

## THE INFORMATIZATION OF THE LOGISTICS ACTIVITY IN A FIRM

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**Abstract:** Nowadays, it seems impossible the existence and operation of a firm which is not on their equipment would possess computer equipment. Today, informatization affects all areas of activity of each enterprise. In all its forms are used in computers, information systems and the Internet. The following article presents the creation of an enterprise information system using a database (the modeling process and their types), the introduction of EAN codes, and the need for decision support systems SDI (their normalization, data transmission techniques and systems), together with board charts.

**Keywords:** logistics, information, database, SDI system, board chart

### 1. Creating the data base in the logistic informational system of the firm

Logistics aims at putting at the disposal of the clients the appropriate product in the required quantity and in the right moment and place simultaneously with transmitting the proper information when and where it is necessary. Thus, the lack of information in the flux of products is a false state of tranquility for the firm and this contributes to the growth of entropy in the system of the firm. That is why the phenomenon of progressive disintegration of operational logistics in a firm highlights the risks of handling the operations and of collecting, analyzing and transmitting the information in the logistics process in a firm. Therefore information is the raw material of the logistic operator who has to build an informational system based on the operational administration.

As it contributes to the increase of efficiency in the activity of the firm, logistics needs more and more detailed information. This happens because the operational data identify in the first stage large masses of material fluxes and total quantities. If the global logistic resources are evaluated more easily then their local identification and measurement is more difficult. All these lead to the following question: *how and where should we take action in order to create an efficient logistic informational system of the firm?*

Local information is more varied and it proves to be necessary. But it has to be correlated in a coherent and homogenous way although it refers to the passing of the materials and products through various links of the organizational structure of the firm or even through several firms. Thus the informational system is created and it is operational as a coherence instrument of the activity of a firm. It is based on common data, a common language and on the information transmitted through a network of communications and it becomes the nucleus of creating a Logistic Informational System of the firm (SIL) which permits

applying the tracking operations that authorizes both a specific identification of each object (a package, a means of transport etc.) and a marking of each payment order point of the circulation system. Moreover for achieving the best results in the activity of a firm, logistics has to use numerous inputs in its models and analyses. A well-structured SIL is the only capable one to collect very heterogeneous data, to archive and to analyze them in order to ensure with a minimum of effort the raw materials necessary for building the logistic models. It transforms raw data in information as a follow up of the electronic systems of decision assistance.

The evolution of informatics places at the disposal of logistics in a firm a working instrument adapted to achieving the different logistic objectives regarding the use of operative information in the firm. Informatics has thus an impact both on the strategic dimension of firm's logistics and on its operational components. The use of informatics as a support of the logistic reflex ion offers additional possibilities for the following: the decrease of costs through a better knowledge and a more efficient control of the operations; the improvement of the service levels through the ability of managing in each moment the operational activities; the emphasize of differentiating the offer of the firm in relation to the competition through using some systems of information exchange in order to improve the serving of clients.

The quick gathering, processing and transfer of appropriate information permit the avoidance of manipulation and storage of physical objects. Thus the raw material is replaced with information whose cost is continuously decreasing. Gradually it will be performed a progressive integration of operations with the help of the information systems not only inside firms but also in the field of the relations with the clients and the suppliers.

That is why when crating a SIL great attention should be paid to the process of creating a logistic database (BDL), which should be correlated with the logistic chart board (TBI), the means of logistic information exchange (SID) etc.

Creating a logistic database (BDL) is a complex process that implies an assembly of activities structured into two large groups, namely:

## **2. Creating a database**

Structuring a SIL always starts with creating a BDL as a result of the existence of some limited information. The existent informational systems derived mainly from the accounting systems do not fulfill the conditions in order to be assimilated by logistics because they are not adapted to the logistic concept based on the notions of flux and integration. Although the accounting informational system answers the legal requirements it still has some inconveniences, namely: it presents the costs a posteriori, having mainly a role of recording; it does not imply the services notion; the costs taken into account are influenced by the costs of labor; it emphasizes situations that measure quantities at fixed dates; the distribution of costs on sections takes place in the conditions I which the differences between different activities are harder and harder to be achieved.

BDL can be considered as an assembly of information which regards the whole logistic chain and it permits the regrouping on subassemblies of data necessary to the functions of the logistic administration regarding: forecasting, execution, observation. This will contain data linked with: the flux, the services levels, and the level of costs (fig. 1.).

Nowadays the biggest BDL is being created for the system of supporting the integrated logistics due to the DOD initiative (Department of Defense) in the USA and it is called CALS (Computer Aided Acquisition and Logistics Support). This one aims at: simplifying the procedures of information exchange necessary to SLI, reducing the acquisition cost of logistic data, avoiding the redundancy phenomenon in the system.

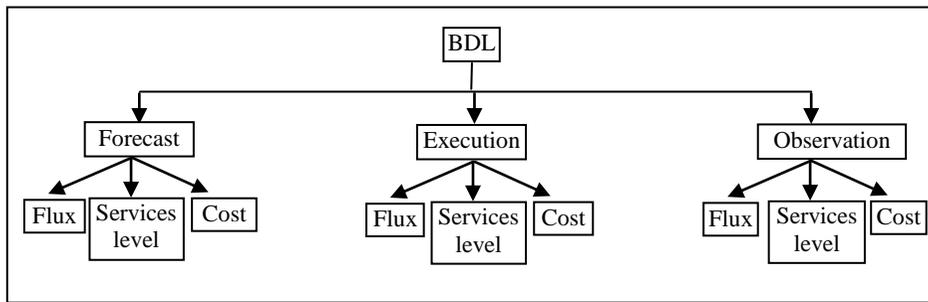


Figure 1. The use of a logistic database

CALS will allow through ANSI (American National standard Institute) for a product still in the conception stage, the identification of the information that will change the whole life course of a product or of its different component parts. On the other hand, the physical handling of a warehouse requires a management of supply, receipts, locations, picking operations and shipment that uses a database in movement (BDM) (fig. 2). Such a database allows the simultaneous communication regarding the marking in the accountings of all entries from the warehouse, of all the outputs, of the clients and suppliers' return.

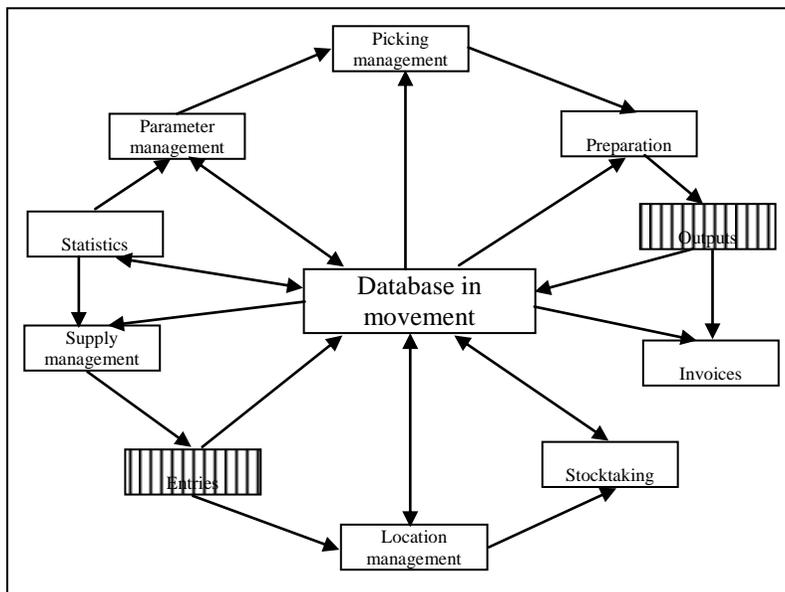


Figure 2. The use of a database in movement for a warehouse

### 3. Encoding the great distribution

The volume of information existent in a BDL is in relation with the generated cost. There are four main operational systems, namely: *the system of the code mentioned on the bill; the system of hyper frequent codes; the system of the labels applied on the product; the system of the visual recognition of the characters through reading with a luminous fascicle.* These systems requires, for fulfilling their mission, the normalization of the encoding not only at the level of a client or a supplier but also at the level of a whole profession, at national or international level in order to limit the complexity favored

by a management of multiple codes. In order to eliminate this risk between the great distribution and its suppliers, the International Association EAN has elaborated two standards based on a system with bar codes, namely: *a universal standard of encoding the items, a standard of representation*. The EAN encoding systems are applied to the products which will be consumed and allow an automatic gathering in case of output, both for knowing the price and for the whole management (the supply of the storehouse etc.). Being very reliable, the bar codes lead to the decrease of the deviation percentage from 1% in the manual variant to 0.33% in the variant with bar codes. These efforts focus on the management before the shops, the production units being the first targeted. But there are also concerns about the receipt of products as a follow up of the identification of the logistic units (cardboard, pallet etc.).

#### **4. The informatization of logistic management of the firm**

##### **4.1. The necessity of SDI existence**

The logistic activity implies an intense focus on the information received from different fields. The documentary aspects that are at the base of the initiation or observation of the physical activities require the existence of numerous informational supports of data and relevant means of transmission and processing.

These costs of information exchange and of their processing represent 3-12% of the merchandise value and the complete cost of processing an order is modified according to the number of order lines, to the litigation tax etc. The exploitation of information in the S.D.I. system offers knowledge about the multiplication of the volumes treated as an application of the Juste-a-temps system. In industry it influences an important part of the distribution and it leads to a multiplication of orders and thus an increase related to the number of accompanying documents. The interval and the relevance for the means of information transfer do not always allow another direct approach of the sent information and this is why there are necessary operations of recollecting that lead in the end to the dissatisfaction of the client. At the same time the transmission intervals are often long and their relevance is questionable.

When two firms have means of processing the information in time, the lack of compatibility or of the interferences lead to some disruptions in the information transfer. Their passing through other means reduces the performance of the systems that are used. After the division in physical fluxes the information fluxes are separated too. The use of the S.D.I. procedures offers a dialogue instrument to the various parameters and especially to the loader who now has some commercial information regarding: the observation of the services level; the transmission of this information with a minimum deviation between their gathering and their processing; the possibility of reaction towards logistic problems; the possibility of supervising the orders from the moment an order is made by a client and until its receipt. Thus, S.D.I. makes possible both a logistic observation in real time and an observation of the quality of the logistic performance.

The scheme in figure 3. emphasizes the main stages of emission and processing of information when transmitting an order from a client to its supplier.

Thus, the informational system of firm's logistics has the following advantages:

- it allows the information transfer from computer to computer, either directly or through some stages in which the messages are processed;
- it contributes through its logic to the realization of zero paper exchanges;
- it leads to the improvement of the services level suggested by the firm acting on the time interval (the exchange of documents through courier – one, two days, through

- telex – a few minutes and through the computer – a few seconds), on the relevance and the reduction of costs;
- it is very important for the development of some strategic activities such as recycling the physical fluxes and the international fluxes, the increase of the market segment in which new services brought by S.D.I. are tried, the change of the market structure through renouncing at mediators, initializing or integrating some new management methods such as the method of juste temps.

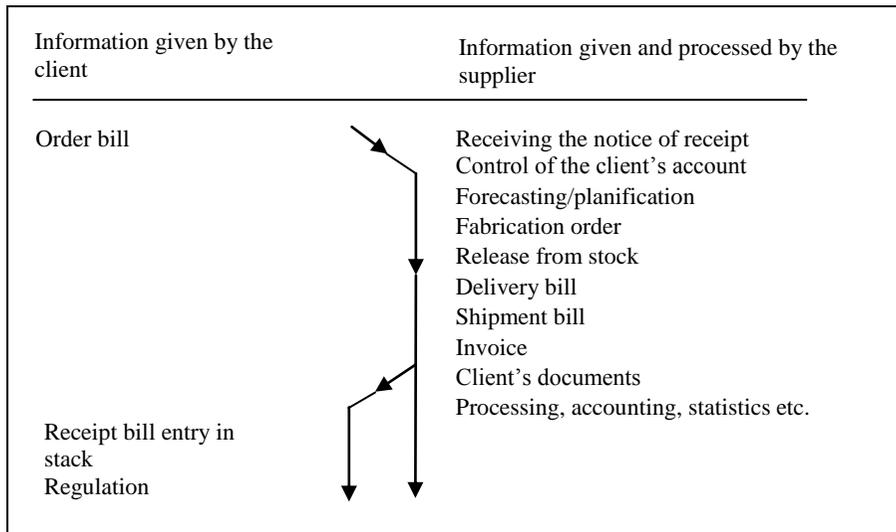


Figure 3. Information resulted from the processing of an order

#### 4.2. SDI normalization

S.D.I. realizations are applied to each logistic sector using a system of codes called: *ODETTE* for European level automobiles and its objective is applying the information transfer without physical support between supplier and clients in Europe; *LIDIC* used in the sector of production of electric materials; *CIDIX* used in the chemical industry in USA; *ALLEGRO* used in the industry of consumer goods; *EDIFRET* largely used in French railway transport; *PACCS* used in airway transport; *EDITTRANSPORT* used in multi-modular transport etc. These examples emphasize the existence of a diversity of rules at the level of each utility sector and on each geographical area. In conclusion we assist at a richness of sectors rules that govern the documents exchange. This is why it is necessary an international activity of nominalization of documents, an activity that was initiated in 1986 through creating first of all an EDIFICAT norm related to international commerce.

#### 4.3. Techniques of transmitting the information in SDI

Once the nominalization of messages has been done the problem of the transmission modules is to be solved. In order to ensure the information necessary to the logistic activity, the information exchange has to succeed in interconnecting an increasing number of enterprises (suppliers, clients, transports, etc.) with different informatics supports. The services expected by the exchange means are increasing (international exchanges, information storage, availability 24 hours of 24 hours). In these conditions there have been created: *the specialized phone line*, made up of a phone line established between two enterprises and used only for their exchange

of information (fig. 4.), a commuted phone line (fig. 5.), the transpac network (fig. 6.) a branch of the commuted phone network which offers a national transmission network and a professional message etc.

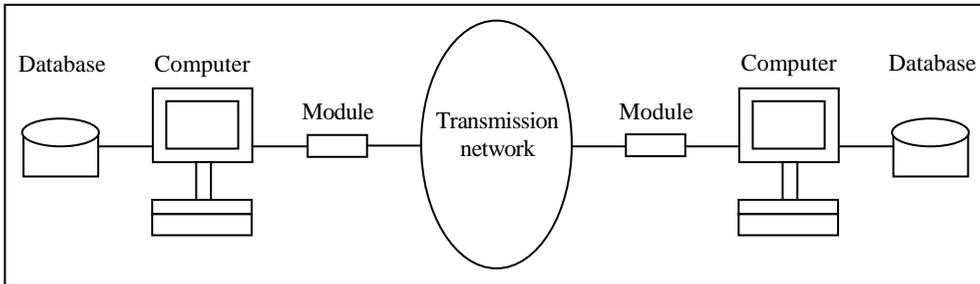


Figure 4. Specialized phone line

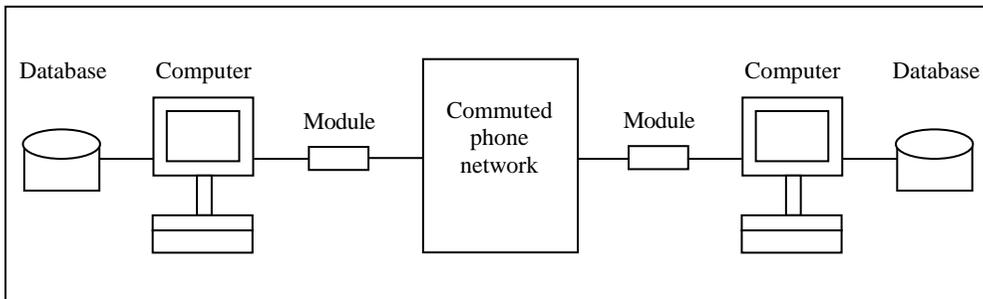


Figure 5. Commuted phone network

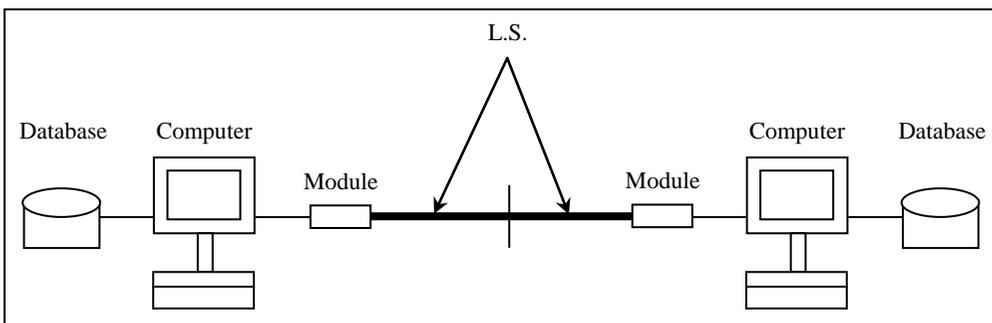


Figure 6. Transpac network

#### 4.4. SDI systems

One of the most used SDI systems is the system created for the consumer goods called Allegro that links the producers with the dealers. Using a compatible micro-ordinator PC an assembly of messages can be transmitted, namely: messages nominal zed Gencod (orders, copies of invoices etc.), service messages (confirmation of a reception of dysfunctions), and personal messages.

To improve the relations between consigner and consignee the S.D.I. Servadis system has been created and it offers data about: Expenditor Servatis, notes, answer to requirements,

order of picking and of return, complaints, delivery data, non delivery that leads to delay, deficiencies, transport evaluation, consigner-consignee, advice of shipment at the dates forecasted for the delivery.

Thus, the development of this system requires in all cases a powerful involvement of the enterprise that should: qualify its project as being a strategic one, be conscious of the necessity of eventual reorganization, be pragmatic in needs analyses, know the initial investment, know the interval of functioning, assure specialized assistance within this first logistic approach.

#### **4.5. The use of the board chart in the logistics of a firm**

In the logistics of a firm the board chart can be used. It is also called *the logistic board chart (TBL)*.

The realization of such a chart is a complex process, which implies:

##### *a) conception of the structure of the board chart.*

The logistic board chart is one of the essential handling instruments of which the logistic manager should dispose or design it immediately. It offers an objective approach of the logistic performance in the firm only as an action objective and not as a notification. It is an instrument of synthesis absolutely necessary taking into account the great volume of information of different origins that must be approached and supervised by logistics. The objectives of the board chart are in relation to those of the logistics.

The board chart used by logistics has minimum three components, namely: *components specific to logistics* seen at the activity level, the use of resources, the relation cost-level of service etc. The activity levels or the physic fluxes measure the physic activity of the logistic system. The indicators used in the board chart are divided in the logistic subsystems for example supply, production, and physical distribution. For this it is mentioned the quantity of each product in tons, number of orders made by the clients, number of order lines, number of issues per line, number of receipts, the levels of the stocks of raw materials, of products I course of fabrication, of finite products etc. These data are expressed in m<sup>3</sup>, t, pallets, cardboards etc.; *referential components* limited in time in relation to the industrial sector of the firm etc. It is always necessary the existence of a reference in time to indicate the value of the period, the cumulated value, the mobile average per year etc. These values of reference allow a supervision of the activity in time and it integrates the periodical needs of information of other systems. The use of the reference indicators of an activity vector whom the firm belongs to, offers the possibility of comparison with other types of similar activities and the BDL development and the regular publishing of the reference indicators offers the main data upon the relation of the firm with the outside; *analytic components* such as achievements, objectives, deviations etc. The achieved values are the results of an assembly of reliable measures related to the periodicity of the board chart. They imply the existence of a structured SIL, developed around a BDL and for which the board chart is only one of the results.

In all cases the number of the indicators comprised in TBL will be minimized and the structure of the board chart must allow its use on different hierarchical levels of the firm (fig. 7.). The use of the board chart is done both within the logistics Direction of the firm detailed on fluxes and partially by the persons in charge on subsystems.

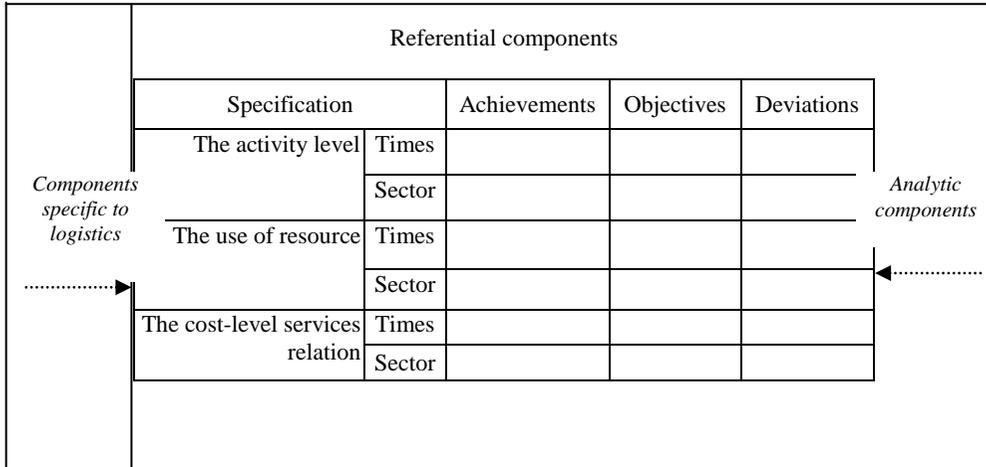


Figure 7. Interdependency between the components of T.B.L. structure.

*b) use of resources*

It refers to: the pallet stock, the indices of use of the whole area, the weight of the empty locations in the wholeness of locations, number of order lines – preparation, number of hours of personnel used in preparation, the coefficient of using the capacity of the means of transport, the rotation of the stocks, absenteeism etc;

*c) the relation cost-level of services*

Global or analytic costs are calculated on places of activity in each stage of the logistic process. In general the costs of transport, of storage, of processing the orders and of maintenance are covered. They are expressed in relation to the operation to which they refer to in lei/stocked unit, lei/order, lei/pallet, lei/km. Global cost is expressed either in absolute units or in percentages from the turnover.

The services level (fig. 8.) is observed through the indicators that reflect the service level expected by the clients and identified through the questionnaire *services levels* and it is seen in the following indicators: quickness (the average interval between two deliveries), reliability (deviation from the average interval), availability level (the percentage of incomplete orders and the number of lines of distribution received), the quality of the services (the percentage of errors in preparing the order, the percentage of wrong deliveries, the percentage of divided orders).

Defining the indicators of services levels intensifies the relevance of the relation cost-services. They must be carefully selected in relation with the content of the logistic subsystems (production, physical distribution, supply) and they should reflect the client's expectations. When devising an appropriate indicators system it is advisable to take into account three aspects, namely: *do not trust the indicators of self-satisfaction; the average level of an indicator is not relevant; the chosen indicators should cover the assembly of logistic activities.*

The objectives are either global, or analytic on logistic subsystems. The correct definition of the objectives is of utmost importance because it is the one that allows the use of the best indicators. Thus, in certain sectors, the use of the *return* is often met from a commercial point of view. If one objective is their limit, then it is necessary to use a characteristic

indicator such as the weight of the value of returns in the turnover. If one objective is the limit of non-reliability of the requirements made to the suppliers, then an estimation indicator is used: the number of correct orders and the total number of orders. No matter what indicator is used, the differences always appear between the previous setting up of the objectives and the real realizations, and their analysis will lead to the use of correction actions.

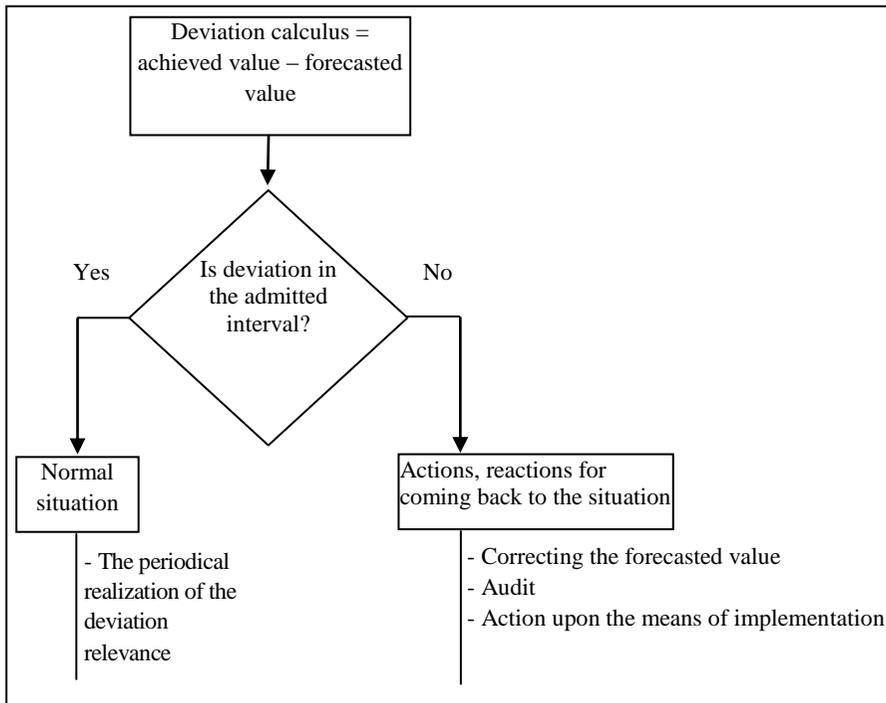


Figure 8. The calculus and the analysis of deviations

The use of the board charts implies ten stages (fig. 9).

The investment in the board chart must be understood as an investment in a method of logistic management whose profitableness, never easy to be measured, can still be increased. Economy generated by global costs on short-term, the profitableness of investments, a better view of the operations management on medium and long term, various combinations in defining the objectives, detailing the objectives on operations, anticipating the tendencies which appear in development are just some of the advantages of using T.B.L. Under these circumstances T.B.L. must be considered as a handling instrument of the enterprise. This is why the use of the chart board is closely linked with the management of operations and with its intervention in the operational frame. With all these advantages though the logistic chart board must not be considered as a stimulus for people's motivation, to indicate what actions are to be taken, but it is more as one of the main instruments of the management of logistic operations.

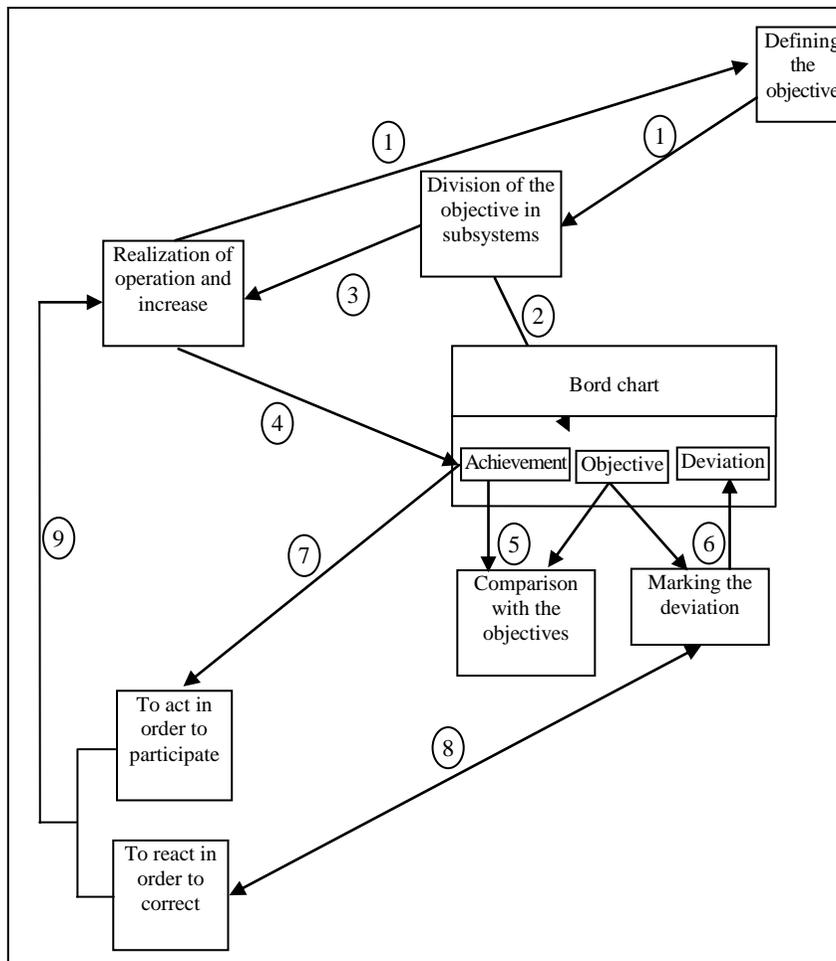


Figure 9. The stages in the use of the board chart

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