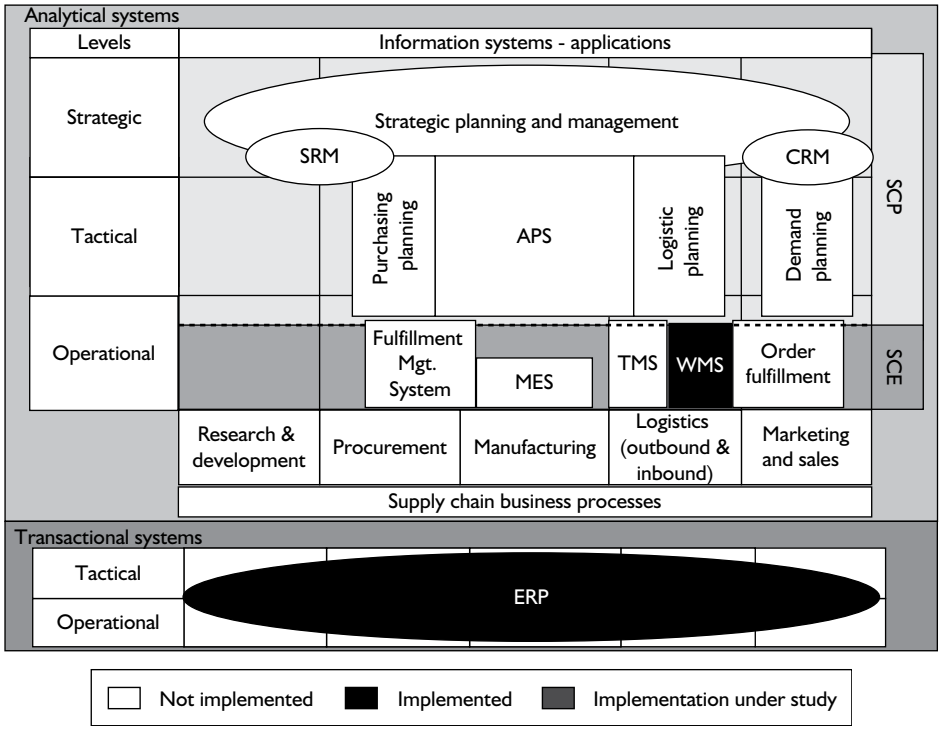


Figure 9 - Framework applied to Castrol supply chain. a) Castrol Brazil; b) supplier A; c) supplier B; and d) logistic provider A.

a result a higher complexity of its operation. This logistic provider has been serving Castrol Brazil since 2000. This provider adopts in its site at Rio de Janeiro the JDE ERP system of Castrol Brazil. In its DC at São Paulo it has been operating a prologs WMS since 1999. The main business process of Castrol Brazil supply chain that is integrated with logistic provider A is the logistics outbound. Figure 9d presents the framework with the ISs of this logistic provider.

The Sony Brazil Case

Sony Brazil started its operations in 1972 by importing products from USA and Asia. In 1985 it started to produce locally assembling products at Manaus. In 2003 it started to implement a ERP system (SAP R/3) with the following modules: finance, sales and distribution, procurement, material management, maintenance, quality, and human resources. The implementation process took approximately two years and was conducted by employees of different areas of the company and by external consultants. This system substituted many legacy systems. This implementation process was done together with the implementation of CRM, TMS and order fulfillment ISs. The implementation of these last ISs took respectively: three, six, and seven months. The company is now planning to implement the following ISs: APS and WMS. This plan is being conducted by a global team. Figure 10a presents the framework with the ISs of Sony Brazil.

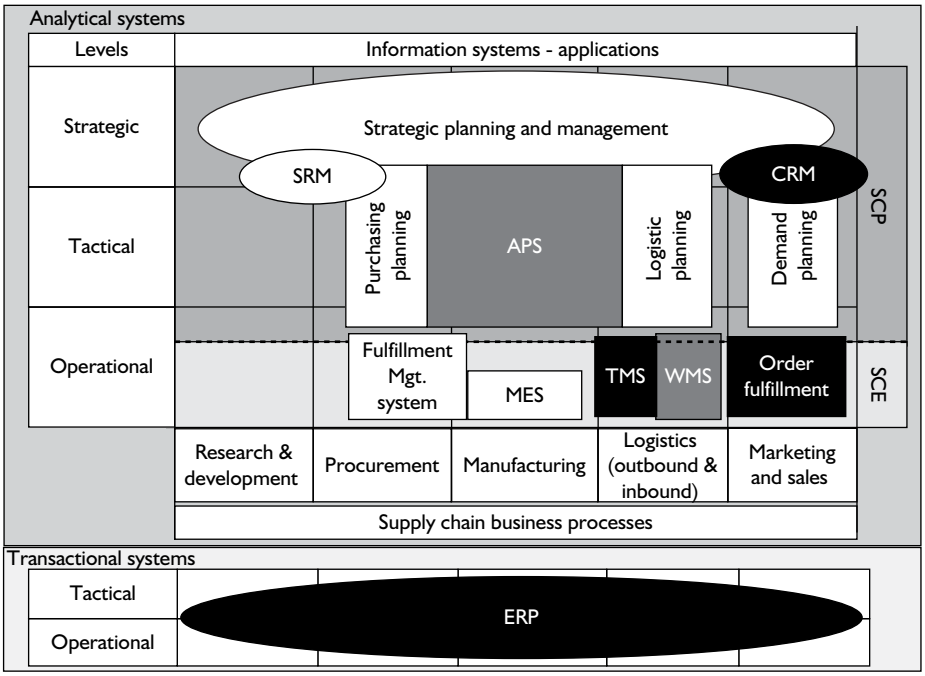
Three significant members of Sony Brazil supply chain also took part of this case study analysis. Two of them were logistic suppliers, being one the same that also works for Castrol Brazil (logistic provider A). The other one is here called logistic provider B. The third member was the most significant first tier customer, here called retailer A.

Logistic provider A has been working for Sony since 2004 and offers transport and warehousing services to the brazilian southeast region. This provider operates a DC at São Paulo and uses the same software described before in the Castrol case (ERP and WMS).

Logistic provider B operates for Sony Brazil using its DC located at Tamboré that is integrated with Sony DC located at Brasilia. This logistic provider has implemented the following analytical ISs from SAP: WMS (LMS), TMS, and order management. These ISs were implemented together with the SAP ERP in an operation that took eight months. The go live was in July of 2002. This provider is studying the implementation of the logistic planning IS. Figures 10b and c present the framework with the ISs of these logistic providers.

Retailer A was founded in 1946 at Rio de Janeiro. It has more then 300 points of sale and operates in Brazil with six DCs (Rio de Janeiro, São Paulo, Belo Horizonte, Brasília, Rio Grande do Sul, and Paraná). The delivery from Sony to retailer A is all done by the two mentioned logistic providers. This retailer implemented its Amadeus ERP system in 2000. For analytical ISs it has implemented TMS and WMS. The TMS implementation took 4 months. The WMS was also implemented in 2001 and the implementation process took two months. Both implementations were conducted by a team of external consultants and of internal employees. Both interfaces of the TMS and the WMS are very friendly with the

(a)


Analytical systems
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Information systems - applications
Strategic
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Purchasing planning
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Demand planning
SCP
Fulfillment Mgt. system
MES
TMS
WMS
Order fulfillment
SCE
Research & development
Procurement
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Marketing and sales
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Transactional systems
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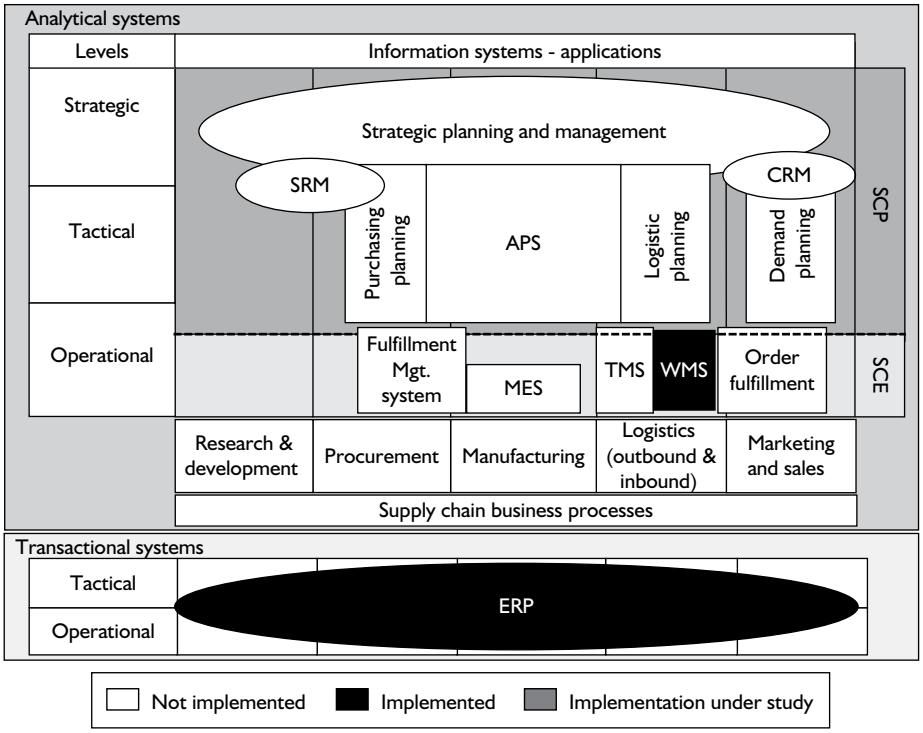
(b)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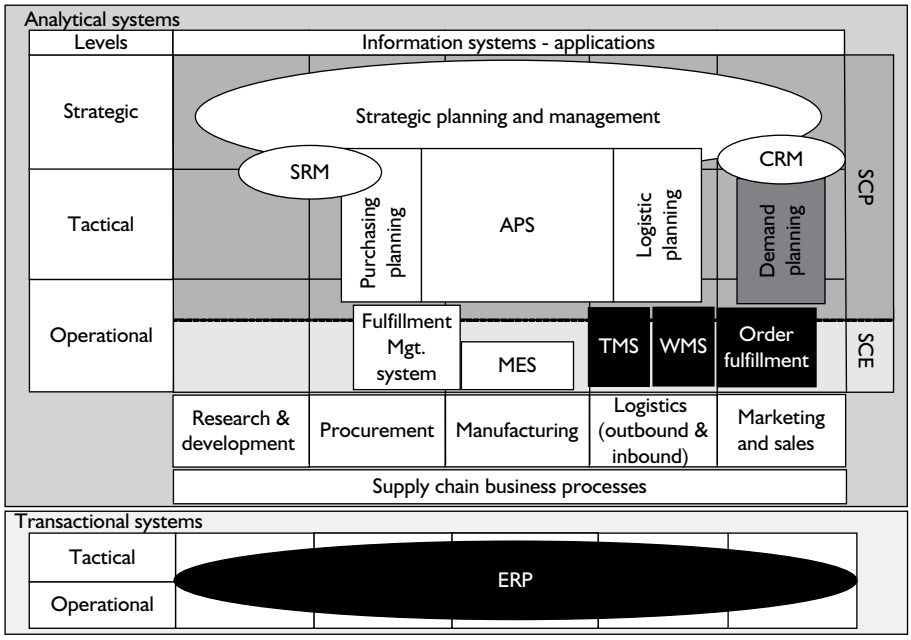

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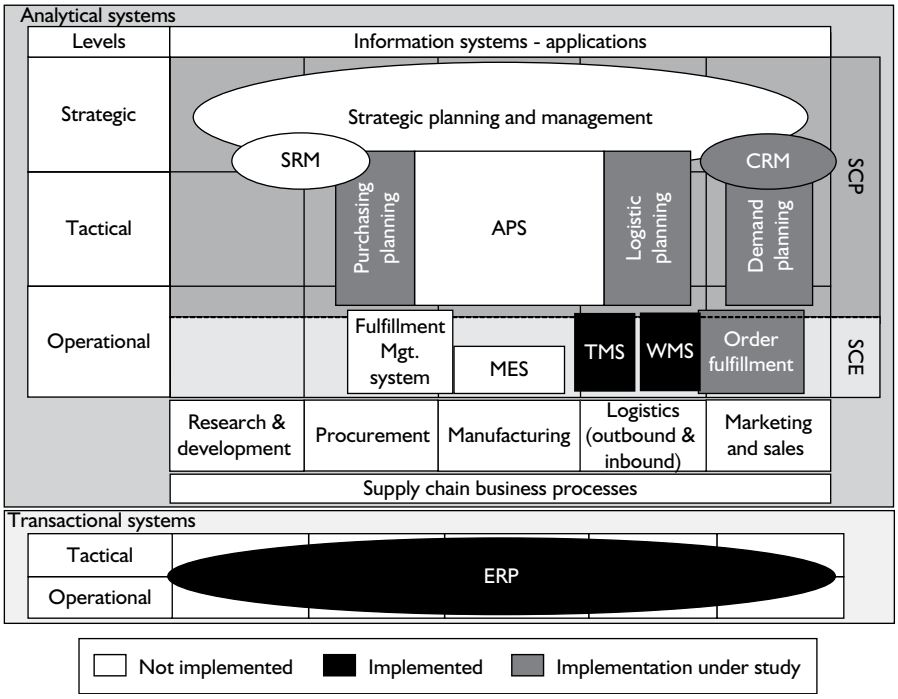

Figure10 - Framework applied to Sony supply chain. a) Sony Brazil; b) logistic provider A; c) logistic provider B; and d) retailer A.

ERP system of Sony. The information interchange between these companies has improved significantly after Sony implemented its ERP in Brazil. In order to improve its operation performance, this retailer is studying the implementation of the following analytical ISs: CRM, demand planning, logistic planning, order fulfillment, and purchasing planning. Figure 10d presents the framework with the ISs of retailer A.

Conclusions

There is nowadays a demand for reference models that organize the different ISs necessary for the supply chain success under a SCM perspective. In this paper, an attempt has been made to review the literature on ISs in SCM. The literature available on reference models concerning this topic has also been reviewed and eight models were highlighted. Although there are some differences among the models, they exhibit a common architecture based on the principles of hierarchical planning and are formed by two dimensions: levels of supply chain decision (the vertical axis of the SCM matrix) and supply chain business processes (the horizontal axis). The literature review served as a comprehensive base for understanding the organization of the many ISs in SCM. Together the models cover the main aspects and characteristics that we consider relevant to be included in SCM matrixes. This review aided by interviews was the base for the development of a framework that helped us to analyze the supply chain of two companies in Brazil.

ERP have been largely implemented in the different companies that took part of the analyzed supply chains, but the cases' results point out that the analytical systems are not at the moment a consolidated reality.

In the case of Castrol Brazil supply chain, just one of the analyzed companies (logistic provider A) has implemented an analytical IS (the WMS). This implementation is limited to its DC at São Paulo. The site of this logistic provider located inside the plant of Castrol Brazil uses the ERP module of Castrol Brazil to manage its warehouse operations instead of the WMS. The main reason for this fact is the simplicity of the logistics outbound operation of the DC located at Rio de Janeiro when compared with the one at São Paulo. The DC at Rio de Janeiro attends just Castrol Brazil, while the one located at São Paulo attends other customers of many industrial segments. This results in the handling and management of a higher amount of material and SKU (stock keeping unit). To deal with the higher complexity of DC at São Paulo, the logistic provider needs a WMS. This highlights the fact that analytical systems are not always recommended for all cases.

Among the analyzed companies of the Castrol Brazil case, just this lubricant manufacturer had plans to implement analytical systems (CRM, TMS, and MES). This points out to a lack of analytical systems that still exists in some Brazilian supply chains, fact that was highlighted in the non-structured interviews. The Sony Brazil supply chain case presented more analytical ISs then the ones found in the Castrol Brazil case. This is explained by the fact that the number of SKU and the aggregated value of the electronic

products of Sony Brazil are in general higher than lubricants and the life cycle is much shorter. Sony Brazil has implemented recently three analytical ISs (order management, TMS, and CRM) and plans to implement two others (APS and WMS). The other analyzed companies of its supply chain also have recently implemented many analytical ISs, with the exception of logistic provider A that has just implemented the WMS.

Other researches that also worked with ISs in SCM found interesting results concerning the brazilian reality (Aguilar, 2004; Barros, 2005). These two researches had just the focal company perspective but their findings also pointed a large use of ERPs in their supply chains. In Aguilar (2004) the APS was implemented in the two analyzed companies. In Barros (2005) the WMS was being implemented in the focal company and the implementation of TMS was being planned.

It was possible to verify in both cases of this paper that, in a general perspective, the use of ISs in SCM is increasing in the analyzed companies and that these systems have provided benefits to all of these companies. All the ISs of the framework used in the companies were recently introduced and many of these companies plan to implement more. In spite of this, there is still a strong individual perspective in these systems. The authors of this paper believe that to take advantage of all the benefits that can be obtained by the adoption of new ISs, companies should work more on the interfaces between their supply chain members. These companies have already integrated the information inside their four walls with the implementation of ERP systems. Now they should do the same integration beyond their walls. This inter-company integration is already on track and has already improved, but there is still a long way to go until they are really integrated along the supply chain.

Another interesting point found in this research is the fact that the ISs adopted by the brazilian subsidiaries of the analyzed multinational companies of both supply chains are the same ones adopted worldwide by their parent companies as a result of a single IT architecture structure defined globally. This new scenario took place of the one in which local subsidiaries developed locally their own ISs "in-house". The information integration within the companies' business units worldwide was difficult and unfriendly with the independent "in-house" ISs, what had to change when the dependence among the subsidiaries became needed with globalisation.

Finally, it is important to highlight that whenever organizations think on their SCM they should have in mind their main supply chain processes. These processes should be integrated and optimised with their respective supply chain members. This integration with other organizations is supported by ISs and should be driven by a well planned IT architecture structure towards achieving an effective SCM. None of the ISs by itself covers the full spectrum of SCM requirements. The ISs need to be combined and integrated into a supply chain suite, what is not yet fully available. The major supply chain processes compose dozens of specific tasks, many of which have their own specific ISs. As the importance of these processes for supply chain organizations depend on their business

and offered product/service, the adequate supply chain suite can vary from organization to organization. This requires organizations to define precisely their objectives concerning the several ISs applications and their supply chain processes. Organizations highly dependent on their procurement process search for the improvement of their suppliers' service level. Consequently, these organizations should adopt ISs that integrate this inter-organizational process with suppliers and logistic service providers. Manufacturing organizations that are production intensive may want to improve their production process focusing on increasing the production planning flexibility and efficiency adopting systems such as APS and MES. In the same way, service organizations normally concerned with distributing goods might aim for an efficient support of transportation and inventory management and have adopted ISs that integrate them with customers and logistic service providers, such as WMS and TMS. Transactional systems like the ERPs have become the backbone of these analytical systems.

Acknowledgements

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Biography

Luiz Felipe Scavarda is associate professor of the Industrial Engineering Department at PUC-Rio (Pontifícia Universidade Católica do Rio de Janeiro). His graduate, master, and

doctoral degrees in industrial engineering were obtained at PUC-Rio. During 2000/2002 he cooperated with the German Fraunhofer Institute for manufacturing engineering and automation, on the field of SCM.

Alessandro B. de Carvalho is commercial manager at Hewlett Pachard (HP) Brazil. Before joining HP he worked many years at Sony and Shell. He is an economist from UERJ (Universidade do Estado do Rio de Janeiro) and has a master degree in logistics obtained at PUC-Rio.

Márcio da S. Vieira is the manufacturing manager of Castrol (BP) Plant in Rio de Janeiro. He took his business degree at UERJ and his master degree in logistics was obtained at PUC-Rio.

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Corporate Social Responsibility as a Symptom of the Existential Dissatisfaction in Post-Industrial Economy

Piercarlo Maggiolini
Dipartimento di Ingegneria Gestionale, Politecnico di Milano, Milano, Itali
E-mail: piercarlo.maggiolini@polimi.it

Krysnaia Nanini
Dipartimento di Ingegneria Gestionale, Politecnico di Milano, Milano, Itali
E-mail: k.nanini@libero.it

Abstract
The main purpose of the paper is to give an answer to the following question: why has the interest in Corporate Social Responsibility (CSR) literally exploded in the relatively few recent years? After a brief presentation of the different approaches to CSR (focusing on the behaviours or on the aims of the CSE: CSE only as a means to achieving business goals or also as an aim) the paper introduces Malone's interesting contribution, trying to show how important it is nowadays to put human values at the centre of business and to promote a "market of human values" (where a relevant role has to be played by the Information and Communication Technologies). Starting from this point of view, and basically using Bell's classical framework concerning post-industrial society, the paper tries to demonstrate that the growing interest in CSR is a very relevant symptom of the existential dissatisfaction with intrinsic features of post-industrial economy and society.

Keywords: corporate social responsibility, corporate ethics

Introduction

The interest in Corporate Social Responsibility (CSR) in the last few years has literally exploded. Which are the reasons of this growing interest? We will try to give a possible answer. According to Gallino (2005), this is – in spite of all appearances – a negative sign with respect to the current situation. In other words, nowadays, people talk (and write) so much about CSR because today there is very little of it, certainly less if compared to some decades ago.

Moreover, in the general scepticism (or realism?) currently pervading the world, probably most authors and commentators highlight an improper use of CSR, namely a

purely instrumental one, able only to result in an effective tag that makes a corporation differ – in some ways – from the others on the marketplace in achieving a better income.

In the definition, and in the study, of Corporate Social Responsibility, currently two different approaches coexist[1]. The two approaches are well highlighted by Viviani (2004).

The first one defines a corporation as "socially responsible" when – firstly and above all – it implements a series of "socially responsible" specific actions in a given and historically determined context. The content of these actions, that is the conventional identification of their responsible behaviours, has been modified during the years (and it also differs from place to place). In other terms, CSR is a purely social convention (culturally and historically determined).

From our standpoint, the "*Green Paper*" on the CSR of the European Commission dated 2001 (COM 2001) and the United Nations Organizations' "*Global Compact*" (2000 and 2004), adopt this – limited – approach.

Even from this – limited – viewpoint, despite what many think, both entrepreneurial and managerial best practices, that could be considered generally valuable, in reality do not exist, especially in innovative environments, not even related to CSR (and consequently to its managerial instruments). This means the so-called best practices cannot be transferred from one context to another, as they are necessarily "situated"[2] into specific and contextualized socio-cultural situations[3].

It is clear that corporations adopting the very same behaviours, which are considered socially responsible by stakeholders and society, do not necessarily have the same meaning, as they are not based upon the same motivations, do not respond to equal scheme of incentives, do not maintain the same relationship with the mission of the corporation.

As a consequence, another useful approach to study CSR should be taken into account. According to this second approach, two different visions of the CSR exist:

- in the first case CSR is seen – only – as a competitive instrument (means) for the corporation; and
- in the second one, CSR is seen – also – as an aim used both by the corporation and the State to achieve a model for development (of economy and society) which cannot be obtained through the pure competition of the profit-oriented corporations on the marketplace.

Considering this view, for those questioning on the reasons and aims that pave the way for a corporation to be "socially responsible", and on the intentions driving a "social

[1] A more general presentation of the historical evolution of the concept of CSR, of the different theories about CSR, and, above all, of their application to the peculiar Brazilian context can be found in Ashley (2005), and in its 24 pages of bibliography!

[2] See Ciborra (2004) for a critical analysis of the concept of "situation" in the organizational and managerial studies. For what concerns the ontological and anthropological roots of this concept, see Heidegger (1927).

[3] We have to cite necessary Hofstede's (2003; 2004) 's works and the way of thinking about the organizational culture he inspired.

responsible" corporation, to debate about CSR and its foundations means to discuss about the nature and the objective of the "corporation as institution" (or, better, on the different institutional forms of corporation) within the economic system. In other words, the definition of social responsibility does not only regard responsible actions, but their deep and intrinsic relationship with the aim of the corporation itself and the context where it acts.

However, defining the aims of the corporation and consequently its institutional configurations and how they relate to the context of a corporation (particularly considering the stakeholders on the whole) is nonetheless a consequence of historically determined socio-cultural processes. A corporation's culture is therefore always embedded in its social and historical context.

Obviously, the organizational culture will depend on the institutional features: however, it is clear that corporations with equal institutional features may have different **values** which influence their behaviour and the criteria of its evaluation.

To sum up, CSR regards the evaluation (shared both by stakeholders and social context) of the ways of defining, producing and delivering *value* through economic activity.

Corporate Social Responsibility as a Means or also as an Aim?

In its essence, the discussion may be focused on the following dilemma: CSR is only a means or also an aim for the corporation? Considering the question in these terms, the ethical dimension of the topic comes out, if one thinks, as an analogy, to the famous saying by Immanuel Kant according to which human beings cannot be considered only as means but also as aims.

Adopting the first perspective (CSR only as a means) and according to Friedman's theory, CSR is conceived as a way to both increasing profits and establishing an effective position on the marketplace. In fact, Friedman (1970), in an article written in 1970, asserted that "Business Social Responsibility is to increase profits", obviously following the law and the "game rules".

His main statement was that stakeholders, employees and customers of a corporation should decide on their own which social (or other) causes to support with their money and, as a consequence, the corporation should not take these decisions for them.

Naturally, Friedman declares that corporations should abstain from what is not legal. Occasionally, good actions could help to earn more money: for instance, treating well employees could mean attracting new talented people, just as philanthropy could result in a better treatment by public authorities, or asserting that products do not pollute could contribute to increase sales. But, acting in this way only because it is good or correct is not a sufficient reason.

Later, we will introduce the pragmatic overcoming of this theory proposed by Malone. But, surely, it is immediately evident that CSR policy, if only animated by such an

instrumental perspective, will result too occasional and unstable to be credible (and to produce long term effects).

Above all, even without radically rejecting this first approach (that is, considering CSR also as a means), we should highlight its limits. As we will discuss later while introducing Malone's position, a mature concept of CSR should necessarily take into account new phenomena of post-industrial society, the growth of complex forms of social aggregation based upon cultural identity, the pursuit of quality of life as an aim not only related to increasing incomes: all these aspects favour a dimension of rationality which is not only instrumental but also "expressive".

The second perspective, considering CSR also an aim, is harder to explain in a few words.

In this case, we will later present the position illustrated by Malone. From a theoretical viewpoint, for the purpose of this synthetic exposition, we can refer to the set up described in Italy by Lorenzo Sacconi (one of the main scholar of CSR in Italy). Sacconi (2004) defines CSR as "a model of enlarged corporation governance, according to which who governs the corporation has responsibilities concerning the observance of trust duties regarding both property and in general the stakeholders on the whole". In Sacconi's opinion, the corporation is an institutional solution to a problem of coordination and cooperation among multiple interests. It is, in fact, an artificial construction whose purpose is intermediate and not final, or rather it is a means that takes to the solution of a coordination problem for the stakeholders' interests (and hence the goals).

Obviously – integrating even other viewpoints in this theory (as, for example, Zamagni (2003)[4] - another obliged reference for those who study CSR in Italy - does) – the interests are not only strictly economical (and the products purely economical), but also "symbolical", "relational", and so on. How many corporations (even producing foods and beverages!), nowadays, sell no more "goods" but "ways of life"? And concerning the relational aspect, for example Zamagni (2004) writes: "Consider the normal employment relationship between the corporation and the employee. It can assume the features of a "social exchange" or a "market exchange". Immaterial elements (as trust, loyalty, honesty, work reliability) take part in the social exchange. These elements are not verifiable and so not enclosable in a contract. However, for a corporation, the type of employment relationship installed with the employee, makes great differences in terms of economic performance. Now, it is evident that a worker will accept to enter a "social exchange" only if his counterpart, that is the corporation, will appear as a moral subject, a subject that is able to demonstrate to give back, practically, values as trust, loyalty, honesty, work reliability and so on". Values, we add, that can be perceived and exchanged because they are good by themselves, and not only because instrumental to the mentioned economical performance, and therefore,

[4] Important even his book, written together with Bruni (Bruni and Zamagni, 2004).

also as aims and not only as means, even because, if "reduced" solely to means – before or after – they will... disappear!

According to this assumption (and in reality, going a little further), Corporate Social Responsibility, in its global concept, may be defined[5] as an evaluation agreement, shared by a system of subjects, on the components of the value produced through the economic activity. These agreements, in a way, are not fixed and unique within our society; instead, are multiple and evolve in time. Then, these agreements are related to the particular organizational cultures: that is, the modality of value (intended as economical dimension) production and distribution, depends on the system of values (intended in their ethical and cultural dimension) shared and agreed by the corporation with its own reference social system (in a broad sense: it can be on a world scale).

Putting Human Values at the Centre of the Corporation: Malone's[6] Proposal

In his recent book *The future of work*[7], Malone (2004a) discusses – also – ethics and CSR in an apparently very pragmatic manner, in that his proposal to put human values at the centre of the corporate activity seems the logical "objective" conclusion of a current evolution in post-industrial economy and society, and a "rational" choice taken by the corporation. Really, the ethical choice undergoing this proposal, although implicit, is clearly evident.

Malone does not add anything from the theoretical viewpoint to Friedman's theory (explicitly mentioned) and to those theories derived, more or less, from the transaction costs theory. Instead, he helps to establish an (expandable!) bridge between the two aforementioned perspectives, and consequently to unify them, seeing the first perspective as an application of the second one, and to explicit the exchange organizational forms (markets included), in particular making the ICT role determinant in the implementation of the human values oriented approach.

The way Malone shows the importance of values in the "new contemporarily" corporate life can seem surprising.

He introduces the topic using his MIT *Leadership* course experience. Practically, he helps his students to evaluate what is really important for them. He takes them in a place where they can stay alone for a while, to concentrate on the following thought.

Imagine being at the end of your life, with just a few hours left. What would you like your best friends and family to say or think about you? What would you like to have achieved in your life?

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[5] See Viviani (2004)

[6] Thomas Malone is director of the Center for Coordination Science, Sloan School of Management, MIT.

[7] See also Malone (2004b).

The purpose of this exercise is to create the conditions for a statement of one's own "personal mission": a description of the most important goals one would fight for during one's life.

Often, we discover we waste our days on details which are of no importance at all. And that the really important aspects are continually ignored, forgotten or postponed. Many people state, for instance, that money and professional achievement, in the end, will be less important, while other things – such as family, friends, spiritual life and trying to improve the world – will be more important.

We perfectly know that such practices take back to the millennium spiritual human experience, and that nowadays risk to be banally "divulged" for multiple purposes. Evaluated in their seriousness, they can re-conducted, for example, to the search for the "authentic life" prospected by Heidegger in *Being and Time*. Starting from the assumption that human existence is, in its constitution, ontologically "*project*" ("situated"), "possibility", human life can be authentic or unauthentic according to the fact that the man substantially will live "losing" himself in the common opinions, in the ideas he breathed in the social environment where he lives, or otherwise projecting, taking part, choosing himself on the basis of "his own possibility". Now, we should know that the only authentic human being's "unconditioned and insuperable possibility" is... death. Well, the conscious assumption that his own death as his "more proper" possibility does not mean "to think of death" in the sense of taking account that we will die, but considering **all** the other possibilities as "pure" possibilities, none of them definite or necessary. Man's awareness of "being for death", according to Heidegger, hence is deeply releasing for the human being. Heidegger writes: "the anticipating being free for his proper death liberates from the **dispersion** of possibilities that **casually** cross, in a way that the effective possibilities, those situated before the one insuperable (the death), can be **authentically understood and chosen**" (Heidegger, 1971, p. 135, Italian version).

Why are Values Important?

In Malone's opinion, if we went towards an economic system where everyone were required to be "entrepreneur of himself", and therefore, if we were asked to make many more decisions in our professional life, we would also think about values to be taken into consideration while deciding. If we do not deeply think to what is really important for us, it will be very easy being distracted because of not important things. Indeed, in creating a corporation inspiring authentic loyalty and care towards its employees, customers and other shareholders, the focus should be more on their human values instead of strictly economical ones.

It is true – Malone admits – that money is the main thing asked of a corporation. However, people decide to work for one corporation rather than another because they feel realized, because they prefer working with interesting people, they may like travelling

or spending more time with their family and so on. In explaining this concept, Malone inevitably considers Maslow's (1970) work: once basic needs are satisfied (food and shelter), then, other aspects become more important: relationships, different personal fulfilment, giving a sense to life. Now, it is understandable that employees, customers, suppliers and even investors will progressively move to corporations offering something they perceive as an added value, beyond the strictly economic one. Sometimes, they will find such a value in products or in services, or in corporate production processes (less pollution or more employment), or simply in the care about customers and stakeholders. Malone also remarks (and he is not the only one) that corporations will compete on the basis of their ability in delivering sense and meanings.

All these considerations, or perspectives, seem to be in contradiction with other evident statements. As Malone recognized, in the last decades (especially in the United States), the main view is that the only and legitimate purpose of a corporation is to make money for its shareholders.

Malone cites the case of *Business Roundtable* (a group constituted by 200 major American corporations top managers) which in 1981 declared that managers' task was to be also accomplish all the legitimate stakeholders' (shareholders, customers, employees, community, suppliers and society in general) demands, while in 1997, in its *Statement on Corporate Governance* the same Business Roundtable asserted: "The conception that the corporate management should accomplish shareholders' interests with all the other stakeholders' interests lead astray the managers' role". A deep analysis of this trend can be found in Gallino (2005).

We have already shown how also CSR coincides or is seen to achieve this aim, and how – in this sense – the clearest and most influent viewpoint was Friedman's.

Friedman's argumentation is based on the fact that a manager works for the owners of the corporation itself. And he states that big (quoted on the Stock Exchange) corporation owners' desires are to earn as much money as possible, in accordance with the basic rules of society. In Friedman's reasoning, there could be some explicit exceptions, related to the case of corporations with a single owner or established for other purposes rather than profit (e.g. schools and hospitals).

But in this case, Malone tries to use Friedman against Friedman, that is to take Friedman's reasoning to its ultimate consequences in order to go beyond Friedman himself, and then to unify, under the same logic, both the profit-oriented and the human values-oriented perspectives (and so, CSR only as a means with CSR also as an aim).

Malone, in fact, shows how Friedman did not assert corporations should act only for the sake of their owners' economical interests, but rather they must serve their owners' wishes, whatever they are. And so, who are – in the end – the corporation owners? And what do they want? People are, obviously, the owners. And people have lots of wishes, some are economical and some are not. Why shouldn't people – Malone wonders – take into

account their non-economic values to decide how to invest their money, as it happens in various aspects of their life?

An example of this phenomenon is the growth of "socially responsible" investments funds: in 2001 – Malone cites – quite the 12% of USA funds was defined "socially responsible". In Europe the ethical funds are already more than 1,000 billions of euro. Furthermore, when asked whether a big corporation, even quoted on the Stock Exchange, could prosecute a non-economic purpose as its first priority, Malone answers affirmatively and remarks the case of Johnson & Johnson which allocates its customers', employees' and community's interests **before** its shareholders' ones.

Therefore, if it is correct that corporations also have targets which are not strictly economical, then, who selects what is to be aimed at? Investor-owners are not the only ones whose acceptance is necessary to have a successful corporation. All other interested people, including employees, customers and suppliers, choose (or should choose...) – voluntarily – to work for it. Society, that has to allow a corporation to exist and function as a corporation, is also included[8].

A "Market of Values"

All these entities often have different standpoints regarding which should be the purposes of the corporation. Therefore, who has to decide?

Malone does not state specific theoretical reference models, but it is not difficult to recognize the logic inspiring the transaction costs theory (interpreted more or less as Sacconi does). In the end, Malone remarks that the aforementioned decision is nothing else but any other corporation decision. Any decisional model could be used. And one of the most interesting possibilities is the market, specifically, a "market of values". Just as in any other market, in a market of values decisions are taken through a reciprocal agreement among directly involved people. We, in fact, could negotiate to aim at any class of values we consider important for us. We will have success only if we can find people who agree with our scale of values. Those sharing our values will tend to work with us, sign contracts with us, buy our products or invest in our corporation.

As a matter of fact – Malone makes us notice – now we already have this market of values. Customers, for example, can decide to buy products or services from those corporations who share their values and not from corporations whose values they do not agree with. Corporations could freely and consciously move to certain specific types of values. Employees also express their values whenever they chose for whom they want to work for. Not-economic values already play an important role when people make economic decisions.

[8] In this sense, it is very interesting the contribution of Zairo B.Cheirub and Richard M. Locke (2002), where it is also illustrated the different role of society in three Italian examples of industrial crisis: Fiat, Alfa and the textile district of Biella.

Naturally, markets pose economic restrictions to decisions on values. As an example, people can not indefinitely work for a corporation sharing his values, provided it makes profit or disposes of other sources. Hence, profit, if not a target, it becomes at least a means. And, in addition, it is true that who has more economic resources, is generally more influent on the market than who has less. Nevertheless - Malone affirms - the different decisional power is not exclusive of the market. In a political environment, even in democratic Nations, opinion leaders and who controls media have more influence than simple electors.

Despite their limitations, markets show interesting features about value judgements. As individuals, we can directly express our values choosing what to buy, where to work and how to invest our money. Corporations can compete for customers, employees and investors, not only on the basis of products, but even on the basis of the values they "embody". All have – at least potentially – the possibility to choose people and corporations they want to interact with, and nobody is tied up to decisions he does not agree with.

The result of all this reciprocal agreements is that market permanently varies the resources according to the values of people participating in it. Adapting a well-known quotation to this case, people who participate in a market of values have the society they deserve, just as well as people in a democratic Nation as regards their Government.

Transparency and the Role of Information and Communication Technologies

Malone correctly underlines the risks of opportunism that the perspective of a market of values introduces. As a growing number of corporations try to achieve not strictly economical targets, as previously mentioned, one of the most evident perils will be that some people will try to exploit others' "good intentions".

For example, if people want to work for socially responsible corporations, some of them will try to show off in order earn a reputation as socially responsible, even when corporation internal daily life is very far from being like it. Malone reports, as an example, how before scandals, Enron disposed of a widespread ethical code of 64 pages, where it was indicated that its activities were to be implemented "in a correct and honest manner".

By the way, in the entrepreneurial environment, people cynically manipulating other people to reach their own goals have always existed.

Therefore, if we want the previously mentioned process to function correctly, ethical codes are not enough. We'd rather need other things. We need the process to be transparent. People should take decisions on values based on adequate information. Transparency implies that a great amount of precise and reliable information must be communicated to many people. Fortunately, by Malone's point of view, the new Information and Communication Technologies have potentially made this type of transparency economic and easy at a level never seen before.