SOME APPROACHES TO THE SUPPLY CHAIN MANAGEMENT IN ECONOMIC AND MILITARY DOMAINS

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If a company makes goods from parts purchased from suppliers, and those products are sold to customers, then there is a supply chain. This is comprised of all the businesses and individual contributors involved in manufacturing a product, from raw materials to finished merchandise.

Some supply chains are simple, while others are rather complicated. The complexity of the supply chain will vary with the size of the business and the intricacy and numbers of items that are manufactured.

Supply chain management is constantly evolving and there are always new trends and issues that are of interest.

Keywords: logistics system; supply chain; supply chain advantages; supply chain disadvantages; Supply Chain Operations; logistics services.

Conceptual Approaches

Logistics represents an evolving field that has gone and still goes through many changes caused by the characteristics of the economic environment in which it is acting. Therefore, we witness the transition of logistics from one operational activity to a tactical or even strategic one. In this way, the logistics grew out from the premises of an enterprise, and so the concept of supply chain emerged.

The prestigious group of specialists in this domain in USA, *The Council of Logistics Management*, uses as an established notion the *logistics management* defined as *planning process, implementation and control of bidirectional flow and effective and efficient storage of goods and services and also related information between a point of origin and point of consumption in order to meet consumers' demands.* (Lambert and Stock,

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1993, p. 4)[1]. It is a very general definition, which manages to emphasize the physical distribution management and delivery to consumers, with the central objective of satisfying the consumers' needs and obtaining the profit as well, objective met namely by ensuring competitiveness.

Following the analysis of that definition, it results that logistics management is part of a complex management, which focuses on coordinating specific business functions (marketing, production, financial) within firms and between firms, respectively the process known as supply chain.

Specialized sources present the supply chain in two ways regarding the similarities and differences.

The first option shows that supply chain, known in specialized literature as *supply chain - supply / delivery*, includes all activities that make up the flow and transformation of goods from raw material stage to consumers or end users, and also the associated information flows.

The concept of supply chain may also include, along with suppliers and customers, companies specialized in logistics services, including third non-operators. It developed the so-called "supply chain management" *that consists of systemic and strategic coordination of traditional functions and policies related to these functions within a company and between different companies in the supply chain in order to improve the long-term performance of the companies considered individually and the supply chain in general*[2].

The second option describes the supply chain as a coordinated system of organizations, people, activities, information and resources involved in moving a product in a physical or virtual manner from supplier to customer. In a general sense, a supply chain consists of two or more organizations legally separated, but linked by material (physical), financial and information flows. These companies that produce parts and products may be companies that provide logistics and even the customer himself. In a restricted sense, the term "supply chain" is applicable to large multinational companies with activities in different countries, which leads to the aspect of effective coordination of physical, financial and information flows. In the latter case, the supply chain is intra-organizational, while supply chain including different firms is inter-organizational[3].

On the basis of the above-mentioned aspects, we can argue that the supply chain is a sequence of processes and flows that are mixed in different

[1] SC Ailawadi, SCAR Singh, R Singh, Logistics Management, 2005, books google.com; www.managementmarketing.ro/pdf/articole/8.pdf - logistica sursa de competitivitate

[2] *Ibidem*.

[3] Chopra, Sunil and Meindl, Peter, Supply *Chain Management: Strategy*, Planning and Operation, 2007, p. 107.

entities (stages) to satisfy the customer's demand for a product, producing at the same time profit for all participants in this economic circuit. Each flow generates costs but also value added to products traded transferring from one stage to another in the supply chain of the product in analysis.

Some of the *advantages* of implementing a supply chain include:

- the materials / the products are present only where needed and the minimum amount really necessary;
- the generalization of reducing the stock levels and therefore the costs of storage;
- the rationalization of transport;
- the improvement of production scheduling.

As *disadvantages* of implementing a supply chain, the following can occur:

- when there is a *large number of small customers* and the implementation of a supply chain management is either very expensive or impossible. In this case, the quality of the service offered to the customer is essential and demanding partnership agreements are impossible.
- when there is a *large number of small suppliers* and the supply chain management implementation is impossible and there are also huge costs for suppliers.

In the commercial process, the physical flow interruption is a stage where the commodity on the market is moved. Often, this disruption is accompanied by a transfer of responsibility, which sometimes occurs when the transfer is made. Generally, this interruption of flows occurs during the loading and unloading operations and also during the change of means of transport. According to assessment of experts, the moment of flow interruption is crucial in organizing the *supply chain* and also in its overall performance, for the following reasons[4]:

- is a favorable time to ascertain the quality, quantity and real value of goods sold, changed or reloaded, for the authorities (including customs), as well as vendors, customers and *logistics providers*;
- is an action that involves consumption of resources (labor, information systems, handling equipment, etc.)
- is a state in which the cargo is immobilized and also becomes available for new transport (multimodal transport), for processing or marketing;
- is a level in product circulation during which the cargo may be damaged or stolen, because it is transshipped or its temperature can change.

[4] http://facultate.regielive.ro/cursuri/transporturi/trecerea_de_la_logistica_la_lantul_logistic-35858.html

The decision to build a *logistics* system will take into account the number of interruptions of such flows and their vulnerability. Decision making tends to reduce as much as possible the number, cost, duration and even their degree of technicality. Generally, the interrupts occur at the intersection of two activities (often performed by different companies). To avoid interruptions the question of timing activities arises, which leads to the idea of *supply chain*[5].

The Identified Models

According to expert assessment, a supply chain consists of several legally separated companies that work for generating a product in order to improve its competitiveness as a whole. Integration refers to the special stages that make these companies to work together for a long term such as: mate selection, the organization of networks and the inter-organizational cooperation, the supply chain management. The selection criteria should be based not only on costs but also on the future potential of a partner to support supply chain activities.

For functional purposes, scientists have identified a variety of models of supply chain that address both upstream and downstream participants. The SCOR model (Supply Chain Operations Reference), prepared by the Supply Chain Council measures the performance of total supply chain. This is a reference model for supply chain management, being built form the *supplier's provider* to the *customer's client*[6]. It includes the achievement in making the delivery and the order, the production flexibility, the costs of honoring the terms and disclaimers, the stock networks and the assets, and also other factors in assessing the overall performance of supply chain efficiency[7].

Each link in the supply chain is an activity or set of activities that can be grouped under one of the four expressions of SCOR model method:

- source: namely supply; it includes all activities associated with this concept we can find, purchase, the establishment of the references, etc.;
- make: that means industrial production in its different variants: mass production, ordered production, etc.;
- deliver: namely distribution in all its forms: sales to other companies, sales to final customers with their various variants;

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[5] Harrington, H.J., Harrington, J.S. Management total în firma secolului XXI, Teora Publishing House, Bucharest, 2000, p. 28;
http://facultate.regielive.ro/cursuri/transporturi/trecerea_de_la_logistica_la_lantul_logistic-35858.html

[6] *Ibidem*.

[7] Lect.univ.dr. MihaiFelea, Academia de Studii Economice din Bucureşti, *Rolul stocării în lanţul logistic*, Revista Amfiteatru Academic nr.24 din 2008, ASE Bucharest, p. 120.

• plan: presents the two transversal cross-link operations that allow the management of their relations[8].

In the functional sense, each link is connected, except the extremities, to one link upstream and one downstream. So what is the *Source* for one becomes *Deliver* for the one that supplies and leads *Make* for the one that uses supplied products. A logistician is interested, in a particular link, in less the content, procedures and techniques used, but especially in its management, mainly regarding the planning aspect. So, in an assembly plant production techniques involve only indirect the supply chain. Instead planning the activities of the machines, the equipment and the supply of the spare parts are related to supply chain management.

Based on research related to practice, supply chain Global Forum introduced another model of supply chain. This framework is built of eight key business processes, which are both inter-functional and cross-functional for the company. Each process is managed by a cross-functional team that includes representatives from the fields of logistics, production, acquisition, finance, marketing, research and development activities. Processes within a supply chain are: *customer relationship management, customer service management, meeting the demand, order fulfillment, manufacturing flow management, provider relationship management, product development and marketing, reverse logistics*[9].

Functional elements

The logistics chain activities (also called value chains or life cycle processes) transform raw materials and components in a product that is delivered to the consumer or user. Therefore, a supply chain links various value chains within it.

Supply chain represents a modern approach to supply chain. In this context, using solutions provided by the logistic suppliers in the supply chain, the customers of the profile company benefit from a number of advantages such as: increased revenues, increased profitability, reduced capital investment, reduced operating costs, saved resources networks and the proximity to customers because of the faster deliveries made at a higher quality level.

According to the experts' assessment, the supply chain functions relate mainly to: forecasts, treatment of orders, purchasing, supply of raw materials,

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[8] Philip Kotler, Gary Armstrong, *Principiile Marketingului*, Ediția a IlI-a, Teora Publishing House SRL, Bucureşti, 2005, pp. 615-616.
http://facultate.regielive.ro/cursuri/transporturi/trecerea_de_la_logistica_la_lantul_logistic-35858.html

[9] *Ibidem*.

storage of raw materials, raw materials management, delivery from the warehouse to the consumer, program production, control and self-control at the production site, the management of inventories of finished products, storage distribution products, plant-warehouse transport, conditioning-packaging etc.

Some of the services within the supply chain of a company with commercial profile are mainly: *designing supply chain, collection of goods, storage of goods under customs or free, handling and preparing goods for delivery/distribution; stock management; goods delivery; ensuring goods during transport and storage; obtaining customs clearance of import/export, as appropriate; preparing and submitting INTRASTATE documents; receive/deliver all documents to the client; close monitoring of all operations; various other value added services: sorting, packing, wrapping, labeling, attaching instructions etc*[10].

In terms of information in a manufacturing company, everything is based on forecasts. They determine the structure of the company's activity on a waiting foreseeable future. The forecasts are based on data from previous years' activity and on forecasting methods. Forecasts materialize in strategic planning networks and the tactical business plans.

In terms of information flow, the first step is *to address orders* followed by *supply of raw materials*. The purchase involves a plan based on production type of business. Another element is the *purchase* that requires a process of market knowledge and negotiating. The next step is to *store raw materials* in the deposits of the company, followed by *the introduction in the production line of the stocks*; depending on the type of production, *semi-finite products are stored in intermediate storage facilities*.

However, finished products are subject to the control at production site, on the manufacturing line and the end of it by specialized controllers. Depending on the type of production, the control can be statistical and presently there is a tendency to develop a in a greater manner the *self-control* which is performed by each operator at his place of work by controlling the parts coming from upstream and those made by him that go downstream. More increasingly, simple techniques are used to prevent defects mainly due to positioning and handling parts by applying the theory of quality circles, which seeks concrete solutions to improve production.

The control has as its main purpose ensuring the quality that represents the most simple and basic aspect on the quality scale. The next stages are the quality certification according to ISO 9000-14000-18000 (quality-

[10] Sunil Chopra and Peter Meindl, *Supply Chain Management: Strategy, Planning, and Operation*, 2007; http://www.topexpert.ro/logistica.html

environment-health and safety), which is based on a company's internal quality plan and is summarized in what is called "Quality Manual". This is done as Total Quality Management (TQM), namely integration into the overall enterprise of all structures based on quality. It includes management's commitment to respect the rules and procedures for supplies from suppliers, internal production, customer satisfaction etc.

Regarding the internal logistics, the management of finite products is the next step. These are distributed to regional warehouses, to the wholesalers and then to retail stores. Service for these products is part of the supply chain and starts to be a very important link. The life cycle of a product includes more and more, besides manufacturing, maintenance, the disassembly and recovery of reusable elements and these elements constitute the concern of the company sometimes becoming a promotional element for the sale of new products.

The main purpose of the modern enterprise is profit, and to that end the value chain comprises two types of activities: *primary activities - creating ideas, support activities - that help create value.*

Technological development in this century, called the century of knowledge, is and will be the main source of value creation. Most developed countries, as well as the most profitable companies are developing more advanced technologies. Thus, in the case of a value chain, there are three fundamental factors: *the shareholders, the company, and the customers*.

For a shareholder, profit occurs when the ratio of the amount invested and the benefit is higher to costs and financial resources used.

For the company, the value is not only financial and also has other connotations; it occurs when the ratio between quality and resources increase. In the case of the customer, the value is the price he is willing to pay for a product and its related services that are offered.

Current issues of concern related to the chain are *the level performance and quality of supply*.

On the performance, it is characterized by all the products, services and the work accomplished to satisfy customers. Accordingly, the performance can increase through a new vision of what the company is respectively: *a company transition from a closed to an open type, the transition from the organization on directed flows (production push) to the production on controlled flows (pull type production).*

Vision leads to new models involving the shift from product offer to the product and service. A basic element of a model is serving speed.

Depending on customer expectations, the tendency is to increase product diversity. Currently, the trend is to shorten product life cycle. This shortening is deliberate, on the one hand, and on the other is due to the use of

materials and technologies and also reliability programs that allow very precise lifetime in which the damage or wear, aging of components, make them no longer repairable cost-effectively.

In terms of *supply*, this should be seen as increasingly more complex and concerns: the *transition from a standard product to a personalized product*.

To stay on the market it is necessary to have all the parts of the supply chain in a close cooperation, up to the alliance between them. Thus the logistics problem is not only the logistics integration between logistic components of a single organization (integrated logistics) but also logistic cooperation between organizations of the supply chain (logistics cooperative)[11].

Worldwide, there is a tendency to concentrate different fields in large monopolies, making a great area to have only a few very large operators, which takes over most of the market and leaves a small activity area only to companies without international business. In this context, there is a logical transition from "standard product" to a logic "product innovative product", with major implications on the management of stocks as a major component of the supply chain.

Linking efforts of military and commercial regarding the management of the supply chain

With the possibility of using national infrastructure and especially ports becoming increasingly limited due to existing capacity, it is obvious that the logistics system, both the military and civilian, need to reorient their work methods. Extensive use of the Internet leads to the implementation of new procurement and distribution procedures. Virtual service providers allow exchange of information between the entities that provide goods and services globally. According to the current economic conditions, this leads to true transnational corporations whose business is spread virtually worldwide. In this way, information becomes a real mode of transportation in logistics, which increases the importance of technology in the conduct of current operations, some providers turning into information management companies.

Through electronic commerce, beneficiaries can access real time data on inventory levels, ordering, procurement and following the path of ordered goods. The revolution in information technology leads to major changes in the supply chain and to performance in fulfilling tasks, both in military logistics and in the civilian commercial area.

Thus the concepts of electronic commerce, electronic release orders, sales via the Internet and virtual storage lead to changing the relationship

[11] Conf.univ.dr.ing. Georgeta Emilia Mocuța, „Politehnica" University, Timişoara, Logistica - instrument şi concept în continuă evoluție, AGIR Bulletin nr. 2-3/2009, p. 5.

between suppliers and distributors and even to redefining the concept of job. Real-time access to data regarding the business of potential suppliers and beneficiaries allows users to have a dynamic control over stocks and a rapid response to market demands.

In the military, each structure can be viewed as a decentralized item of consume, connected to a central distribution point providing necessary goods for coherent operation of each element. Existing transportation systems allow the distribution of goods to the fighter. In many cases, it is more useful to identify the manufacturer and achieve direct link between supplier and final consumer (fighter), thus avoiding the potential queue during storage, transport and distribution[12].

In the civilian logistics area, direct coordination between the seller, supplier, carrier and the final beneficiary, through the Internet, allows avoiding lags, the system helping to mutual identify the needs and also to have more effective resolutions of the requests.

A military logistics system, based on Internet use, requires the interconnection of components and continuous exchange of information between structures with responsibilities for procurement, supply and transport. This is possible if we consider that initially the Internet was created based on military scenarios.

Regarding these aspects, the most relevant example is the Gulf War, where, according to a report sent by the General Accounting Office of the U.S. parts worth $ 2.7 billion remained unused. This was due to the fact that, at that time, the army did not have a viable system of tracking stocks. Also, there was a strikingly lack of specialized equipment, ports of embarkation / disembarkation becoming overloaded with equipment and materials that were to be processed and delivered to units.

As a result of the Gulf War experience, the U.S. Defense Department has implemented a tracking system and automatic identification of all movements of goods, leading to significant savings in money and also human and material effort. Although labour available decreased substantially since that time, new technologies have increased the efficiency of the activities, especially regarding the shipping materials by specialized cargo ships. Benefits became apparent at the start of operations in Afghanistan, when the new system, more accurately and much faster, has become operational[13].

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[12] Dr. Kristine Lee Leiphart, *Creating a Military Supply Chain Management Model*, USA, 2001. Global Logistics and Supply Chain Strategies, „HYPERLINK" http://www.supply chain brain. com/"

[13] Major Joshua M. Lenzini, *Anticipatory Logistics: The Army's Answer to Supply Chain Management*, USA, 2002.

For the military system of distribution and transport, the idea of having all the necessary equipment directly to the places of embarkation / disembarkation is not very different from the type of coordination that exists in the civilian environment between retailers and other elements of the supply system (primary providers, carriers, wholesalers and so on).

Nowadays, modern armies are experiencing the so-called concept of "anticipatory logistics" for petroleum products, ammunition and maintenance, which is, in fact, the logistics based on real consumption needs. This concept uses technology, information systems and procedures for predicting and establishing the consumer's priorities to be able to provide adequate logistical support, according to real consumption. Although, at first glance, the concept is relatively simple, in the future the is planned further expansion of modern technologies as tools for monitoring stock levels and also the technical condition of major equipment. The use of information systems to assist decision to determine the best solution to use the existent support means is also planned. In this way, logisticians will have the most modern tools of supply chain related to delivery at hand.

Military supply chain management

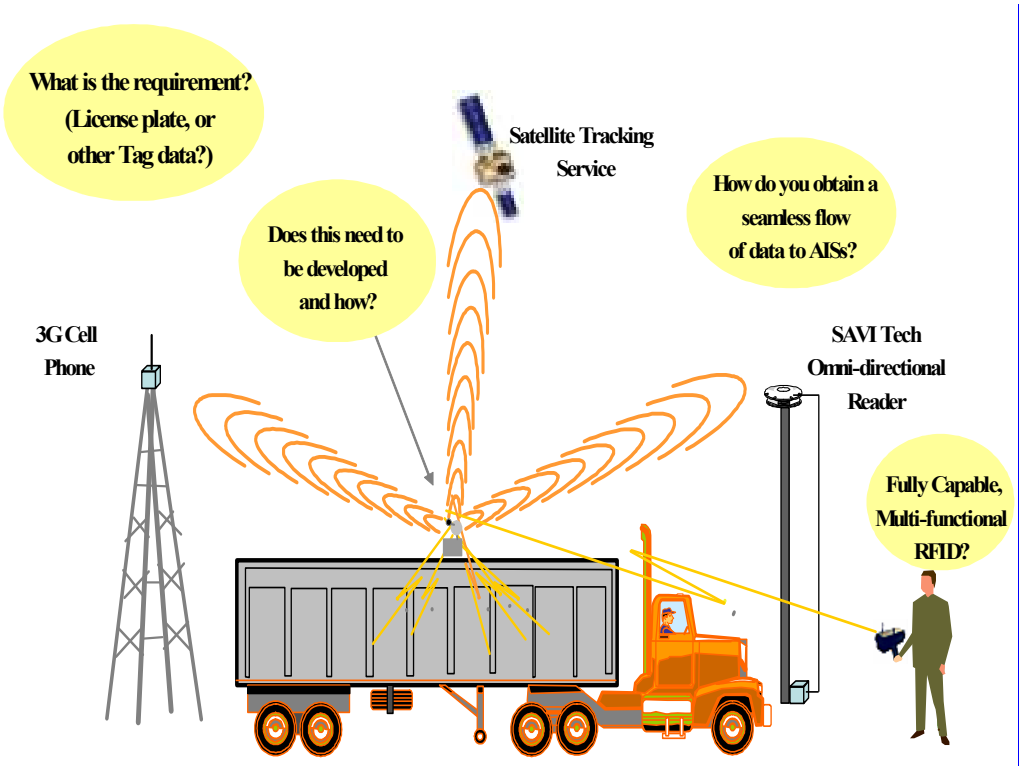
Experts have identified nine components of supply chain and the factors that ensure success in achieving logistic support. In the military, these are slightly different from those used in civilian economic environment, mainly because the forces are focused on fulfilling a combat mission, while civilian economic organizations pursue, primarily, the obtaining of a higher profit.

In both military and civilian business domain there were identified the following management components of supply chain: *manufacturers, suppliers, procurement, demand management (ordering to suppliers), Production / Maintenance, storage, transport, final consumer (fighter), reverse distribution*. The following figure shows possible visibility and communication within a supply chain.

Visibility and optional communication within a complex supply chain

In the military, the following factors are considered by experts as essential for success in logistic support: (fighter) consumer's needs, information and communication technologies, the deployment of the armed both in national territory and in foreign theaters; interoperability, regulation of specific military domain, information about the environment in which military actions take place, including those relating to the enemy; specific requirements of the mission[14].

[14] Dr. Kristine Lee Leiphart, *Creating a Military Supply Chain Management Model*, USA, 2001.



As you can see, the chain structure is relatively the same, both for the military and civilian, although there are some essential differences. The most obvious are the transport and storage, which indicates that, in the military, a number of components and equipment can be used both ways, especially for maintenance and medical support. Also, the maintenance is not considered as a distinct field within civilian companies. Other differences were identified in the external factors that influence supply chain: *increasing interoperability between different military domains within the C4I system (command, control, communications, computer and intelligence system), deployment of forces and requirements of the mission*; these being specific for the military environment.

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In Romania, the term supply chain has been recently perceived, and in most cases, both in private companies and public sector, *"rings that form the supply chain"* are often managed in isolation, thus being absent the integration between the various logistics functions, integration particularly necessary to achieve the objectives of efficiency and leadership. It is also an essential condition for development and growth of enterprises and of the entire economic system of Romania, for optimizing the logistics chain components and also for their successive integration in order to manage and coordinate in a unified and unique manner. Only after the integration of logistics functions within a single company has been made, ambitious and successive levels of

efficiency can be achieved, integrating also the logistics functions of the other protagonists of economic and technological development: the Supplier, the Manufacturer, the Customer. Then, an important change in management should be made in order to integrate effectively the objectives of those three.

Promotion of advanced logistics requires professional staffing, with regard to the achievement of objectives which include: globalization, internationalization of the supply chain, development of the Internet and e-commerce and outsourcing of logistics services.

Making logistics a third part is a growing attitude throughout Europe. Producing and distributing companies tend to make complementary activities a third part, and distribution is one of them. Meanwhile, on the other side, logistics providers continue to diversify and improve the offer.

Successful logistics managers of the beginning of the 21st century will be those who, according to specialists, will have an overview of the strategic plans of their own companies and understand the role of the supply chain in the successful implementation of these plans. However, logistics managers will cooperate with the departments of marketing, production and finance to identify the types of activities that add value to products and services of their company.

Logistical challenges for the early years of the 21st century were many and varied. One thing however is certain: *logistics has a significant strategic role in achieving competitive advantage by companies in terms of global market competition*[15].

In conclusion, for achieving the objectives of supply chain, we consider that logisticians will have to adopt the planning processes, implementation and control of effective and efficient flow and storage in terms of costs, raw materials, products in production, finite products, from the point of origin to the consumption point, in order to permanently adapt the effort of specialized companies to customers' demands.

BIBLIOGRAPHY

Lect.univ.dr. Felea Mihai, *Rolul stocării în lanțul logistic*, Revista Amfiteatru Academic nr. 24, ASE Bucharest, 2008.

Dr. Leiphart Kristine Lee, *Creating a Military Supply Chain Management Model*, USA, 2001.

Popa Virgil, *ECR (Efficient Consumer Response) – Răspuns eficient pentru consumator. Strategii, politici, tehnici, instrumente*, Economic Publishing House, Bucharest, 2000.

[15] www.uem.ro/.../logistica%20marfurilor.../cartea.pdf

Kotler Philip, Armstrong Gary, *Principiile Marketingului*, Ediția a III-a, Teora Publishing House SRL, Bucharest, 2005

Conf.univ.dr.ing. Mocuța Georgeta Emilia, *Logistica – instrument şi concept în continuă evoluție*, Buletinul AGIR nr.2-3/2009, „Politehnica" University, Timişoara.

www.managementmarketing.ro/pdf/articole/8.pdf-logistica sursa de competitivitate

http://www.topexpert.ro/logistica.html