

Collaborative Practices within the Supply Chain Area, as a Solution for Logistic Enterprises to Solve the Challenges in Obtaining Sustainability

by

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Abstract. This paper highlights the improvement activities in terms of the global competition and the current economic crisis, in the presence of an exigent clientele, that wishes a significant reduction in response time, under the same quality. The current logistics situation and particularly the oil logistics is reviewed to identify the main challenges of the sector and to propose efficient business management solutions in this area. The idea of adopting a “Supply Chain Management” (SCM) initiative appears as a performance and sustainability instrument for the company, which can ensure objectives achievement through a better management of both internal and external relationships. Recent collaborative practices between actors with common interests in a supply chain structure are analyzed, to optimize operations, maximize profits and improve customer service. It is showed, that among the secrets to a successful SCM lies the ability of supply chain partners to position themselves in a collaborative relationship rather than in a competitive one and their ability to share information and synchronize their activities thanks to an efficient information system and associated computer applications. Finally the paper concludes by proposing a set of appropriate informatics applications, which can improve the situation of a company on a highly competitive market.

Key words: collaborative practices, information systems, innovative solutions for business management, quality management, supply chain management.

JEL classification: P13, P11, R41

1 Introduction

Today the main focus of the companies in the oil sector is to reduce logistics costs taken into account both the globalization, the recent economic crisis and the current requirements for sustainable development of the energy sector.

Logistics has always been considered as a cost center due mainly to the transport and storage activities, estimated globally by the specialists as reaching between 10% and 17% of the GDP of a country.

Despite significant productivity gained in the recent years, the simultaneously increase of fuel and electricity prices make this problem still present.

At the same time, customers today require faster access to products and have high expectations towards the quality of the rendered services.

A new constraint for the logistics activity is the increased public concern for environmental aspects and sustainable development.

Transport is at the heart of these concerns, because of the greenhouse gas emissions, traffic congestion, noise and air pollution etc.

Logistics can then have a significant contribution to sustainable development by designing logistics chains that reduce transportation needs (e.g. computational models of optimal routes, intermodal transport design).

The oil companies in Romania are influenced by the same situation.

For the past 15 years the energy consumption has steadily increased, amid a highly competitive environment, limited infrastructure resources and increased quality standards after joining the European Union in 2007.

Nowadays 90% of the global energy demand comes from fossil fuels, where oil registers 39% the highest consumption level, see Figure 1.

Current oil logistics chains are mainly a result of the market globalization. In an extremely competitive environment, the need of reducing the production costs while maintaining or improving the quality of the finished products and services is very high. On the other hand the

oil companies have become more complex today, due to their size and area of coverage, both national and international. The regrouping of actors with common interests in a structure to optimize the supply chain operations and at the same time maximize the profit, eventually leads to a new type of competition: competition between the logistics chains. In this new set up, more entities must work together to achieve the best possible results. Such coordination is not easy, especially that it requires a deep cultural change and openness towards the suppliers and customers that expect business innovation.

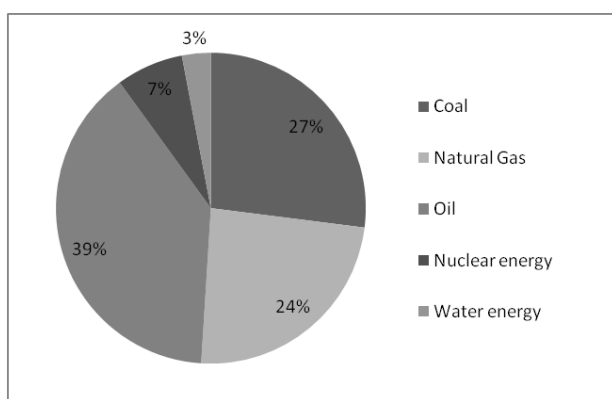


Figure 1. Structure of the global consumption of energy resources

Based on the specific case of a well-known Romanian company in the oil industry, which holds its own logistics company, this paper aims to highlight the contribution that, Supply chain management (SCM) can have in terms of reducing the response time and improve the quality of services.

In order to achieve these objectives the first part of the paper will focus on the significance of the collaboration within the supply chain and the second part will assess the current situation of a logistics company in the oil sector, by identifying up to what extent an integrated, collaborative approach, by using an appropriate set of computer applications, can improve the company's position on a highly competitive market.

1.1 The importance of integration and collaboration within the supply chain

Defee and Stank (2005, p.29) define supply chain management according to the Council of Supply Chain Management Professionals (CSCMP, formerly The Council of Logistics Management (CLM)) as follows:

“Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversation, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, Supply Chain Management integrates supply and demand management within and across companies (www.cscmp.org)”.

Supply chain management involves many organizations in the integration of raw materials, the transformation of goods and the delivery of final products to customers in order to support all sections of the industry to create an efficient supply chain channel (Stonebraker and Liao, 2004).

Integration is an extremely major action within supply chain management (Bales et al., 2004). Normally, the integration is a “vertical line” in the supply chain channel to link the suppliers to customers; this is including all of the partners and operational activities within the whole supply chain management.

Stonebraker and Liao (2004, p.1037) said *“Vertical integration may also facilitate stabilization of production quality or quantity, and management of the process flow of costly or risky technologies, permitting a more efficient, standardized, and high-volume output”.* The output is the value from the efficient supply chain operations reflected in the SCM flows.

The integration process makes the supply chain channel more complex. It can be said that the integration of the supply chain channel influences the supply chain management. The partnership between the buyer and supplier is totally changed through the integration of supply chain. Prior to integration, the buyer and supplier only have the “buy and sell” connection; in other words, the suppliers only provide the material to their buyer. After

integration, the other supply chain partners join their buyer organization operation processes and also need to coordinate. In addition, the advanced integration of the supply chain channel can lead to the creations of new joint products. This totally redefines the meaning of supply chain management and creates more challenges for the participators working together within supply chain channel.

Theodorakioglou *et al.* (2006, p.148) said that “*Supplier management issues, like information sharing, establishment of long-term and trusting relationships with suppliers, mutual dependence and commitment are also advocated by the TQM philosophy. Also, internal integration, a prerequisite for SCM implementation is a key point in the TQM philosophy*”. TQM engages in recreating a vital position to monitor the whole SCM operation and monitoring quality within supply chain management.

This is further explained by the Temtime and Solomon (2002, p.181) definition: “*TQM is a management philosophy for continuously improving quality of goods and services delivered through the participation of all organizational members; it is the process of making quality the concern of everyone in the organization*”.

Companies are now expected to achieve a high level of customer satisfaction, in order to outperform their competitors. Many companies focus on how they can do better to meet their customers’ requirements. Some of them have adopted TQM principles as a solution to their problems. In other words, the goal of TQM is to reduce the cost for their customers (Wong, 2002). As one can observe, SCM has grown, from integrating all the functions within the supply chain channels in order to achieve cost reductions and create more value. In the next stages, SCM focuses more on JIT (Just in Time) and the use of EDI (Electronic Data Interchange) to manage the data in the supply chain, and then pays attention to TQM to assist the SCM quality standard establishment.

Another important aspect of the supply chain is the collaboration between the partners and their communication flow. Simatupang and Sridharan

(2002, p.19) said that: “*A collaborative supply chain simply means that two or more independent companies work jointly to plan and execute supply chain operations with greater success than when acting in isolation*”.

Therefore, collaboration, in the context of the supply chain, means sharing commitment, trust and respect, skills and knowledge, and intellectual agility between supply chain partners (Barratt, 2004). All of the members involved in the chain have to integrate and act as a homogenous unit. Consequently, Supply Chain Council (SCC) members’ joint decision making is preferable to create competitive advantage through mechanisms such as increased market access, better material sources, and cost-effective transportation. In order to achieve this, the SCC members must have a very close relationship. The strategy is to focus on the collaborative partners’ relationship and improvements in the SCC process.

In other words, when the companies have more trust in their supply chain collaborative partners, then the commitment is expressed in their relationship.

Today no company can ignore that the management of the classical production must incorporate supply chain management to meet the new demands on the market, be competitive and face the new relationships between companies and their partners. Therefore all companies are trying to adapt to this new reality, in order to obtain the following benefits:

- Improved proactivity and flexibility;
- A significant cost decrease;
- Improved customer service;
- An improved overall performance.

Adopting an effective supply chain management structure occurs as a tool for company performance, able to achieve the objectives due to improved management of external and internal relationships. Creating added value on the part of the optimization process designed to sell more by better answering customers’ requirements, but also from better organization of production results in the reduction of costs.

It is difficult to identify a unique and universally accepted definition of supply chain management, the approach can be designed

more as a philosophy, as a guidance and management logic. This is the reason why implementation and solutions vary from one company to another. In any case, whatever elements are involved, their common point is that the SCM integrates all supply chain functions in a single system simultaneously to optimize service quality and internal operational costs. It handles the flow of information, primarily for grounding and decision making. One of the secrets of success of SCM is the ability of having a good communication between the partners and synchronizes their activities. The information and applications associated also play a crucial role. Secondly, because the supply chain brings together a large number of players, it is quite difficult to find an optimization to satisfy all at the same time. On the other hand, the success of supply chain management approach depends on the ability to create synergy between the different functions of the chain. It is obvious that the general interest is that all actors in a supply chain to position themselves in a collaborative relationship rather than in a competitive one. Finally, the quality of the process (e.g. the implementation of a set of standards such as ISO, Lloyds) plays an important role in the successful implementation of supply chain management. Conversely, SCM has the ability to produce quality service and thus to contribute to better customer satisfaction and loyalty.

1.2 Current challenges in obtaining sustainability while staying competitive on the market

Each logistics company is facing various challenges in obtaining sustainable performance while trying to stay competitive on the market and at the same time, bring the best value for its customers.

Based on the Romanian West Trade Logistics Report from March 2013 one can name the following factors as main challenges for the Romanian market:

- Limited availability of resources;
- Increasing rate of consumption;
- Rising logistics costs;

- Difficulty of defining and collecting data about the cost calculation;
- EU regulations that have a certain standard to comply with;
- Limited storage spaces for the raw materials;
- Inefficient processes and delays in the logistic chain;
- Availability and quality of infrastructures related to trade: ports, airports, roads, railways;
- Development and quality of logistics services such as transport trucks, storage, distribution, transport and customs agents and value-added logistics services (third party logistics providers);
- Development of performance indicators;
- Establishment of public-private coalitions for logistics reform.

High trade costs are associated with poor logistics performance, according to internationally comparable indicators.

Romania has made some progress on the part of trade facilitation and logistics in recent years, as reflected in international statistics. International supply chain performance is measured by the Logistics Performance Index 2012 (LPI).

According to the Logistics Performance Index, Romania took the position 54 in 2012, equivalent to 63.8% of item 1, equivalent to 59.1% of the previous LPI (2010) and the position no. 51 or 59.8% of LPI 2007, however, Romania is still part of the group of logistics performers.

However, given the growing number of newly established logistics company in early 2011 and a growing foreign direct investment (FDI) in logistics sector (over 700 million in 2009) to more than 300 million in 2005 (although the share of logistics total FDI is still low at approx. 1% of total FDI in 2009 for Transport and Storage), the main challenges for the Romanian logistics providers involve improving the quality of service levels and the competitiveness on the market, while reducing logistics costs.

2 Study case on a Romanian logistics company

The present paper has conducted a study on a Romanian logistics company, which belongs to a well - known oil company in Romania that has intermodal transport, by using the main characteristics of the supply chain management. This Romanian logistics company has adopted the TQM principles starting 2002.

In this company, the logistics activities are mainly organized by the internal personnel and resources (road transport, maneuvering), but also through the collaboration with other service providers where the logistics capacity is not enough for the activity peak.

The company holds a number of 30 shunting and transport locomotives and 500 wagons for transporting oil products such as (petrol, diesel and LPG) all property of the Company and authorized by Autoritatea Feroviară Română (AFER) for transport and access to public tracks. In addition, if necessary, another 5 - 10 locomotives and 300 wagons can be used, all rented from the profile market. For activities in the automotive sector, the company holds around 50 road cisterns for petrol, diesel and LPG products, as well as vehicles for technological transportation (cranes, charging vehicles, truck, tractors, semi-trailers). For activity surpluses the company has contracts with various suppliers in particular for the transport of oil products.

The logistics chain for the key company's customers is based on the following stages:

1. Products loading to automatic (petrol, diesel and LPG products) or un-automatic (coke, sulfur) ramps in the refineries.
2. Maneuvering of the CG wagon from the refinery to the train composition.
3. Primary product transport between refineries, storage facilities (there are 6 storage areas in Romania) and Constanța harbor for exportation.
4. Product unloading in the refineries, warehouses, Constanța harbor and the new location.
5. Product loading from in road vehicles (operating auto loading ramps);

6. Secondary transportation of petroleum products from warehouses to customers (own gas stations, gas stations of other customers, wholesale for end consumers, street transportation).
7. Product unloading in their own gas stations, third parties stations and to other end consumers.

With the aim to monitor the customer satisfaction level and at the same time the efficiency within the supply chain of the company, the authors have applied in September - November 2013 a questionnaire for the main five clients of the oil logistics company. Those clients were selected because they bring approximately 80% of the income of the company.

The most important results are shown in “figure 2”, “figure 3”, “figure 4”, “figure 5” and “figure 6”.

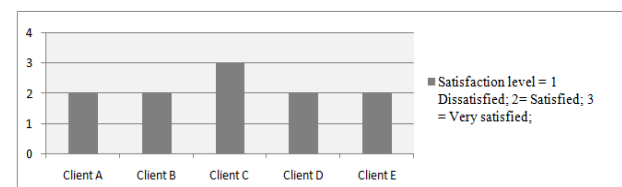


Figure 2: The behavior of the products purchased by the company



Figure 3: The price of the products and transport services



Figure 4: The flexibility and punctuality in the order fulfillment



Figure 5: The quality of products and services



Figure 6. The way the complaints are treated

The customers' responses have been analyzed together with the Quality Department of the company. The results showed a high level of quality and flexibility of the performed transport services. The transportation prices were also competitive on the market and the companies' reaction towards complaints solving was fast. The questions derived from these results are: "What helped the company in obtaining such good results towards its clients?" and "How does the company succeed in remaining competitive on the market?"

The most important aspects concerning the monitoring process together with the current trends in goods logistics will be further analyze, in order to compare with various "good practices" that are now used in this area of activity.

2.1 The monitoring of customer satisfaction

A very important aspect of the integrated system used by the analyzed logistics oil company is the customer relationship and the way in which complaints are being handled in order to eliminate all issues.

Customer satisfaction reports are done yearly in order to check the quality of the company's services and to improve the aspects where is still necessary to intervene.

The main activities carried out yearly are:

- the actual monitoring of the customers;
- identification of customers with whom the company closed a contract in the current year;
- communication of identified customers;
- organization of the questionnaires based on companies procedures;
- Analysis of customer feedback;
- Evaluation and measurement of customer satisfaction survey;

Consequently, the various activities of goods logistics (both physic as well as information) are being analyzed, with the aim of identifying if any activity can influence the overall quality of the product offered to customers. Then, the way in which the logistical cooperation and integration could increase the customer satisfaction degree and the role of information and communication technology (ICT) could have on a certain customer logistics is also being monitored.

2.2 Current trends in goods logistics

The physical distribution (logistics) is a complex activity through which the product and service cycle of the manufacturer is insured to the consumer or end user. The logistic system of a company is composed of a set of inter-linked activities: products transportation, storage, disposal, manipulation, sorting, packing, dispatch and acceptance.

- a) Products Transport is the basic component of the physical distribution, representing approximately 2/3 of the cost of logistical activities.
- b) Product storage is a component with weight in the logistics costs. The insurance of a rhythmic supply is necessary in order to meet the enterprise needs.
- c) The deposition refers to the location and selection of the necessary spaces for the preservation of goods for the period when they are in storage. The deposition contains activities concerning products acquisition, projection, security and sorting.
- d) Goods manipulation represents a movement system of the goods in the storeroom. It refers to the receipt of goods, placement and delivery.
- e) An efficient logistic system needs to provide: the right product, in the appropriate quantity, in the right place, at the right time, with the appropriate quality, to ensure minimal logistics costs.

The logistics activity begins with the acceptance of an order from the customer. The order processing system prepares the bills and sends information about the order to those who need

it. The storage areas will write instructions of the packaging and expediting of the product. The dispatched goods are accompanied by shipping documents and invoices, while the documents of the goods are sent to several departments of the company.

The storage process is estimated by several companies as a cost problem. Anyone wishing to secure a height-delivery rate, then there required a good deposit base that has both high storage costs, and high capital adjustment.

A key decision point consists in the specification of the size of the deposited quantity. The logistics values and measures can be the basis for the further forecast in order to secure the quantity for each stock on short and long term. The size of the security quantity depends on the following factors:

- the planned level of supply objectives;
- the number of intermediary storage places;
- order frequency of customers;
- activities for promotion and other for distribution;
- disadvantages as a result of not delivery or delivery delays, etc.

For several years, the concept of „*Just in Time*” (JIT) production and its impact on the storage and logistics capabilities is discussed. The goal is to provide the necessary raw materials for production and machines in the right moment, and then use them all in order to minimize the storage costs. This setting in production can be implemented on transport and logistics problematical areas.

The storage capacity has an influence also on the customer satisfaction. Lately, many companies have significantly reduced their inventories and implicitly the expenses relating to this with the help of JIT logistics system. This means that the producers and distributors have smaller inventories and the storage days are heavily decreased. These systems contribute to significant cost savings in storage and handling of products.

The optimum performance of a Romanian oil company largely depends on the level of logistics. An improvement in the logistics level, eg. shorter delivery time and better delivery preparation also follows a progressively

increasing cost curve. It is, therefore, the logistics level sought, which the "high cost problem" solves high conversions. To be effective, logistics must be planned and coordinated, in order to achieve lower costs in terms of satisfying customer needs.

2.3 Effects of informational advanced technologies in logistics

The fast development of informational advanced technologies has influenced not only the performance of supply chains, but also changed the industrial structure and created new services. The fact that suppliers and consumers have easier access to information has established a direct trade exchange. The Internet has created a new type of activity that is not based on assets.

A special new service appeared: "the virtual supply chain". It is a communication system with a central database that integrates all aspects of logistics operations and to which the interested parties have access to check the logistics information in real time (the location and tracking of goods, control of purchase orders and other forms of information).

The use of this technology at the level of the analyzed Romanian oil company reduced information processing time and cost, strengthened connections, thus facilitating the intermodal transport and improved the performance of the supply chain.

As a result, the trade transaction flow and the physical distribution were separated.

Figure 7 shows the increase of transported quantities from 2002, when the implementation of informational technologies by the company started.

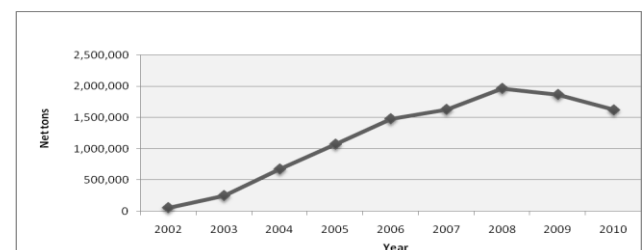


Figure 7. Evolution of net transported tons by analyzed the logistics company

The EDI has fundamentally changed the way in which trades are managed. There are various software tools that help the logistic company manage logistics information and share it with all affiliates in real time. In order to avoid publicity the authors will not give the names of those applications.

The Romanian oil logistics company uses an online software application that functions like a platform and helps it in information storage, organization and management in a central location that shares then with all affiliates. This system uses informatics links in the form of lists and libraries that allow members of the project to work and communicate more effective and productive. The reason for choosing this tool was to promote the communication and cooperation at a society level.

The main advantages of this software are:

- The increase of employees productivity by simplifying operations;
- Faster management capability, higher feasibility, capacity and transparency;
- Reduction of reaction time to the market changes and consumer needs by accelerating organizational processes;
- simplify the organization access to both structured and unstructured information.
- enabling stakeholders with the information and expertise in order to make well-documented decisions;
- delivery of a single integrated platform for managing intranet, extranet, and internet applications within the company.

The designation and tracking systems of tools and vehicles in real time have transformed together with the planning the logistics management systems in the context of the logistics company. The company may transport, track, and program almost anywhere in Romania.

For the street transport the orders of the customers are registered and inserted into the database. Thereafter, a software application calculates the optimal road routes and cargoes to obtain the lowest cost and the best coverage possible. There are also technical calculations and simulations for the configuration or modernization of the company processes in real

time by informing and cooperation. Thus, if a change in the company appears, the staff gets to know immediately when and why this has occurred.

For the rail transport the logistics company uses another software which calculates the following aspects: the selection of the optimal transport route and the maximum transportable quantities. The software helps the company regardless of the geographical area in which the customers are located. This allows the company to secure a better relationship building a competitive advantage.

For a better customer focus the company is organized into 12 rail working units like for example: Vega, Ploiești, Dumbrava Berești-Bistrița, Mogoșoaia, Vatra Dornei, Constanța, Năvodari, Bucharest etc.

In this context, the use of this software minimizes the risks linked with the geographical diversity, time variables and communication gaps.

Other advantages of the software usage are: previous error detection and resolution in the development cycle, cost reduction and faster response times.

2.4 Strategic recommendations concerning ICT in logistics companies

The net reduction of physical transportation as a result of optimizing certain activities is mainly produced by the additional goods from rising supply and from the delivery options to / from wide areas. These areas are made more accessible by the technological advances. So there is a significant business opportunity for those who have implemented ICT and know how to use them effectively.

As a result, the ICT-usage within the entire logistics chain is now in constant evolution. Thus, ICT should continue to be an important subject of promotion within the Romanian logistics companies.

In general, the ICT innovative technologies are introduced only for the development of logistics networks, if the physical infrastructure of the physical transport and its facilities are already well developed.

However, the innovative ICT remains so sophisticated that they can be used as powerful tools for the strategic redirection of logistics operational model. Therefore, the development of physical infrastructure cannot be independent of the information architecture and of the characteristics of the strategic design networks. Another important obstacle with which the Romanian logistics company was confronted while adopting ICT, was the slope of investment risk. On the one hand such risks result from the large demand of ICT investments and on the other hand from the long period of time necessary for the application of software and systems. So there is a major devaluation risk of ICT before they create the desired events. Consequently, the decision factors of the company must keep the pace with the rapid development of ICT and make relevant software elections that encourage the development of logistical planning.

In view of the fact that the developments are at global level in the ICT area, the opening and interoperability of the informatics system of the company need to be carefully planned.

The Romanian logistics companies should take into account the fact that innovations are on the one hand caused by the interactive processes between various economic enterprise activities and on the other by the research activities and national and international technology development. Therefore, in order to develop the logistic networks, there is a constant need of communication between all the parties and of creating synergies across different providers and third parties.

3 Conclusions

Nowadays, more than ever, companies are focused on increasing the efficiency of their logistics chains. Cost pressure and an increasingly competitive landscape determined new approaches in terms of strategy, quality, and supply chain management. This pressure has often led companies to transform traditional networks to focus on demand value chain. Companies are creating in the supply chain, collaboration models that improve the business

by engaging the customers and suppliers as partners instead of mere participants. For a logistics company, the main goal of this relationship is to improve the ability to control, optimize transportation network, to produce more cooperative strategies in order to better satisfy the customer.

One of the major oil companies in Romania, operating on a very competitive market and in the presence of well-informed and demanding customers can differentiate itself by the quality of service provided and the cost efficiency. All these elements are putting a constant pressure on the company, forcing it to try to optimize the supply chain activities within the continuous increase of quality services for better customer satisfaction, better adaptability to market changes, increasing competitiveness through cooperation firm-supplier-end customers to obtain a result of win-win-win and at the same time to develop an information system in order to reduce response times.

This paper analyzed how the concept of TQM is already applied in the company based on the idea that performance in obtaining superior quality is achieved only by engaging the entire organization within continuous improvement processes. The integrated Quality & Health & Safety & Environment (QHSE) management system of the studied company although it does not target an application of TQM as a whole, it targets the customer satisfaction.

It was then studied the strategic decision of transportation routings, leading to the conclusion that the company was facing a problem in fixing the optimal logistics in 2001. Logistics must therefore be planned and coordinated, therefore strategic integration and IT support plays an important role. The analysis showed that the current use of the ICT within the Romanian company reduces the time and cost of processing information and creates quality links, therefore facilitating inter-modal transport and improving supply chain performance. Due to the fact that the flow of commercial transactions and physical distribution were separated, the computerized exchange of data fundamentally changed the way business transactions are managed.

Clearly, the current oil market developments in general like for example: increasing consumption in emerging countries, limited resources, conflicts and political instability in mining areas, and stock speculation, are some of the causes that lead to significant tensions in this field, and in particular to a significant pressure on costs .

On the other side the customers wish to have a service of quality in terms of the shortest response time. Certainly, many steps remain to be done in the field of quality improvement, especially by making use of the new technologies.

In order to stay competitive on the market it is important for a logistics company to be able to adapt to new technologies and adopt new programs or communication systems that improve the quality of service, reduce costs and, what is more crucial, that better satisfy the customers' needs.

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Authors' description

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