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Information Systems for Logistics and Distribution Management Performance Indicators (KPI's) (from Theory to Practice)

Jose Rascão
Polytechnic Institute of Setúbal School of Business Sciences Campus do IPS Estefanilha Setúbal (Portugal)

ABSTRACT: This articlediscussesthe main Performance Indicators (KPI's) for Logistics and Distribution Management, as well as the role of information, in terms of decision-making support, by different managers of organizations. Information has become a source of value for organizations in the global economy, taking a key role in contributing to sustainable development and its performance. Information as a thing, process, or object, in business management, helps managers in the decision-making process. It aims to sensitize managers to the importance of issues related to Performance Indicators (KPIs) d SupplyChain Management, from an integrative perspective of all stakeholders and flows involved in the chain, considering the requirements placed on Logistics, Management and monitoring of the Distribution process.

KEYWORDS*: Information system, Information Systems Management, ICT, Logistics, Distribution.*

I. Introduction

For some years now there have been numerous attempts to improvethe flowof information in business. During this period the watchword has been information and we have seen an important transformation in the nature of business. We have moved from an economy based on industry and transport to another based on information and knowledge, supported by information and communication technologies. Nowadays it is the information and knowledge that unite us and many people currently gain their whole way of life by acquiring information in one way or another. This dependence on information will increase in the coming years. Today and above all tomorrow the basic understanding of information will be as important as a few years ago was expertise in the fields in the age of agriculture or basic knowledge industries in industrial society. In fact, understanding the importance of information, as a strategic resource in the management of organizations, will become more important for strategists than were models for formulating the strategy of industrial society. In the 21st century no manager will be able to successfully define and implement the strategy without a basic understanding of strategic information.

Some managers mainly privilege quantitative information (past or forecast) over qualitative information, since it is easier to obtain, can be compared and give them greater comfort in decision making, while qualitative information is very subjective and depends mainly on the interpretation of strategists about future development prospects. Managing resource information today represents an increasingly pressing need in any business. The organizations of the 21st century compete in a turbulent and complex environment full of interrelations that remain in a constant state of change, and in this context, information represents an increasingly valuable resource, necessary for managers to understand, interpret and respond to changes in the environment to reach or maintain a favorable position in the market.

II. SCIENTIFIC METHOD

Introduction

This is an exploratory study that seeks to clarify and organize performance indicators (KPIs) forlogistics management and distribution of organizations / companies,independent of supporttechnologies (pencil and paper or computing) presented in the literature of Business Sciences, Information Science and other Sciences. It is an organization that allows identifying a common denominator among the different indicators already indicated in the literature, so as to enable their grouping by identity, application / use and pertinence / aggregation of value in the context, in which the terms are inserted. Data collection is characterized by bibliographical research, on the terms and concepts applied to different levels of organizations' management.

It is a descriptive and analytical approach seeking to know and analyze existing cultural and/or scientific contributions on this subject, from the literature review. The research was structured based on the systemic approach to understanding the problems of Logistics and Distribution, in the global and digital era, seeking in practical, operational or application terms, the solution of "real life" problems of organizations / companies and managers.

Theme and Search Problem

The development of Business Science has been based on the objectives of understanding nature and the phenomena linked to the real world in the last four centuries. For this, scientific knowledge was subdivided into thousands of disciplines that, very successfully, made the sciences advance. This advance eventually generated classical science, which uses often ineffective methods to deal with some of the most complex contemporary problems. Thus, new sciences emerged in the post-war period and developed differently from classical science, presenting, as one of its identifying traits, the interdisciplinary practice of information, necessary for the development of its research.

The greatest change is the transformation of industrial society into the information and knowledge society (digital society). The center of the work passed "to intellectual work and telework". In developed country societies, access to good jobs and a career are increasingly dependent on a degree. This is the logical result, since it has passed from work with the sweat of the face and the strength of the body, through industrial work and it came to intellectual work. This last step represents a break with the past:

- The fact that knowledge and education are now a passport to good jobs and a career means, above all, that in digital society companies are no longer the only means of doing so in life and have become one of several opportunities available.
- The third sector, the services sector, such as consulting, distribution, for-profit institutions, with paid or non-paid staff, emerged.
- Management, in addition to performing a function, also has a social function. Organizations are evolving and taking new forms based on information.
- Knowledge has become the capital of developed economies and knowledge workers, which determines the values and norms of the digital society.

The great challenge for developed countries is to maintain a commitment to the economic performance necessary for organizations and countries to remain competitive.Organizational management deals with the fundamental aspects of knowledge, wisdom and leadership, and can be considered an "art" because it is a practice and an application. Managers are based on all the knowledge and teachings of the social and human sciences, psychology, philosophy, economics, business sciences, history, exact sciences and ethics. But managers polarize this knowledge around effectiveness and results.

Goals

Logistics and Distribution aim to make the quantity of goods available, at the right time and in the right place, and it is necessary to optimize all processes so that operations are profitable and profitable.

For this goal to be achieved it takes a detailed and structured planning to ensure a return on minimum investment and customer satisfaction, being attentive to the current economic scenario that we are living, so that there are no margins for errors, because punctuality is what guarantees the great differential in the market and without delays in delivery. Becauseit results in the loss of sales and customers and for this not to happen, it is necessary that the supplychain is integrated.

This book seeks to contribute to the understanding of the importance of information, as a resource, for organizations. Althoughorganizations use different management models, managers place a different importance on information and performance is often small.

The objective is to discuss the relationship between the various terms and concepts related to Performance Indicators (KPIs) for Logistics and DistributionManagement inOrganizations / companies,in order to understand the common and differentiating characteristics between them, to facilitate their development and implementation in organizations / companies.

The results show the different uses, independent of assistive technologies (pencil and paper technology or computing technology), and which are crucial for the variety of terms and concepts attributed to Performance Indicators (KPIs).

Approach Methodology

This is an exploratory and descriptive study that seeks to clarify and organize the concepts aboutperformance indicators (KPIs)presented in the literature of Information Science and BusinessSciences. This type of study is recommended to propose research that clarifies concepts, establishes priorities that can guide future research, etc. (Selltiz et al., 1981).

It is a proposal for grouping the terms and concepts that allow their identity, use and relevance in the context in which words are inserted. Research is characterized by literary research on its terms and concepts. The first step was the selection of authors who published books on the subject and to submit at least one chapter for the object of study. From this first phase of selection of authors, the follow-up was determined by the frequency with which the authors are commonly referenced in studies on the subject.

It has a qualitative character with the intention of promoting a reflection on the different types of Performance Indicators (KPIs) for the management of Logistics and Distribution, presented in the literature.

III. THEORICO-METHODOLOGICAL FRAMEWORK OF RESEARCH

Fundamental Concepts

The Sources of Information

On the basis of the information economy, (McGee, and Prusak, 1994), claim that competitionbetweenagencies is based on their ability to acquire processes, interpret and use information effectively. The organizations leading this competition will be the big winners of the future.(LeCoadic, 2004,p. 38), states that the use of information is working with information material to obtain an effect that satisfies the need for information.

Matrix 1 - Conceptual summary of information sources

According to (Sugahara, andJannuzzi,2005),the products and services that organizations/companies innovate are

References	Main Issues
Davenport (2000).	The sources of an informational system should be as varied and complex as the surroundings that this system seeks to represent
Sugahara and Jannuzzi (2005)	The sources of information for technological innovation have been classified into internal and external. The information sources are internal information from the departments of research and development, and information from other internal areas. The external sources are divided in: sources close to market activities, sources of professional, specialized and institutional sources.
Pereira and Barbosa (2007)	Classify the sources of information, according to the source, in relation to the relationship/proximity and with respect to the media.
Alvarenga Neto (2008)	Given the complexity and multiplicity of sources of information, both internally, as outside, a possible alternative would be the mapping of corporate information sources.
Wensing (2010)	The sources of information have become synonymous with informational resources available in digital format. Evolution of information sources: stone, Papyrus, paper, photographs, and microfilm, magnetic tape, *K7*tapes, floppy disks, tapes, *VHS*, floppy disks, hard disks (HD), *Compact Disc* (CD), *video laser*, *DVDs and pen-drives*.
Barreto (2010)	The information content is symbolically significant. The information has a sense immaterial. The goods only exist when information is considered to be the physical basis indicating that resulted from a technical condition of production: a book, an article, a music disk, a printed image, an art installation in a sample.

Source: adapted from Charles Rao and Ursula Blattmann, "Information management and the importance of using sources of information for the generation of knowledge", in *Perspectives in information science*, v. 19, n. 3, p. 4-29, jul/set. 2014.

determinedby how the various sources of information are used, bothinternalsources, and externas.(Barbosa, 2006, p. 94), exposes that "(...) one cannot ignore the multiplicity of factors, individual and organizational nature, that determine the use of information in business environments.Before technological development, (Petro,2008, p. 64), he states that man's wealth is measured by the degree of knowledge heholds through the transformation of information.

Thus, to ensure the proper use of information, it is necessary to add value and, therefore, it is important that the information is in accordance with the context of the organization / company, which is correct andcomplete, with great detail andprecision, in the appropriate format, availableat the right time and in the right place. According to this author, another crucial point about the use of information is the financial cost to collect, process, store, distribute, interpret and analyze the information. For (Choo, 2006, p. 77), the cost is multifaceted and includes essential elements such as physical accessibility and psychological cost (since asking for information is admitting one's own ignorance, which implies loss of prestige or status).(Choo,2006, 2008), tries to explain how organizations use information to create meaning, build knowledge and make decisions, and exposes that knowledge is sustained in three areas: creation of meaning, construction of knowledge and decision making.

According to (Fadel et al.,2010, p. 14), the information culture needs to be designed for the production, sharing, use and ownership of information. Therefore, it is essential to know the behavior and skills necessary for the action of the manager to recognize their own information needs.

Matrix No. 2 - Summary of conceptual contributions on the use of information sources

References	Main Issues
Marchand (2004)	There are four basic ways to use the information to create business value: through risk management, cost reduction, through the products and services offered to customers, and the use of the information to innovate.
Earl (2004)	Value of information, a resource that can be reused, shared, distributed or exchanged without loss of value; in fact, the value is sometimes multiplied.
Oliveira (2005)	The use of the information, the user chooses the information you use when you realize the relevance and significance of this and the problem to be solved. The use involves, therefore, selection and processing (processing) of information sources, in response to a question, a problem solving, decision making, negotiation or understanding of a situation.
Goulart (2007)	The information is used to minimize the uncertainties about the surroundings and identify new business opportunities. Should encourage the formation of an organizational culture focused on the effective use of information in the decision-making process.
Leitão and Nassif 2009)	In the *sense making* organizational approach the use of information for strategic decision-making in organizations is possible to establish a relationship between context, meaning, and processes of formation of sense of the information. Are considered subjective aspects such as: organizational identity, beliefs and past experiences of the members of the organization. The information becomes gross matter of which the Organization must construct meanings and understand what is happening around it.

According to this author, information is the raw material for any "doing", whether in the academic or business sphere. The generation of new knowledge is only possible when information is appropriate for the individual through the establishment of cognitive relationships. It is important to understand that these elements are the basis for different actions: decision-making,includingstrategy,planning, control and implementation, among other actions, which will result in the development of an organization.

Information in Organizations

Information is the link that binds us globally, both in social and business terms, and that feeds knowledge. Second (Mori, 2002, p. 39), regardless of its importance, even because it is a crucial phenomenon for the process of human communication, information "is not even an enlightened and enlightening concept". According to (Buckland, 1991; Jannuzzi & Thalamus, 2004), it is possible to observe in the literature many non-exclusive definitions of each other, both in the search for a conceptual consensus and, also seeking to differentiate, from other terms, whose definitions are similar, such as messages, data, etc.

The information gains different "*garments*" in the flow of communication. In this context, the term is identified and applied with different meanings, as illustrated by the classification presented by Buckland: information, process information such as knowledge, and information as a thing (Buckland, 1991). As a process, information is the oneto inform and is identified in thecommunication flow. The information as knowledge is identified to,as the content of the message transmitted in the communication. And finally, while the information is identified by its informative paper, it is representedthrough documents, data, etc. (Buckland, 1991).

Although information as knowledge is identified, as thecontent of the message transmitted in the communication.

Inenterprise organizations, for example, information has different degrees of complexity and systematization, according to the type of decision to make in the organization. Thus, in this context, it is possible to identify the classified information about its use / application, as to the origin and formatting of theinformation (Falsarella et al., 2003).

(Falsarella, et al., 2003), organises and classifies information from the context of managers, for whom it is intended and what decisions can be taken:

- **Context:** All organizations have mission, objectives, strategies and organizational resources (human, financial,material,technologicalandinformation's). It is necessary to understand the objectivesofthe business, behind the information space and the resources available, taking into account the peculiarities of each context.
- **Content:** Covers the structures for the representation and organization of informative content and includes the nature, volume, and sources of content available and their potential growth.
- **Decision Makers / Managers/ Users**: It is necessary to understand their functions andresponsibilities, as well as their information needs, which are extremely variable and influence behaviors to search for new information.

This type of classification is exemplified in companies by their orientation according to organizational - operational, coordination and strategic levels. According to the criteria of this classification, transactional information, also known as operational, is used in operational procedures for updating the records relating to the operations carried out in the company on a day-to-day basis, as well asin the issuance of advertisements about them; Coordination information is used in the procedures for assigning, coordinating and managing the company's activities; and finally the information to make the strategic decision directed in the medium and long term.

The classification of formatting includes structured information, defined as coded and systematized information in a pre-established framework, and unstructured information, understood as uncontextualized or undocumented, according to the structure established in information systems, computerized or not, of an organization (Falsarella et al., 2003).

Second (Falsarella et al., 2003), with regard to the classification of origin, the information can be internal and external. In this classification, internal information is generated in the organization's processes, from the daily operations of the company, that is, data related to business processes; and as external information, which comes from outside the organization, that is, that are not generated directly, from the company's operations (legislation, data on competition, etc.).

In addition to these classifications, it is possible to verify other forms of categorization ofinformation related to the organizational environment. This is the case for the classification of information on the functional areas of an organisation, or content that includes financial information, accounting information, statistical information, market information, etc., (Cassarro, 2010; Laudon & Laudon, 2010). Another aspect, no less interesting, is that, both in theoretical and applied questions, when the information consists of a compound name, the term associated with it always corresponds to the characteristics of the context in which it is inserted, for example, when business information, government information, etc. is used.

This whole range of classifications is perfectly understandable when it is recognized that information is influenced by the context in which it is inserted. This information behavior occurs not only in nominal terms, but also in its conceptual aspect (Jannuzzi & Tálamo, 2004), since the definition of information is always associated with some type of system (Robredo, 2003).

System

The concept defined by Ludwig von Bertalanffy (1968 in: Beta - Lanffy, 1993) has been used by different sciences, technologies, and domains of human and social activity. (Piero Mella, 1997, p. 25) states that to operationally define system, we must understand that:

- Provide characteristics;
- The state of each element depends on another element and is influenced by the structure.
- The modification of the structure affects its entirety.
- All elements are required to form this structure.

We can thus infer that all elements are necessary to form this structure. This means that the structure is structured (itsstate derives from the integral elements)andstructural (its state conditions the elements).

A system can be defined as a structure (analyticaldesign) observed as a unit characterized by autonomous state and meaning (syntheticdesign). A system does not exist in reality but is defined as such by any observer who gives meaning to states or situations assumed by a structure (Mella, 1997, p. 26).

From this perspective the operational concept is based on a holistic view of the world, irreducible to trends or schools, particularly structuralist, despite this evident affinity with systemic thinking and applications.

Also according to Mella (1997, p. 26) should be adoptedthe following classification: a system is composed of subsystems and isasupersystem.Sishasthe s that are individualized within a larger system and that maintain some relationships, areapartial systemor subsystem.When the system and the environment interpenetratethey have the macro system in general.

To determine this interpenetration, it should be considered that, to individualize a system, it is to specify it in the timeline. The systems are divided into two major classes: those created by man (ororganized agent) and created by nature (notorganized or combinatorial) (Silva Ribeiro, 2002, p. 101-103). Examples of man-made systems have the clock, the car, the accounting system, the road system, etc. As an example of systems created by nature of which organizational relationships are not known, we have the solar system, the water system, the population, etc. In man-made systems we can have multiple subclasses: dynamic systems and their interactive process; closed and open; modular networks and conscious cognitive systems (SilvaRibeiro, 2002, p. 97-101).

Information Systems

The concept of information system has been increasingly used and is subject to semantic ambiguities. It is therefore important to distinguish the concept of information in information science from the conceptual technological information system or the computer system. Considering the blur in the system concept, an information system is a totality formed by the dynamic interaction of the parts, that is, a lasting structure and flow states in time.

Thus, an information system consists or not of different types of information recorded, external to the subject (what each person has in his memory is the information system) regardless of the support (or equipment and technology), according to a structure (producing entity/ recipient) prolonged the action in the timeline (Silva, AM 2005).

The structure of an information system is a complex aspect because it is paradoxically autonomous and is integral information. It is subject to action (person or institution) that produces and receives flow of information is different from that, but it is essential if it exists. The identification of the structure becomes a key to be able to establish the precise contours of an information system and when this is done in information science, through the technical method of quadruple polo, more precisely through the operations of observation and analysis organic - functional. It is not possible that the structure and organisation of an information system can be designed by itself as a separate system.

According to (Hjørland, 1998), information systems in the broad sense are considered in the literature as the information services themselves, as libraries or information centers. In the narrowest sense are information retrieval systems, such as library catalogs and automated systems in general. Both approaches have one thing in common is that both types of systems have similar functionalities: selection, treatment (organization representation, storage) a diffusion d of information.

The systemic approach explains the extent to which systems are composed of subsystems and maintain the characteristics of the system itself, but at a lower level of complexity.

For (Hjørland, 1998),the concept of information systems leads us to the traditional, much older than the term "information system" that arose in the era of computer libraries. It also considers a broader perspective as the entire information system and any formal or informal system of scientific communication, such as newspapers, encyclopedias and general documents that, in one way or another, systematize supported content with a certain size and type.

The expansion of the Western press changed the condition of the relationship between social discourses and the traditional narrative; diversification and expansion of public and specialized libraries generated the emergence of theoretical knowledge about the organization and representation of information.

In the second half of the 20th century, innovations related to photography, radio and cinema reformulated spaces of text and memory through the renewal of knowledge around social communication systems. The transition from "cultural and reproductive technologies" to "intellectual technologies" of digital media, modified forms of registration, storage and transmission of discursive social production and circulation and production management. The relationship between language, communication and information has been treated in recent years as multiple approaches that can be aggregated into two main lines of investigation:

- The dimension of language as information processing devices, that is, from the point of view of its objectives.
- Of language as a dimension of practices and information actions of individuals and organizations.

(Hojrland, 2003), also argues that issues relating to the meaning and informative dimension of social life should identify the "advanced search" in information science. And it would not be to distance information technologies, but only to refine and optimize alliances between people, information, and resources.

(Veron, 2000),makes a comparison between the production of information and the media and the scientific community to compare a television in its reporting function. What is the contribution to a case that puts the production process underway? It's information in speech form. The entrance of the discourse is not equal to the production of speech, that is, there was transformation. The information in the form of output is speech, after the use of sophisticated machines.

(Lyytinen, 1987), which expresses an information system as a communicative institution that resembles a mass means of communication to a local group." For the author, the creation of each system or update information gives a communication institution that intervenes in the social environment through information modeling activities, "an information system is a linguistic communication tool" (Lyytinen, 1996 p. 14).

Although the author does not stop on the subject, he identifies the information system as "local media" in a given organizational context. Hence the assumptions of system design refer to meaning and organization. The author highlights the understanding of the information system, the importance of sharing an organizational context, which justifies the introduction of an intermediate state in the modeling system, consisting of a stable and centered description of the meaning of the data organized in a conceptual scheme. The development of this intermediate state of modeling is called modeling information (information modeling). "Information modeling" is different from "data modeling", which was developed in the 1970s with the objective of describing a digital data access and storage structure (tree, relational, or network).

The author states that information modeling (information modeling) is an activity in which an organization is created and maintained. The success of information modeling depends on the availability of a mechanism that provides acceptance by the organization, as well as the extent to which this organization is in harmony with the way of life in which it operates" (Lyytinen, 1987, p. 16).

According to (Lyytinen,1987), the design of an information system requires understanding the way of life of the organization/company that aims to maintain or modify the flow of organizational information." (...) An information system is a social institution. It creates a classification of types of acts and actors who recognize and support each other."

According to (Lyytinen, 1987, p. 15) this perspective, "information systems should be separated from information technologies and informational modeling should be seen as a study of the meaning of messages (expressed in acts of enunciation) and of the formal properties of an act of enunciation and their combinations (conversation/decision-making)."

An information system functions as a system oriented to generate a language change, in a defined organizational context device. In fact, from the 1980s onto a perceived change in the design of information systems models. The starting point is not necessarily an ontological assumption that legitimizes and preserves the univocal relationship between the language of the information system and the universe of discourse that refers to the informed world. (Lyytinen,1987),incorporates this modeling concept.

For the author there are two approaches to the design of an information system, with different assumptions about what is the "raw material" to be "operationalized" by the information system. One of them, the global view of the real, "implies a process that unfolds between the "real world" and a "formal model" or conceptual scheme, which is the "representation of

the real world". Information models are like homeomorphic models of engineering and architecture (Lyytinen, 1987, p. 9).
For (Lyytinen, 1987), information systems have as their starting point an epistemological assumption in the definition of what (what information) and why (decision/user) technologies have an ontological or objective assumption are more concerned with how to represent informational objects. While users are essentially consumers will use it? Managersare also the interpreters of the same, supporting decision-making, that is, who defines the information that consumers will consume.
The term unit of information, although very widespread in the literature, is not defined by consensus. (Guinchat and Menou, 1994 p.337), use the term to refer to the business area whose mission is to "identify, as accurately as possible, what information can be useful to managers, to help them recover the corresponding primary documents and make decisions".
Sampaio refers to information units as generic to denote different types of libraries and information terms of business organizations. In its design of the author, the use is justified to the extent that libraries and or business organizations increase their field of activity about the management of information stored not only in physical environments (books/paper), but also in electronic, digital and virtual media."
(SueliAmaral, 1998 p.15), defines the information units as: (...) all types of organization working in the field of information and/or documentation, working with knowledge records in any type of support, regardless of their designation. There are a forwarded unit of information, all kinds of libraries, business units, center services/documentation, according to their area of operation and expansion.
According to (Miranda and Simon, 2002), the focus of information science is based on the ideas of the Theory of Knowledge Popper Objective, that is, the "documentary mass "is defined as the realization of Popper's World 3", recognized as expressing scientific, literary and artistic thoughts and experiences, codified in various dimensions of architecture.
The same authors propose a scheme in which content and structure are presented as components of a document, and which constitute the structural cell of knowledge. These elements are interdependent and complementary and can be defined:

- **Type** - Classifies the type of publication and is related to the purpose of using documents; (e.g. scientific articles, theses, etc...)
- **Content** - is the essence of the document, that is, the ideas it contains.
- **Format** - how to draw and display content (e.g. text, hypertext, etc....)
- **Support** - is the physical basis of the document (e.g. paper, digital, etc....).

The authors believe it is based on the "paper architecture" that reality develops communication practices. They say that there is a relationship between sequence elements: content - type - format - holder and that any change in one of them implies a change in the other.
For (Hjørland, 1998), in its broadest design, information systems represent the production, dissemination and use of information. Understanding this social system of scientific communication is a precondition for the design and implementation of information systems.
According to (Robredo, 2003), the information is inseparable from some kind of system, and questions from this premise what the system in the field of information science means. There is a line that disempowers natural systems from man-made systems, and those of interest to information science are "works of man and created to gain some benefit or advantage and are generally associated with some kind of technology (e.g.: pencil and paper, a computer, etc.). The same author defines the information system as "an organized complex entity that captures, stores and processes, provides, uses and distributes information".
(Hjørland, 1998), stresses that information systems are used to collect, analyse, organise and disseminate information in order to increase the chances of finding satisfactory answers to managers's/decision-makers' questions.(Capurro,20003), statesthat information systems should be designed in the context surrounding them in order to serve certain communities and areas, i.e. knowledge can only be considered informative in relation to a known and shared assumption, for which information has characteristics of novelty and relevance to the community.
Second (Pinheiro, 2004),the relevance of a property is essential for communication between people's information, although the concept may be relative or subjective, but it is fundamental for information science, however important that any information system translates into object.
A (Yovits, 1969), proposes that an information system model be generic, with extensive applicability.(Khazanchi and Munkvold, 2000),state that the time information system is based on the meaning of the terms "information" and "system". The information was defined as "processed data with meaning", where the meaning implies relevant to a decision-taker and the data imply facts and symbols decontextualized.
However, according to the authors, a system is a set of interrelated components that work together for a common purpose. The information system, in turn, is a set of interrelated components that (equipment, programs, procedures, people, networks) that work together to collect, process, store, retrieve and distribute information. Not all information systems use information and communication technologies (computers, software and networking) process information and many of the activities that we and the technology of pencil and paper (technological manual). Thus, the components of an information system are:

- **The process technology** - the computer.
- **Technological product** - software that allows you to work all components of the computer background (software) and transform information into data and information in these (application software);
- **The Product** - stored in the Database or in any other physical media, data and information.
- **The organization** - the way people come together to carry out the procedures of collection, sorting, processing, analysis and production of results (information);
- **People** - employees of the organization.

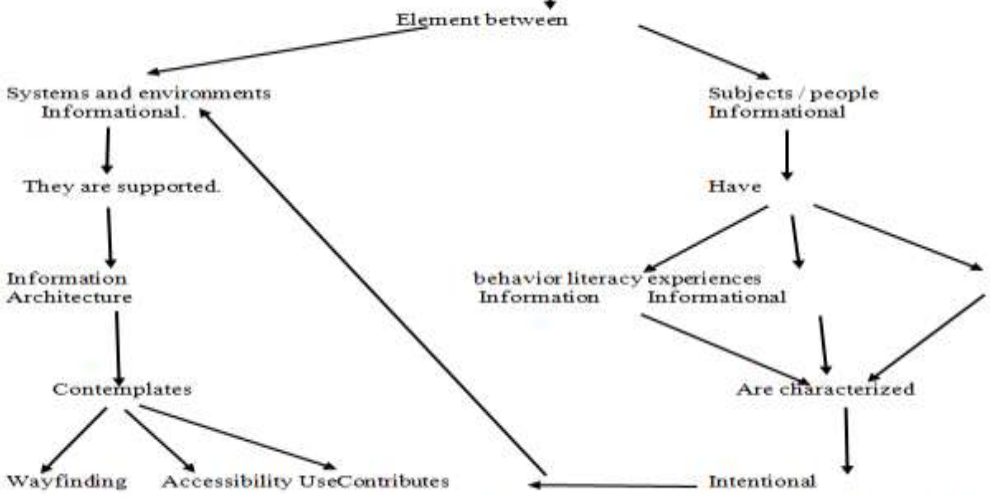
Information and Communication Technologies comprise the computer and software that enable the physical storage of data, process it and make it available to you when necessary. The computer is the physical equipment and software (logical component) that comprises the set of programs used to operate the computer and transform the data into information.

For (Van Gigch and Pepin, 1986),an information system consists of a set of recursively related subsystems, characterized by a series of classes of critical constructions. The Mason and Mitroff model (1973) propose the following definition of the information system:
"(...) a collection of recurrently related multi-leveled subsystems in which at least one person, a certain psychological type, in an organizational context faces a problem of a particular class, for which the rationality and logic of evidence necessary to reach a solution, that is, to select a course of action, and the evidence is provided by a mode of presentation". The classes of constructions proposed by the authors are as follows:

- **Individual / psychological type** - are the decision makers in an organization.
- **Type of** problem - solve it should select the tests, reasoning and logics (information);
- **Organizational context** - involves a vast number of other constructions. The authors present two examples: a "structure of authority" to define the rules and make decisions and the system of "cultural value" represented by ethics and organizational culture that interferes in individual conceptions. The rules defined in the class authority are bureaucratic rules of the system. The logical class comes to epistemological considerations about the validity of assumptions and conclusions.
- **Logic** - any decision-making system is based on a logical system and therefore involves the study of its functions and formal structure of proposals and the establishment of formal validation criteria. To characterize this construction, two concepts are important: one type represents the valid arguments (reasoning method) and the other level of abstraction of the variables used to represent the problem.
- **Evidence/presentation mode** - evidence is a key entry for any system research. The class identifies three levels: data, information, and intelligence.
- **Rational** - is the style of behavior considered appropriate to achieve the objectives within the limits and constraints.

(Gilchrist and Mahon, 2004), present a more pragmatic definition focused on the organizational context, that is, it is a plan whose objectives are to provide relevant information to the right people at the right time. They also include the need to integrate the production, organization and use of information, from a common ontology.
(Coward and Salingaros, 2004), compared the city with complex systems such as computers, biological organisms, or the human brain. The sanity of the city is composed of urban nodes (neighborhoods) and their interconnections seek the process by which develops a "living city" and a "pathological city" goes into decay. The authors seek to understand cities based on information exchange networks, abandoning the prospect of following information flows, so cities should be planned to optimize these flows, offering citizens more options for experiences that add value to them.
According to the same authors, an important lesson to learn from computer systems is the separation between *hardware and software.*The modular decomposition in the software*that* occurs in objects and models works in the abstract space in which the program works,that is, regardless of the physical structure of the computer hardware. In the same way that a city operates in two distinct spaces: the information exchange network and the space of physicalstructures. The attributes that constitute the meeting of information present in the processes of info-communication, are presented in a practical concept for its inclusion in information science.

Figure 1- Conceptual Map
Information Meeting

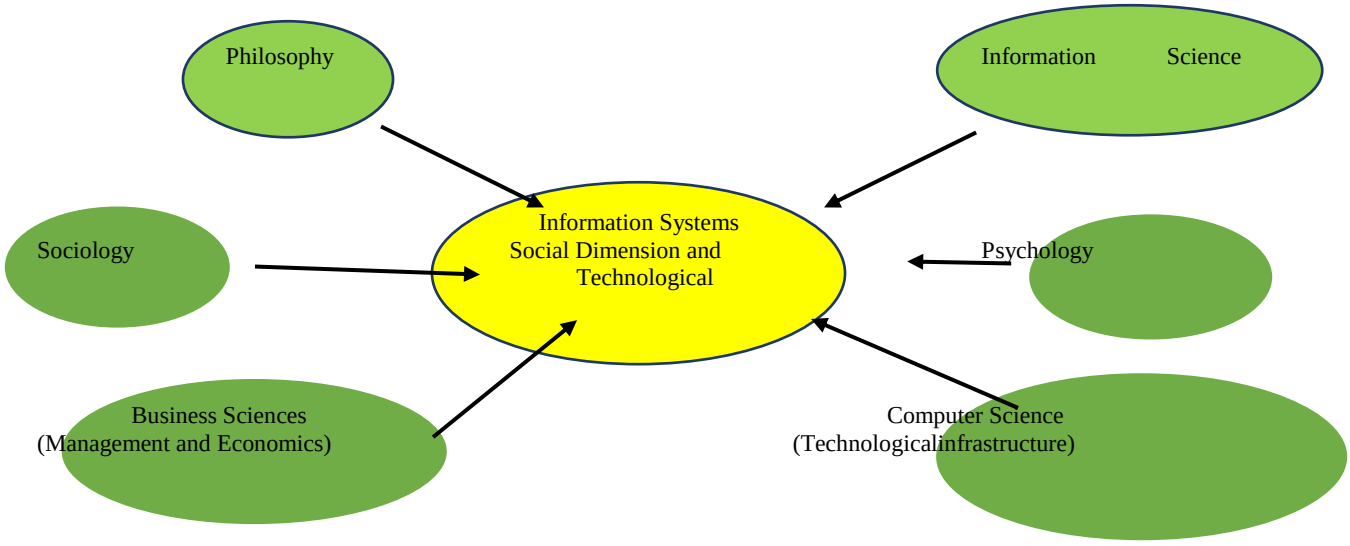


Source: Source: Adapted from Vechiato, Fernando Luiz, (2013, p. 206), Finding information: contributing to a conceptualization in the field of information science. Thesis (PhD in Information Sciences) - Faculty of Philosophy and Sciences, Paulista State University, Marília.

The term findability was presented by (Peter Morville, 2005), in his book Ambient Findability (Miranda, 2010). The author underlines the importance of the degree and quality in which informational resources and environments are easily traceable and/or discovered by informative individuals (people). It's not just about the quality of access and the use of information or even environments designed with a focus on people's needs. His perspective is broader. In addition to aggregating these objectives, the author considers that the context in which the informative subjects are included and their characteristics

interfere substantially in the possibility of finding the information in a given environment or system. Added to this is the capacity that the systems confer to allow the informative subjects to find the information they need, thus allowing the apex of the process: the meeting of the right information, at the right time, and without greater physical and/or cognitive efforts.
(Morville and Sullenger, 2010). affirm that, in practice, discovery is one of the biggest problems, taking into account divergent thoughts and actions, since the informative subjects have different origins, perceptions, behaviors and abilities. It is important to differentiate the search for information (search for information) from information discovery, since the act of research/research will not necessarily result in finding. (Landshoff, 2011). In addition, it is necessary to consider the accidental discovery of information, since individuals may accidentally find something without necessarily looking for the moment, a fact that modifies their behavior.
These situations are related to information behavior, skills, information literacy, intentionality (experiences and competencies) and information appropriation, the latter being closely related to the finding of information. That is, after the discovery of the appropriate information, appropriate to its assigned information, the object can appropriate it and, therefore, the finding of the information constitutes an important element for the appropriation of the information. Also with regard to research, especially in libraries and digital files, the dependence of the search is present and adequate, that is, the retrieval of information through the search engine is the main experience of the subject or user eXperience (UX) in these contexts.
The expression "environment discovery capability" (Morville, 2005) combines the internet and ubiquitous computing. There's a world in which we can find someone or something anywhere and anytime. The information is "in the 118 clouds" and that changes us physically. And it is in this environment that we test our ability to select the relevant sources that meet our needs. (Morville; 2005; Moville, Moville. Sullenger, 2010). The definition of information discovery, in addition to navigation and research in systems and environments, as well as aspects that outline the characteristics of information topics, also combines mobility, convergence and ubiquity of technological development, considering human actions for the search for knowledge in a given environment that has analog and digital characteristics. In the field of Information Science, secondly, (Májory Miranda, 2010), applies the Theory of Intentionality to discovery. It advocates the discovery of information as a mediating element, with regard to the interaction with the concept of information mediation. Intentionality is a term used in capital letters because it indicates a direction and not a purpose or objective, because its phenomenal concept applies to the theory of knowledge and not to the theory of human action. Intentionality, second, (Sokolowski, 2004), is the nuclear doctrine of phenomenology, explains to each act of consciousness, as something intentional, is consciousness or experience of something or other. The user experience (or informative subject) is present in the info-communication phenomenon, since the intentionality of the subject is full of experiences, needs and competencies, understanding, cognition and satisfaction, even providing subsidies for the structuring of information systems and environments. An example of this is folksonomy, which allows informative individuals to express their intentionality by assigning tags to information resources, in addition to producing information from the bottom up. This perspective is characterized as sociotechnical permeated by two variables, being (...) one centered on the organization and representation of information, with the ability to discover and the other on informative behavior, with intentionality. These two variables do not dissociate and form a conjugation between them to solve the problem, or at least approach a compatible solution (Miranda, 2010, p. 301). Intentionality is also important for the field of Information Organization and representation in Information Science when it is used to understand the meaning and relevance of information, always with emphasis on the informative behavior of the subjects. With intentionality, it is understood that the theme of information plays an important role even in technological development. The collaboration of themes is fundamental to the evolution of the Web, because, combined with data web technologies, they have contributed to an excellent way to outline new perspectives, outlining an emerging Pragmatic Web. In addition, with the number of resources, services and digital information environments available, it is the subjects who set their criteria for evaluating these sources because they have their experiences, knowledge and skills to do so.
For (Miranda,2010, p. 273), the intentionality of information for discovery means virility of information and the experience of each subject (experience of use for control in the production, organization and sharing of information); the information that is produced is always about and directed to that is, a subject, with its experience, creates information about, and directed to, to achieve their goals. And it is in this sense, the capacity of the user experience, of intentional awareness, that is based on the web of innovation, of the current paradigm. P, is the Semantic Model of Structuring Information (MSEI), which argues that the participation of information attributed to subjects in the structuring of information allows discovery in information retrieval systems (NIS), contributing to accessibility to information.
From this perspective,(Morville, 2005), combines the concept of discovery particularly with the navigation and research actions that drive it. To be possible, it is necessary that the concept includes the characteristics related to the systems and themes, so intentionality becomes a fundamental element for the whole system and information environment to be designed with a focus on the experiences and competencies of the informative subjects. The concept of information mediation can contribute to the understanding of intentionality also from the point of view of the organization and representation of information, since it encompasses all information processes and all stakeholders, such as institutional individuals (computer professionals and information professionals) and the informative subjects themselves. The information processes are related to information systems and subjects from the perspective of information and information mediation, associating them with information architecture and the emerging paradigmatic, informative, scientific and sociotechnical scenario.
The emergence of the Information Systems discipline is linked to technological development that has been established in organizations and society in general. The term "Information Systems" is used, with capital initials, to designate a scientific discipline and "computer systems", with lowercase initials, for computational/technological products (hardware, software and communications) generated at the heart of information environments. The term 'Information Architecture' is used, with capital initials, to designate a scientific discipline and "technological infrastructure architecture", with lowercase initials, for a product or object of the discipline Information Architecture, (Silva, 2007, Siqueira, 2012). This distinction is important for research in other disciplines, information science.

Figure 2 - Information Systems



Fonte: Fonte: Adaptado de Vechiato, Fernando Luiz, (2013, p. 206), Encontrar informação: contribuir para uma conceptualização no campo da ciência da informação. Tese (Doutoramento em Ciências da Informação) - Faculdade de Filosofia e Ciências, Universidade Estadual Paulista, Marília.

The discipline Information Systems participates in the Inter and transdisciplinarity of Information Science in conjunction with the Archive, Librarian / Documentation and Organization and Methods, considering, among other factors, its relevant application for this field from the computational applications carried out, as happens within the scope of organization, representation and retrieval of information. The discipline Information Systems, in this sense, functions as a discipline of Information Science. (Silva, 2006; 2007).

Secondly, (Silva (2007, Ribeiro, 2002), Information Science also contributes to the discipline Information Systems, since it is becoming increasingly autonomous in relation to Informatics and Computing, characterizing itself as aninter-science,which brings together the disciplines presented in Figure 3. From the point of view of the discipline of Information Systems as aninter-scientificfield, Information Science participates, together with the other disciplines "(...) address questions and contribute answers with regard to all proceduralism, e-communication in any context, whether analog or digital (...)" (Silva, 2007, p. 40).

The technological and social dimensions are fundamental elements of the discipline of Information Systems, and allow us to realize that computer systems, as a technological product, can use sociotechnical perspectives, whose contributions come from related disciplines, especially information science, with regard to the informative-communication phenomenon present in the information processes, which direct the functionalities of the system to the appropriation of information and construction. f knowledge on the part of the subjects, according to their needs, characteristics, behaviors and experiences.

According to (Saracevic, 1996), Information Science (CI), during its development and after the explosion of the information phenomenon, was mainly concerned with the investigation of issues related to information retrieval, despite its evolution to the study of other topics, from interdisciplinarity with other areas of knowledge, which are dedicated to the study of information in various contexts, expanding its interest in research in information resources, moving from the scientific field to the professional field, as in the case of Information Management (GI).

According to Souza, Dias and Nassif (2011), Information Science is dedicated to the study of general properties and information conditions related to sources of information, selection, processes that allow its treatment and processing, its availability and recovery, as well as its effective use. Different disciplines, sciences or areas of knowledge are also dedicated in some way to the study of information, such as business sciences, economic sciences, computer science, communication sciences, production engineering, etc.

The CI gives priority to the theoretical foundations of the information phenomenon and, at the same time, processes and practices that allow the flow of information from its origin to the use of information. Information Science reflects this trend and, consequently, and, consequently, research interweaves the most varied topics involving information resources. The human being has specific singularities, of his well differentiated needs, that is: researchers from the traditional basic areas; applied science researchers; product development personnel; marketers; engineers; and, more recently, executives and managers.

In other words, from the concern with the recovery of information directed to the scientific domain, it is observed, more recently, the emergence of greater care with the flow and use of information in the scope of Management. This means that, in the field of relevant studies in CI, emerge, those linked to Information Systems, the GI, in particular, to information systems applied to different sciences and disciplines.

Referring to the concept of information system (Beatriz Marques, 2017), she states that "in an attempt to clarify this concept, and adopting a holistic view of Information and Knowledge, we seek to contextualize the different perspectives that exist from the concepts that are in their genesis: System, Information System (SI) and Technological Information System (STI). In this context, we retain that the need for a "unitary vision of various disciplines (such as Archival, Librarian, Documentation, etc.) or various sciences (such as Marketing, Management, Neurosciences, Psychology, Information Management,

Innovation Management, Information Technology Systems Management, etc.), contributes significantly to the affirmation, consolidation and enrichment of the core business of "Information Science" (Marques, 2017b) and its transdisciplinary character.

According to (Fernández Marcial; Gomes and Marques, 2015, p.3), "information systems are defined by the participation of material, human and informative resources organized in an interrelated way, in order to allow entries to become outputs - information products and services" For Vickery (1973, p.1) "*An information system is an organization of people, materials and machines that serves to facilitate the transfer of information from one person to another. Its function is social: to help*human communication."

(Silva, 2006, p. 162), defines SI as: "a totality formed by the dynamic interaction of the parties, has a structure (producing entity/receiver) that lasts with a flow of States in time, which consists of the different types of information registered or not externally to the subject",and may have material/technological support". The elements that are part of IS are: the human, informative, political, economic, social, technological, ecological, legal and cultural elements that interact, directly and indirectly, by the functioning of the system in all its dynamics, from the production/reception, organization and representation, storage, retrieval and dissemination of information. "An information system will therefore be one that has as its central information base and as its purpose its management."

To (Fernández Marcial; Gomes and Marques, 2015, p.5), the generic character of this definition allows covering all types of information (primary, secondary or tertiary), all types of information support (material or technological) and all types of structures (producing entities/receivers). In this context, and in an attempt to fully clarify the concepts and their applications, we consider it very important to distinguish between System, Service or Information Product.

According to (Machado, 1967), "the etymological origin of the term Service comes from *the Latin servitium*,and can be defined as servitude, slave condition, slavery, slavery, in a collective sense, slaves. Second, (Houaiss& Villar, 2005, p. 7318), the Houaiss dictionary, provides several definitions for the term Information and Utilities Service: "1 - which aims to obtain information, especially confidential; intelligence, secret services; 2 - the entity or personnel connected to that activity (...). which is useful for society, which is provided by the state for payment by those who use it"

Secondly, (Gomes, 2017, p. 54), (Gomes, 2017, p. 54), the Information Service or Information Units are the Archive, library, documentation center or museum. That is, the Services and their Information Products will be the natural/artificial consequence of the operation of the IS, the *outputs, the outputs.*"A File or a Library, such as services, may be part of a System, while organizations may constitute a System, but cannot be confused with IS (which comprises all information produced/received and accumulated, regardless of the existence of a service that processes, stores, transmits, and preserves it)."

(Assisi, 2006, p. 15), considers that an information product is "one that guarantees and covers the information needs of the members of the organisation and contributes, through bulletins/reports and databases, to the users being confronted with a balanced mix of products".

According to (Carvalho, 2000, p. 260), the Technological or Computer Information System (Its) is one of the constituent parts of the whole, that is, of the SI, so there is no polysemia between the two terms. Despite the various misconceptions and semantic ambiguities that exist at the terminological level and resulting from the use of the same term, SI, to designate different realities, we consider that this fact is due to the common characteristics of the object of analysis – information – and the difficulty or impossibility of circumscribing it to the study of a single scientific area: (...)

"They all deal with information, they are all a little related to organizations or to the work done in organizations, and they are all related to information technologies, either because they can benefit from their use or because they are done with computers or computer-based devices."

For (Karwowski, Rizzo and Rodrick, 2003, p. 18),*"The information system (IS) can be defined as technological systems that manipulate, store, process and disclose information that* has or is expected to have an impact on human organized behavior in any realcontext."

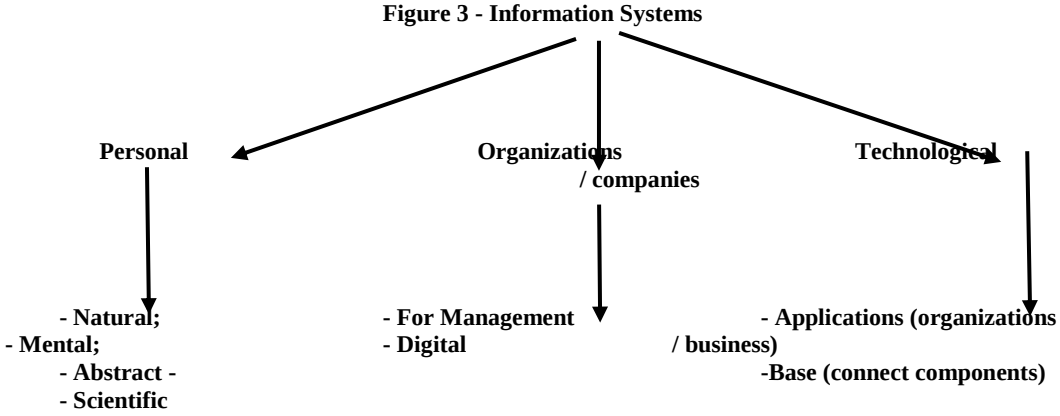
Secondly, (Pessoa, 2017, v. 12, n. 2, p. 060-076), more than a set of data or processes, the object of study of CI is information understood as a phenomenon, human and social. Although the social sciences of the transdisciplinary character, the CI has evolved to demonstrate, at the level of its object of study, the "failure" of technological determinism and the "rise" of human and social determinism. SIT is just one component, among many others, of organizations' SI and does not lead to success, only make the decision-making easier or more agile, being a valuable aid for the efficiency and effectiveness of organizations

A scientific explanation for the behavior of living organisms, i.e. of analysing the whole (the full understanding of phenomena and, in the specific case under analysis, of the phenomenon of infocommunication from the interconnections and interactions established between their parts, the General Theory of Systems (TGS) has developed a way of conceiving or looking at reality from various perspectives or types of information systems:

- **Physical systems** - relationships are physically measurable and derive from a conscious act of man.
- **Abstract systems** – relationships do not derive from a conscious act of man
- **Natural systems** - relationships are natural and are or are not perceived by man.
- **Closed systems** - with endogenous variables and absolute-type laws, because their behavior is not subject to the influence of external variables
- **Open systems** - when their behavior is strictly determined by internal variables.

In an attempt to classify information systems, we can, by their nature and meaning, establish three major classes:

Figure 3 - Information Systems



Source: elaboration of the author

Information Systems for the Management of Organizations / Companies

The Managers

Today, managers have " managementtools" (information and communication technologies) that do notin hamfor a fewyears.They are "how-to" tools. How-to is becoming a central challenge for managers, asorganizations / companiescompetein a turbulent and complex society, and in a seemingly uncontrollable crisis. This problem also happens outside companies, trade unions,government agencies, hospitals, museums, etc. But what causes this apparent paradox? The assumptions on which the company is based no longer fit the reality. These are assumptions that shape the behavior of any organization, that determinedecisions, about what to do and not todo, and have a significant influence on results. These assumptions refer to markets. One of the assumptions has todo with identifying customers andcompetitors and their values and behaviors on the market (added value to products and/or services). Another,of the assumptions is technology and its dynamics of development.

Three fundamental assumptionscan be considered:the envelope,the mission and the fundamental skills inorder to fulfil the mission. Assumptions (products and/or services) define the business. The assumptions of the mission define what the organization considers tobe inthe significant results, that is, point to the way,how the difference is made in the economy and in society in general. Finally, theassumptionsabout core competencies define where the organizationshould improve, to maintain leadership.

The Effective Decision

Three levels of managerscan be considered. Top managers who have a responsibility to define overall strategy and objectives. The operational managers who supervise and control the day-to-day operations of organizations / companies,that is, ensure the normal functioning of the day-to-day. The intermediate or coordination managers are the managers between the two previous levels and whose responsibility is to implement and control the implementation of the strategy and define and control the objectives of their area of responsibility (Marketing, Finance, Production, Logistics and Distribution, Human Resources, etc.) or your business unit.

Effective managers don't make many decisions. They focus on what's important. Theyhave important decisions at the highest level of conceptual understanding. Top managers focusonkey(strategicinformation) managers and think about what is strategic and generic rather than "solving problems". Not very impressed bythe speed of the decision, on the contrary, itconsiders thevirtuosity of considering the key variables (subjective and objective information) in terms of synthesis and reflect onthe underlying realities. Intermediate managers focus on key variables (quantitative information) and analyze deviationsbetween expectations (objectives) and the reality achieved in order to improve the allocation and management of available resources.The speed of the decision corrects the deviations.They use the right techniques and technologies. Operational managers focus onthekeyvariables(quantitative and accurate information) thatenablethem to ensure the efficient and effective functioning of the day-to-day operation of organisations/companies (the decision is quickto respond (deadline) to customer requests.

The transformation of the decision into actionis a component of the decision-making process. The transformation of the decision into action is the one that takes the longest, so the decision will not become effective if the commitment toaction is not integrated from the outset, that is, without anyone taking responsibility. Commitment to action is doubly important when people have to change their behaviour, habits or attitudes so that the decision becomes effective. The decision shall include accompanying and reporting information enabling the real events andexpectations underlying decision-making tobe monitored.

Innovation

Innovation is the ability to undertake, whether in an existing organization/company, in a public or private institution or in the kitchen at home, to create new wealth production resources or to provide existingresources with the best potential for wealth creation. Innovation is the effort to create intentional and targeted change in the economic and social potential of the organization. There are four sources of opportunities within the organization/company and/or industry:

- Changes in industry or market.
- Unexpected occurrences.
- Inconsistencies in the industry and/or the market.
- The process needs to be.

There are three sources of opportunities outside the company: economic, technological, sociocultural, legal-and environmental:

- Demographic changes.
- Changes in perception.
- New knowledge.

The easiest and simplest source of innovation opportunityis the unexpected. Today's market is no longer segmented by the principle of the

income group, but by the so-called lifestyle. This allows fornumerous opportunities for innovation. Often, the behavior of managers in the face of the unexpected is to say that it should never have happened. Information about organizations / companies needs even more attention, since it diverts attention from unexpected opportunities, that is, it reports the problems of areas or business units whose results do not correspond to expectations. This informationis useful and necessary to prevent performance deterioration.

Another source of innovation is the inconsistency between economic realities. For example, if a market has a growing sector, but margins decrease, there is incongruity. The innovative answer is to create small production units. The current media originated in two innovations based on the need for process around 1890, one was the productionof a newspaper in large quantities and the other was a social innovation, the advertising invented by newspaper publishers.

Changes in social structures (lifestyles) create numerous opportunities for innovation for public and private organizations. Companies focus on defending the position they have acquired and tend not to fight back when a newcomer challenges them. One of the external opportunities for innovation is demographic change.

In developed countries, everyone knows that baby births are decreasing, but that there has been an educational explosion. Therefore, the number of blue-collar workers in production has decreased and has become insufficient. This gave rise to robotics. Knowledge-based innovations, whether scientific, technical or social, are the so-called superstar of business. They are what people refer to when they talk about innovation, although not all knowledge-based innovations are important. Algubut even trivial. However, they differ interms of the time theytake,their claims rates and theirpredictability,as well asthe challenges they poseto managers.

Usually, this type of innovation does not require one type of knowledge, but many. As an example, we see the case of investment banking, that is, the use of capital to generate economic development.Another example concerns information and communication technologies. Knowledge-based innovation depends more on the market than any other type of innovation. Intentional and systematic innovation begins withthe analysis of the sources of new opportunities.

The Perception

"The glass is half full or the glass is half empty" are descriptions of the same phenomenon but have very different meanings. Changing a manager's perception from a half-full glass to half-empty opens up great opportunities for business innovation. All health-related indicators show that the mortality rate of newborns has decreased, the survival rate has increased, etc. However, everything seems to cause cancer or degenerative heart disease or premature memory loss. The glass is clearly half full. Instead of rejoicing in the major improvements in health, there still seems to be a great distance from immortality. This vision of things has created countless opportunities forinnovation andbusiness.

A change of perception doesn't change the facts. It changes, however, the way we look at the facts, that is, it changes its meaning very quickly. The economy does not necessarily determine a change in these facts, it may even be irrelevant. What determines whether people see a glass half full or half empty is the attitude rather than the fact, and the change of attitude often defies quantification. But it's not exotic or intangible. It's concreto. Can be set. It can be tested. It can beexploredin terms of innovation and business opportunity.

Effective business management

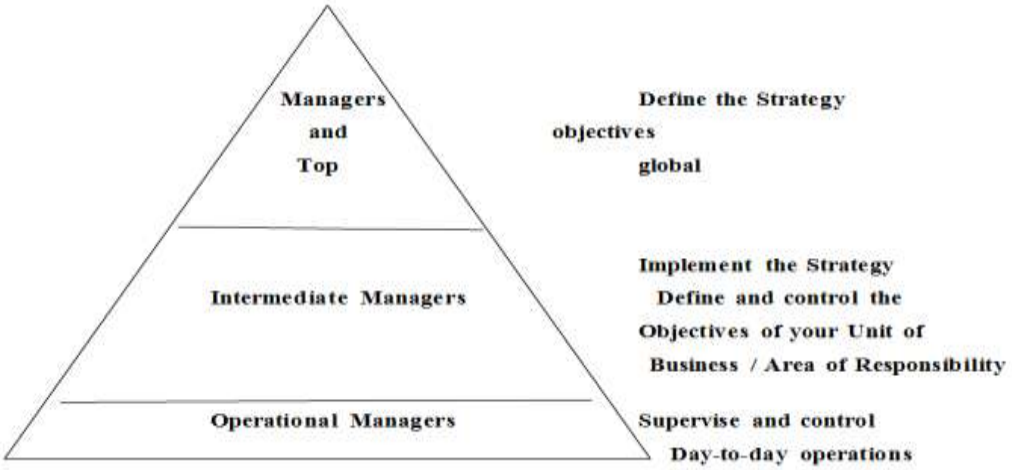
What is the first responsibility of business managers? Managers can beput inthree management levels. Top managers, operational managers and intermediate managers or coordinators.

The main responsibility of top managers is the definition of the overall strategy and objectivesto ensure the best economic results with the resources used or available. The responsibility of intermediate managers is to define the objectives for their area of responsibilities or BusinessUnit,allocate and manage the resources placed at their disposal to achieve the proposed objectives. Theresponsibility of operational managers (team managers and/or geographical location) is to ensure the normal functioning of organizations on a day-to-day life.

Top managers are based on information (objective and subjective) and summarized /synthesized (e.g.marketshare, objectives to be achieved, etc.), while intermediate managers or coordinators rely on comparative (quantitative) (objective)information, between expectations (objectives to be achieved)andwhat was actually achieved (e.g.**volume/sales** analysis,etc.), to improve the use of resources and their performance.

Operational managers make decisions based on quantified and accurate internal information to solve organizations' day-to-day problems.

Figure 4. Pyramid ofthelevels and responsibilities of managers



Source: author's elaboration

The source of information for top managers is 75% external (e.g. trends, turbulence, competitiveness, political-legal

restrictions, etc.) and 25% interna (e.g. evaluation of the organization's performance).The origin of the information on which intermediate or coordination managers are based is internal, but also external, since they have contacts with the outside (e.g. customers, suppliers,etc.) and in percentage termscan be talkedabout at 75% interna and 25% externa (e.g. price comparison with competitors and between suppliers).The source of information for operational managers is 100% internal.

Managerstake up much of their time with short-term economic performance problems.They are concerned with costs **and** prices, sales programs, quality control and customer service, with purchases, recruitment of new employees, increased skills of current employees (training), etc. In addition, managers today have a wide range of tools (e.g.informationand communication technologies) andtechnical for economic business management.

The function of managers is to distinguish the essential of the accessory, the relevant from the waste of time, from what is potentially effective of the rustrante f. Managers are flooded with data and reports, supported bynew information and communication technologies, but only keep the generalities more vague. What managers need are not more or better tools, but simple concepts, methods that help themand m to organize the function rigorously and responsibly, rely onquality information to support themin making the best decision

The role of managers is to manage economic efficiency and do so with results oriented. Most of the work, time, attention and money goes first to "problems" and not to new opportunities and, secondly, to areas where even very successful performance will have minimal impact on results. Managers need to distinguish between effectiveness and efficiency, that is, between doing the right things and doing things well. Surely there is nothing as useless as doing with great efficiency what one should not do.

Still, the concepts and information they rely on in decision-making focus on efficiency. What they need is to identify business opportunities (subjective information) that result in potential significant results and a method of focusing on these opportunities (strategic information surveillance system).

Information systems for the management of organisations can be grouped into three types:

- **Group 1:** The information systems for operational management presented in greater numbers in different classifications proposed by several authors; the fact that the characteristics provide internal information (100%) of the business transaction register; the information is structured, accurate and repetitive; they are mainly used to record and provide information on the registration of operations, supervision and control of the daily operations of the different areas of responsibility or single business ads.

  For example, the information system for logistics and distribution management, whose function is to record, manage and share information relating to customer requests, planning and control of customer deliveries in accordance with what is agreed with customers; Another example is the information system for the management of the relationship with customers, and the provision of transactional information related to operations with sales, marketing and services, aiming, among other objectives, customer satisfaction, as a differentiating factor;

  Another aspect that contributes to the differences between information systems for the management of this group is related to the use of information and communication technologies, using transaction processing systems and process control systems. The first part of the basic structure of the components of information systems for the managementof organizations, which can be manual (use pencil and paper technology) or computerized technology represented by records and documents; the second type, however, works the data at the level of operations, necessarily uses information and communication technologies to facilitate, through sensors and make instant adjustments to the physical processes of organizations.
- **Group 02:** Consists of information systems for the management or intermediate coordination of organisations that feature the work of internal information (80%) and external information (20%) to support interim managers or coordination in decision-making; information is related to the planning and control of the management of resources available by the unit or area of responsibility; the information is internal, structured, summarized and regular, i.e. every semester, quarters, months, weeks, depending on the nature of the decision.

  For example, in a commercial company, information about the sales system is continuous andinformation will be required periodically in order to plan, manage and track sales and make better use of competitive advantages. Other information, such as gross product margins can be requested monthly and annually. Information on decision-making coordination is necessary with frequent intervalsin normal and comparative format in order to analyse deviations in relation to the objectives to be achieved, hence the importance of comparative analysis of transactional performance information for the evaluation of results.

  What are the differences between information systems for the management of organizations and (usually computerised) decision support systems? The first available reports on the performance of the organization made from the combination of transactional information; and the second provides information using mathematical models for simulations, with the aim of helping the decision-making process.

  The same understanding is applied to experts in information systems (computerized), whose characteristic distinguishes it from others is the specific knowledge base, which works with inference in location information that can help solve problems, which characterizes a decision, about a given situation. Finally, we highlight the Business Intelligence (BI)that has inComputer-Based Information Systems (SIBCs) its base of action. Indicated as concepts and methods that support decision making in organizations, business intelligence, called also makes use of internal information, stored in business databases, therefore structured information, which supports managers in decision making.

  Enterprise intelligence uses as primary tools for software and database reporting, multidimensional data analysis tools, etc. (Laudon, 2010). The assimilation and implementation of the concepts applied to Business Intelligence, associated with the use of ICT support tools for Business Intelligence is consolidated as a basis for decision making in organizations. This situation is a reality when it turns out that technological capabilities have evolved in such a way as to allow the use, in some situations of external and unstructured information.
- **Group 03:** Constituted by information systems for the top management of organizations and has as characteristic

work the internal, structured, repetitive, objective and from the records of daily operations, related to the performance of organizations (20%) and external (80%), occasional, unstructured, and from the global and immediate environment, to support the formulation, definition, planning, implementation and monitoring of the organizational strategy.

These systems are designed to improve the performance of organizations to gain a competitive advantage, based on strategic information in a given context and time, never permanent.

Decision making

Second (Vaitsman, 2001, p. 21), "decision-making based on the information available on a problem considered, to provide decision-makers with a reasonable number of alternatives, one of which is chosen as the best or the best". It is common for the Manager/decision-making to be bombarded with a high amount of information. In this context, it is essential that decision-making/Manager is able to identify/differentiate relevant information from irrelevant and develop the ability to discard what is irrelevant. The decision-making process involves the cycle: decision, action and control. In this sense, according to (Gorry and Morton, 1989), the decision-making process can be individual or collective and usually requires five steps:

- **Initial Problem OrOpportunity** Recognition.
- **Alternative**Search.
- **Alternative**Analysis.
- **Choose the Best**Alternative.
- **Implementrthe Chosen Alternative.**

The decision may involve multiple interests and may cause tension between participants in the decision-making process. As such, it requires the decision-taker to develop skills to deal with social processes, political, financial, technological processes, etc., and who knows the difference between personal interests and the interests of others. It is therefore important to stress the importance of systematically seeking common points, collaboration, and cooperation at all stages of the decision-making process.

Relationship between decision models

The information is differentiated according to the decision-making process and can be grouped into strategic, operational and operational coordination. Raj (2002) establishes operational information as "intended to allow certain operations to continue within the operating cycle", i.e. daily. At this level, the decision-making process is repetitive, as it is oriented towards day-to-day problems.

According to (Mattioli, 2004, p. 24), the coordination of information (intermediate managers) "is intended to feed the decision-making process inherent in the allocation, planning, control and evaluation of the resources made available to them – business unit or functional area". This level works with summary and accurate information that requires an analysis of the performance achieved compared to the objectives to be achieved.

Information and knowledge of data collected from various sources of information, aid in identifying the needs and difficulties of the various levels of organizational management (operational, intermediate and strategic).

The quality of information is another important factor for effective decision-making; it must be reliable and accurate, according to each level of management, at the right time and at the right time. Otherwise, the value of information is lost, not contributing to effective decision-making. The value that information provides to managers "is directly linked to how it helps the manager in making decisions to achieve the objectives and objectives of organizations".

Referring to the provision of adequate information for decision-making, (Davenport, 1998, p. 16), states that: "(...) No one can deny that decisions based on useless data cost $Ma million in retained products in acquisitions that do not work, in investments in facilities or equipment that do not produce." The available flow of information is another factor for the effectiveness of the decision. A large volume of information can be time consuming and difficult for managers to distinguish which ones are relevant or not to the decision-making process.

As information is a crucial element in an information system, then nothing more consistent than considering it as such to comparatively study this relationship.

The analysis of the information systems developed in this work culminated in the formation of groups of systems, whose design had no intention of establishing new categories. The purpose of group information systems through their similarities and differences was to facilitate understanding of their role in organizations.

Information systems for the management of organizations can be manual, i.e. using pencil and paper technology or computerized. It is also known that the basic concept of the information system for the management of organisations, first of all, means the set of records and documents relating to the daily operations of organizations.

Thus, indifferent to the resources of information and information and communication technologies (ICTs), it can be said that information systems for the management of organizations are based on the formalisation of data generated in operations (records/documents), the categorisation of which is guided by the degree of complexity of the registers according to the organizational level to beoperational, coordination of the business unit or area of responsibility and, top management (strategic).

With this appearance, it is understood that information systems for the management of organizations are independent of ICT resources. They are, first, conceptual and basic information systems for the various managers of organizations to manage their business, appropriately each at their level of responsibility.

However, it is worth reflecting on an increasingly present concept that must prevail in organizations: the Information System for strategic decision-making. The concept is basically structured in the identification of various sources of information (internal and external) and in the ability to combine and read and interpret the different data, by top managers, to identify and evaluate signals (strengths and weaknesses) and the relevant facts about the environment, so that they can determine possible paths (strategic alternatives) to improve the competitive behavior of the organization.

Understanding these concepts contributes to clarifying the supporting role that information and communication technologies

have in storing and distributing data and information in organisations. One cannot confuse what it supports - information and communication technologies which alone do not make a difference, nor do they allow decisions to be made and what is supported - information, which makes a difference and supports managers, in decision-making.

Information organization

It will be important to reflect on the sequence of the organization and access to information. Does access determine the organization of information or is it the organization of the information that determines the access? What does it mean to organize information?

Information systems, whether libraries, archives, museums, documentation centres, information centres or memory projects, collect information to which they have been given potential value and usefulness in the future. The selection of information that will integrate the information system is not neutral, but driven by institutional objectives, so the selection of information is both quantitatively essential and qualitatively essential.

According to (Barreto, 1994), the information is static, exists and is present, but constitutes a totally inert stock. The information, depending on its static character, "does not produce any knowledge in itself". Information stored in databases, libraries, archives or museums has the "competence" to produce knowledge, which is only effective from a mutually consented communication action between the source (the stock) and the *receiver*,so it can be inferred that the information itself is not a meaning, i.e. is "information" and nothing more.

Secondly (Johanna W. Smit, 2009), so that information in the context of an information system makes sense, that is, that its presence is justified in that context and that the information system can make sense of it, it is necessary to organise it. Assigning meaning to information is the result of your organization.

The same author states that the organization of information is not only an imperative need to access it to be activated, but *it is the sine qua non condition for* the information system to "make sense", that is, to fulfill its social role. The accumulated information, without organization, is just a set of information that "says nothing".

Also, according to the same author "the organization of information gives meaning to it, so it cannot be operated separately from the objective that guides it". It makes no sense to imagine an information organization "by itself", separate from the *objectives.*The decision to preserve certain information and organize it, according to institutional objectives, implies the "institutionalization" of the information, that is, the attribution of a differentiating status to that information, because it was added to an institutional "stamp" that has a dual function: to affirm that this information was considered worthy of custody and that it finds its place, or meaning, in the context of institutional options.

The organization of information includes, by definition, the concern with access to one's own: it is not organized by the organization, but to allow access to information. It would therefore be more appropriate to propose the adoption of the term "organisation of access to information". I believe that the adoption of such an expression would bring at least two advantages to the discussion:

- The access, that is, the purpose of the organization.
- It draws attention to the relative nature of the organization which, through options dictated by institutional objectives, proposes the possibility of access to information, without ignoring that other organizational possibilities, also possible and plausible, could be sharpened if the institutional objectives were others.

According to the Nobel Prize in Economics (Freidrich Hayek, 1945), given the volume of information available, provided and reinforced by information and communication technologies, it is clearer that the problem of today's society lies not in the availability of information, but in the competence to use knowledge never available in a concentrated and integrated way. This declaration points to a greater challenge of access to information: through a qualitative and integrated access to information, it will allow people to generate knowledge from it, appropriating information and thus integrating the information transfer cycle.

Second (Johanna W. Smit, 2009), access is associated with a notion of "physical or virtual access", prevailing the idea of cancelling a distance between the information and the user/user. Access means, therefore, the co-presence, in time and in the space of information and the person who seeks it. The transfer, in turn, is affecting a physical operation, but in this case does not propose the cancellation of a distance, but the movement of the information to the decision-making/user space. This concept of information transfer is widely used in discussions about international movements of buying and selling technology (e.g., technology transfer), but the term also came to admit something else, referring to the process of assimilation of information by individuals.

The transfer of the term does not refer to a spatial or horizontal dislocation, but to an internalisation, to a vertical displacement; the term points to a cognitive operation, because the transference occurs *only*, when the person can appropriate the information to which he had preliminary access, that is, the assignment points to a physical-spatial operation: someone gives, or has access to, information while not doing t*ransference,* points toa cognitive, personal and subjective operation: someone appropriates the information (information feeds knowledge).

Access and transfer mean very diverse and distinct operations, since access raises, at first, the issue of technology (pencil and paper or computer and communication), language and procedures for organizing information, while understanding the transfer process presupposes mainly the mobilization of sociological and psychological concepts.

Information in Management

Secondly (Davenport, 1998), information came to be considered as a good one of organizations: the right information, in the right format and at the right time, can provide good business opportunities. Through information it is possible to place more emphasis on the organizational environment of organizations, in the way people create, distribute, understand and use information. Technology is a means of supporting information and data.

According to the same author, the information view can be subdivided into three environments: the information environment, the organizational environment and the external environment. Information architecture is part of the information environment.

Information architecture is a model that shows how information categories are related to business processes. The architectural plan/design of information models, that is, in a global and detailed way, of information needs to support decision-making by managers/decision-makers, i.e. provides a logical structure of information. (Wetherbe, 1986, Rosenfeld, Morville, 2002). Its definition allows:

- Have a global view of information for business management.
- Structure/organization of the information alum and its content.
- The art and science of the structuring and classification of information.

According to the same authors, the information architecture describes and represents the content of objects, such as documents, people, processes, and organizations. Structuring means determining the levels of granularity for the information, that is, defining the information space. The organization involves the grouping of components, identified in the information space, into main and distinct categories. Clearance of qualification means, such as calling each category of organized information. The information architecture answers the following questions:

- What information do managers need for the management of the organization globally?
- What is the information that intermediate level managers need (business units or managers of areas of responsibility)?
- What is the information that operational level managers need to ensure the normal functioning of organizations on a day-to-day life?
- The information architecture allows managers to have two different but complementary perspectives:
- The informative perspective describing the futurity and novelty of the information used by managers at various levels of management (top, intermediate and operational);
- The perspective of the action that describes current actions with support for information in decision making.

There are three sources of information that contribute to the expectations of top managers: the first is historical information on past (recent) performance; the second is the external environment that provides indications/ market trends/customer behavior (current and non-customers, especially these); the third source of information is internal in nature, which are the capacities and competences of managers (top, intermediate and operational). Sources, one and two can be used to "produce" /predict future trends in terms of market and products.

(Zachman, 1992), proposed an information architecture model that includes six basic elements for an information architecture: What is the information? How - what business units and or what business processes? Where - where can the information be found? Who - which corresponds to which area/sub-area? When - unit of time (day/week/month/... year? Why - what decisions can you support? These elements are data, processes, location, people, time and motivation. The model is a logical and understandable structure to describe the representation of any complex object and is neutral in relation to the processes and tools used to produce the descriptions.

Second (Alcântara, 2004), the most relevant information for decision-making can be grouped as follows:

- **Information classes** - classes correspond to the group of large functions / business areas / business units;
- **Information subclasses** - grouping of information subordinated to an information class;
- **Information subgroup** - subgroup of a subclass of information created to detail the category of information.
- **Business process** - refers to the business process to which the information is associated.
- **Responsible unit** - organizational unit.
- **Location of information** - source of information.

.Second (Khazanchi and Munkvold, 2000), information systems have a comprehensive meaning and consider them as the interrelated set of the following components:

- **Information** - (transformed into data);
- **Technology** - equipment's, programs (software) and networks (information and communication technologies);
- **Procedures** - organization.
- **People** - makedecisions.

In this way, information and communication technologies are the engine that generates data collection and processing, generating information outputs and disseminating them by decision-makers/users.

Distribution logistics

Distribution logistics is the set of activities that involve the management of the goods, from the moment they left the factory, direct from the assembly line, to thedelivery to the customer who ordered them.

Organizations are faced with demanding challenges from the increasingly competitive global market. Thus, supply chain management presents a comprehensive and integrative approach to topology, process and market issues and the impact of logistics on the planning and management of the entire distribution chain.

Transport

Transportation is one of the steps that most adds cost to the product, and information is the basis for any decision making. Information such as cost analysis, who will transport (own fleet or third party), as well as what will be the necessary structure, are fundamental factors for a better performing service. Even when the transport service is provided by third parties, it is necessary to make several negotiations in order to reach the best consensus, through a win-win negotiation, between the parties involved.

Shipment Cargo

The shipment, is the final step within a Distribution Center,it is necessary to check the loads in quantity and type. Tools such as barcode readers can provide security at this conference. Errors in the conference can end in returns and rework – ghosts that frighten many distributors. The return generates losses for both the distributor and the carrier. For example perishable food products, the shelf life continues when the product is returned, i.e. the loss of that product by the time factor is much

longer, either on the market shelf or in the distribution warehouse.

Freight

Freight controlallows the company to optimize thenumerous activities, gaining speed in operations and increasing financial and qualitycontrol. Freight management in companies helps control the entire transport contracting cycle, which includes the quotation and negotiation of tables and payment terms for services.

Route of Deliveries

Transport representsone of the highest costs of Logistics andDistribution if it is not well planned, it can generate great losses for companies. Delivery plays a very important role in maximizing the use of transportation resources,and in thiscase, costs, deadlines and quality should be considered. Given this reality, distributors bet on the identification of the best routes, i.e. those with shorter time, distance and quality (road situation, for example, in the case of land modal). Working in this way, it saves in addition to fuel and time, the expenses with maintenance of the transport vehicle.

Logistics Performance Indicators

Logistic Performance Indicators - KPI's, serve to evaluate and measure the level of performance of different processes. They reflect the objectives and goals of distributors. Key indicators in the distribution include transit time, returns, accuracy of transport notes and punctuality of deliveries.

Logistics and Resource Management

The confusion between Logistics and Distribution happens because it associates logistics with transportation. But it goes beyond that as well, the concept of Distribution is broader. Logistics and Distribution manage the resources of an organization / company, related to the acquisition and reception of raw materials / materials, people, raw materials / materials for production, products / materials, in the process of manufacturing, finished products / materials, products / secondary materials, the storage of finished products / materials in warehouse, as well as the sending and means of transport of products / materials to the final consumer / point of sale.

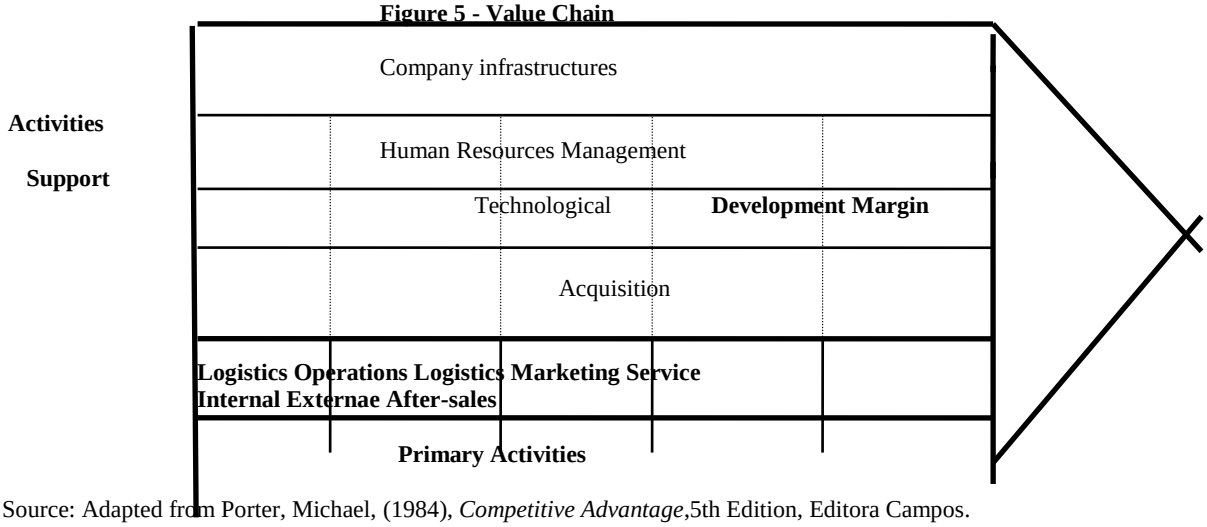
Value Chain

The concept of value chain was described by Michael Porter (1984) as the collection of activities that are performants*for the design*, production, marketing, distribution and support of products and services. All these activities can be represented using the value chain (figure 5).

Equally the value chain of an organization is only a part of the added value of the activities of an industry - **the value system**. The value chain must be understood as one of the components of the industry's value system - suppliers, customers and competitors. The actions of the other parties will have an impact on what the organization does and how it does it.

The value chain is an instrument that allows to disaggregate an organization / company in its activities so that one can understand the behavior of costs and existing sources and the potential for differentiation.

Figure 5 - Value Chain



Source: Adapted from Porter, Michael, (1984), *Competitive Advantage*,5th Edition, Editora Campos.

In competitive terms the amount is the amount that customers are willing to pay, for what organizations/ companies provide them. The value is measured by the total revenue, reflecting the price of the product and the units it can sell/give. An organization/company is profitable if the total value is greater than the amount involved in creating the product. Margin is the difference between the total amount and the total cost of executing the value activities. Value activities can be divided into two types of activities:

- **Primary activities.**
- **Support activities.**

The primary activities are those that are directly involved in the physical creation of the product or service and in its transfer to the customer and which are:

- **Internal** Logistics - activities related to the reception, storage and distribution of inputs*to*products;
- **Operations -** activities associated with the transformation of *inputs* into final products;
- **Logistics. External -** activities that receive, store and distribute the products physically to customers.
- **Marketing and Sales -** activities associated with offering a means by which buyers can purchase the products and lead them to do so.

- **Service -** activities related to the provision of service to intensify or maintain the value of the product while owned by the customer.

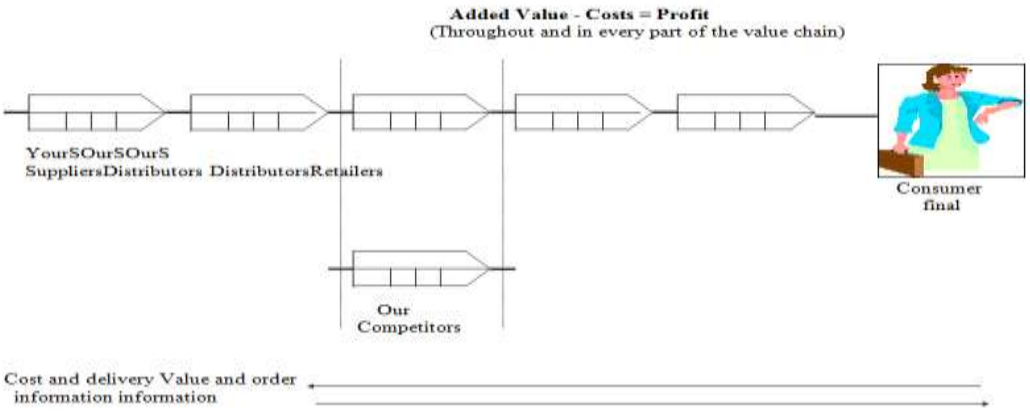
Each category of activities can be vital to competitive advantage, depending on the industry. Support activities are those that are involved in supporting primary activities and each other, through the *provision of inputs, technology,* humanresources and the set of other general functions of the company and can be divided into:

- **Acquisition -** refers to the purchasing function of raw materials and other materials used in the value chain.
- **Technological development -** set of activities that contribute to the improvement of products or processes.
- **Human Resources Management -** activities involved in the recruitment, hiring, training, development and compensation of personnel.
- **General Infrastructure - consists** of activities related to General Management, Financial, Administrative, Public Relations, Control, etc.

The External Value Chain

Figure 6 gives us an overview of an industry's value system. Shows us the key information through the chain.

Figure 6 - External Value Chain



Source: Adapted from Ward, John, (1995), *Principles of Information Systems management,* Routeledge.

The total performance of an industry in terms of the ability to maximise added value and decrease costs is primarily dependent on how the request and provision of information is shared at all stages of the industry.

To achieve the highest results and benefits of consumption of products and services by industry, industry resources need to be concentrated on the production of good products and services at low cost in order to satisfy consumers.

Worse information quality means that resources are inefficient, costs rise without increasing sales and revenues decrease. In this situation all companies in the industry are competing with their customers and suppliers in the limited sharing of netincome.

The Internal Value Chain

Much of what has been said about the external value chain can apply to the internal value chain - the relationship between the added value of activities. Before trying to improve the internal use of information, it is necessary that the needs of the industry are understood, since external interfaces exert the greatest influence on the information path. It should be brought together, organized and used by managers.

The internal analysis of the value chain, like many other techniques for evaluating the operability of companies, is divorced from what companies do and how they do it, that is, to consider activities and their performance, in order to add value.

Historically companies use information systems for internal management and only recently the information resource, as a system, begins to be integrated into the process in which organizations / companies seek to satisfy their customers and business management. This means that management information systems are more geared to ensuring key information about business performance regardless of organizational structure.

With the information it is possible to manage the stock of raw materials / materials, sending the quantities at the right time and at the exact moment for the start and place of production and manage the stock of products / materials in the process of manufacture, as well as the final stock of products / materials. But the work doesn't end there. Logistics has to know how long it takes for a particular product to be made, for the means of transport to reach the final customer.

Logistics is not something new. It has always existed since the wars of antiquity, when soldiers received supplies from the administrators of the kingdoms. What happened was the sophistication and improvement of the processes. Today everything is controlled in a digital way, which allows you to follow the phases in real time.

Types of Information

Inorganizations, managers use various types of information to make the decision and achieve the objectives. With regard to applicabilityto different levels of management, information can be grouped as follows (Moresi, 2000 in: Adriana Beal, 2004):

- **Institutional Information (Global and** synthesized): Allows top managers to observe and evaluate all variables related to the evolution of the environment and internal performance ofthe organization, as well as the definition, implementationand control of organizational/company strategy.

- **Less detailed information** that allows intermediaryor coordination managers to allocateand manage the resources (materials, financial and human) of their area of responsibility or business unit and correct any deviations from theobjectivesto be achieved.
- **Detailed information that allows the operational manager** tomonitor and monitor daily the activities / tasks of yourgeographicalarea under your responsibility.

Informationsourcescan have thefollowing sources:

- **Formal source:** for **example,** the media, database, scientific or technical information (patents), documentation of organizations, customers, suppliers, State, etc.
- **Informal Source:** for example, seminars,conferences, study visits, exhibitions, advertising, information or even rumors about products, customers, suppliers, etc.

Information and Communication Technologies

The concept of technology is easily understood by those whouseit. There is unanimity in an implicit concept, although vital to explain, that is, technology is a complex set of knowledge, means and know-how, organized with a view to producing something. Thus, we can talk about producing high density technologies and measurement, supported by a global network of design and manufacturing centersinterconnectedbysatellites (Ribaut, Martinet &Lebidois, 1991, p.13).

For Lopes (1997, p. 40), "Information technologies support information systems, encompassinghardware, software and everything related to communications and architectures associated with all these components - in a range, are the technological infrastructuresofinformation systems."

Any technology comprises three components:

- **Knowledge:** By itself, it does not constitute atechnology.
- **Media**: Resource technology, but do not limit it; in unqualified hands any technology represents a waste of investment;
- **The Know-How:**It isa specialization withoutadequatemeans, but no results can be obtained and quickly falls into disuse due to lack of application.

To improve the competitive position in the market, organizations / companies act in two ways: on the one hand, observe and analyze themarket (consumers),which can lead to technological innovations or, on the other hand, to the analysis of the advantages ofreplacingone technology with another q ue toimprove its performance in terms of results effectively and efficiently.

Any technology always appeals to various scientific disciplines, such as laser technology that combines optical,electronic,fluid mechanics and thermodynamics.The scientificnvestigation aims at the acquisition or valorization of knowledge (temporary certainties), while the creation of technologies aims at production in industrial conditions. Technology only makes sense in terms ofguaranteed result: technology only exists when it is validated and when it allows production underspecificconditions, that is, technology solves a problem.

Information and Communication Technologies can be defined as the set of knowledge, material resources (infrastructures) and know-how necessary for the production, marketing and/or use of goods and services related to the temporary or permanent storage of data, as well as its processing and transmission.

The emergence and development of technologies represent a decisive impetus for the emergence of new forms and strategies to address issues related to the functioning of competition. The use of information and communication technologies has been expanding, so much so that the English expression "InformationSystems" does not representasystematic, complete and organized form ofcollection,sorting,processing, analysis,information, dissemination by organizations/companiesand supporting decision-making managers/decision-makers.

Information and communication technologies allow the storage, processing, access, and transmission of information flows; therefore, the process (hardware) and product technology (software) should not be confused with the product itself (information).

Understanding the difference between what information is forbusiness/organizations management andinformation and communication technologies is vital for managers/decision makers for the simple reason that such informationhelpsthem make decisions, whatever the supporting technology. However, managers/decision-makers should also not forget that information and communication technologies are a means/resource to support information systems for management.Not all information transformed into data is collected, processed, stored and distributed using information and communication technologies (computers and communication networks).Muchinformation about the activities of organizations is collected, treated, storedanddistributedthroughpencil and paper technology (manual technology). Thus, the differencebetween information technologies and informationisas follows:

- **Computer:** is the technology of theprocess,thatis, the abilityto execute the instructions oftheprograms.
- **Software: is the technology of**theproduct (a group of programs that defines all componentsofthecomputertofunction, that is, it is a form of human expression of the behavior of a machine: the computer).
- **Communications Networks: it is the t**echnology that allows the transmission of data from one technologytoanother.
- **Organization: is** how people group together to carry out procedures for the collection, sorting, processing, analysis and production of results (information).
- **Information:** is the product(anintangible asset that helps make decisions)
- **Managers/decision-makers**: - who make the decisions.

Information and communication technologies comprise a computer (with all its components, including communications)andsoftware that allows youtophysicallystore data, process, transmitit from one location to another, and make it available whenever necessary.A computer is the physical equipment and the software comprises the set of

programs used to operate the computer and transform data into information. Stored/archived data consists of facts or events that are processedto provide management with the information necessary for decision making.

Logistics

According to the Council of Supply Chain Management Professionals, "logistics is part of the managementof chainfromsupplythanPlan implements and Controlsthe Streams ando storage efficienteeconomic from raw materials, semi-finished materials and finished products, as well as the information than Carries of thepointfromoriginTo ponto from destination / consumption, from forma satisfy theRequirementsof thecustomer"(Oak,2002,p. 31).

Accordingto (C.Avozani and A.R.Santos, 1991),logistics andcompetitivestrategy demonstrated their importance. Preparing for the Gulf War, the United States and its allies had to move large amounts of material over long distances in a short time. Half a million people and more than half a million materials and supplies had to be transported by air and more than 2.3 million tons of equipment transported by sea in a matter of months using logistical resources.

Throughout human history, wars have been won and lost with power and logistical capacity, or lack thereof. Although generals in ancient times understood the critical role of logistics, interestingly, organizations and companies recognized the vital impact logistics management can have on gaining competitive advantages only in the recent past. In part, this is due to the lack of recognition of the low levelsofunderstanding of the benefits of logistics integration.

The physical distribution of goods is a distinct problem of creating orders with major failures in distribution operations due to the lack of coordination between the creation of orders and their physical supply, thus becoming an issue that should be addressed and addressed before the start ofdistributionwork. However, logistics refers not only to physical distribution, but also to inventorymanagement, storage, distribution,purchase and management of transport, as well as support activities.Over time, logistics has evolved from isolated to synergistic actions, i.e. integrated logistics and, currently,supply chain management (value chain management).

According to the Value Chain (Porter, 1985), logistics consists of primary activities (transportation, stock storage, order processing and information systems for management), which are of paramount importance to reduce costs and maximize the level of service. Other activities (storage, material handling, packaging, supplies, planning and information and communication technologies) are considered as support to primary activitiesin order to satisfy andmaintaincustomers.

Coyle (1992) definedthe logistics mission asthemeans "to ensure the availability oftherightproduct, in the right quantity, in the right conditions, in the right place, at the right time, for the right customer, and at the right cost." Bowerssox already defines the logistics mission succinctly as the balance of expectationswith regard to service and costs,so that the business objectives are achieved. It can be said that one of the logistical objectives are to increase the degree of customer satisfaction, and to achieve this goal, it must be implementedinall functional areas and areas of activities:

- **Function projects and technologies: -** Unification of components; design aimed at ease of maintenance; synchronization of the lifetime of assembly components; design for easily trans-portable products; modularization of packaging; safety-oriented design;save raw materials withponentes; recovery and reuse of such materials;
- **Supply function of materials and components: -** Synchronization of supply with production; with a short lead time (control of production time);supply ofhigh quality materials and components;supply at limited costs; respond flexibly to changes in production;
- **Production Function: -** Allow maintenance of excellent quality; compress stock and what is being produced.
- **Physical Distribution Function:** -Short time between order receipt and shipment;physical distribution witherror-free shipments, observation of delivery times agreed with customers; reduced costs, so as to be able to respond to peak demand;
- **Marketing and Sales Function: -** Reorganization of distribution channels to customers;physical distribution commitments among those responsible forsales, agreements for the provision of services, post-service goals (after the provision of the service), exhibitions and exhibition of products in stores.

According to Fleury et al (2000, in: Camila Avozani and Aline Regina Santos (), there are five stages of development:

- The first so-called "farm to market", established at the beginning of the 20th century, focused on the issue of agricultural production flow. The starting point of this phase was marked by the publication by (John F.Crowell, 1901) of a treaty on costs and factors affecting the distribution of agricultural products.
- The second phase, “paper functions", took place between 1940 and 1960 and was characterized by specialization and emphasis on functional performance. In these years, the logistics bow of the PA wasdepartmental,andall effortsmade were oriented to improve the efficiency of the ties, without concern for the integration of the chain.
- The third phase begins in 1960 and is called "integrated functions".The focus was then on the integration of internal logistics, with emphasis on the concept of total cost and systemic treatment. At the time, the first notable association of logistics professionals and academics emerged: The National Council for The Management of Physical Distribution (NCPDM, (1962), - defines logistics as follows: "Logistics consists of activities associated with the efficient circulation of finished goods from the end of the production line to the consumer, and in some cases includes the circulation of sources of supply of raw materials until the beginning of the production line. These activitiesinclude transportation, storage, material handling, packaging,stock control, choice of facilities and warehouses,processingorders, order forecasts and customer service."
- The fourth step, known as "customer focus”, opened in 1980 and focuses on the study of productivity and the cost of stocks. During this time, NCPDM became the CLM - Logistics ManagementCouncil. The definition of logistics then moved to: "Logistics is the process of planning, implementation and control of efficiency, cost of flow and stock of materials, inventory of materials during the manufacturing process, finished products and related information from the point of origin to thepoint of consumption of the end user, in order to adjust to the customer's needs" (l 986).
- Finally, the fifth and final step is "logistics as a differentiating element", which corresponds to reality as it is

today. Today, logistics is seento gain competitive advantage. It also highlights the emergenceof the concept of value chain management (supply chain management).In the 2000s, the CLM changed its name to the Council of Supply Chain Management Professionals - CSCMP- and the logistics definition of the new Council becomes: "Logistics management is the part of supply chain management (Porter, 1985) that plans,implements and controls the efficient forward and reverse flows and storage of goods, servicesand information related between the point of origin and the point of consumption to meet the needs of customers."

Logistics is responsible for integrating and synchronizingthe three flows:physical,financial and informative. Thus, through logistics, customersatisfaction can be ensured over time in a supply chain through transportation, distribution, points of sale, customers, material flows, recovery and recycling,information flow, cashflow andhuman resources.

To meet these requirements, it is not enough for logistics to deal only with the delivery of products to customers,commercial goods and services held at the time. It shall also globally reorganise the functions of supplying materials, components, production and sale of wholesale products, as well as the function of product development and physical distribution, the sales function, and so on; You need to study them together to establish a system. The various companies must jointly define their objectives, taking them out of these concepts. Logistics management seeks to contribute to excellenceinmanagement project and organizationalstrategy, aiming at reducing costs and improvingorganizationalservices.

Reverse logistics

Reverse logistics is a logistics branch that refers to the circulation of a given productfrom the point at which it was consumed to the point where it was produced. The collection of some types of recyclable waste (such as plastic bottles) is an example of reverse logistics. Another can be illustrated by the postoffice,specificallyinsendingdocumentsandreturngoods. Reverse logistics seekstorecyclesomesolidwaste, reducing the need for raw materials, thus reducing theenvironmentalimpact.

Integrated Logistics

The concept of integrated logistics refers to the integration of the company's logistics processes into systems that increase the efficiency of the business, improving its results. Integrated logistics should address the cost of storing the materials used for the creation of the product in question. Efficient logistics management is increasingly important in current market conditions, where consumers are becoming increasingly demanding.Therefore, integrated logistics takes on a crucial dimension inbusiness.

Business Logistics

Currently, logistics is known as an essential part of thebusiness. It is a department responsible for the management of materials, regardless of their nature. Logistics deals withthe financial and material management of resources, production of plans, storage and transportation and distribution of these materials.

Thelogisticsbusinessis present in various types of companies and has several functions. It is afieldthat has grown significantly as organizations/companies increasingly seek quality in their services and products,and logistics plays an important role in this.

Distribution

From thepoint of view of producers, distribution is the set of structures and means that allow themtoreachconsumers,making their products accessible to all. Therefore, on the part of products,to define adistributionpolicyis to choose the means of distribution best suited to the development of the sales capacities of their products, i.e. by ensuring the company itself or by other undertakings.

The concept of distribution welcomed by producers and many of their theorists tend to consider it one of the variables of the marketing mix, such as product, price and promotion. From this perspective, the distribution merely describes the relationship between production and consumption, bringing together all the operations necessary to ensure the flow of products. From the suppliers' point of view, distribution is the business sector that ensures the essential function between production and consumption, allowing them to place their products on the market.This function takes place in the following ways:

- Acquisition of large quantities of products.
- Temporary storageofgoods.
- Placing products in the retail sector,i.e. where consumers gather.
- make products available to consumers through retail outlets.
- Promotion of products through themedia.
- Data collection according toconsumerrequirements.

The distribution operation encompasses alltransport,supply, storage, packaging,conditioning, advertising orpromotionoperations; It can therefore be said that the distribution comprises a number ofcompaniesthrough a wealth of commercial transactions and different logistics operations, from the production phase to the consumption phase, in good time and in the right places, in order to meet the needs of consumers.

Supply Chain

According to Mentzer (2001), there are several definitions in the literature of what a supply chain is. Based on some of them, it states that thesupply chain is a set of three or more companies directlylinkedby one or more upstream and downstream flows of products, services, financeandinformation, from a source to a customer.

This group ofcompanies(raw materials, component manufacturers,assembly lines, wholesalers,retailers, etc.) is involved inthemanufacture of products and/or services and in the delivery of those products and/or servicestocustomers. This more'traditional' view ofthe Supply Chain is often represented by a pipeline (see Figure**1)**thatemphasizes the flow of products/servicesthroughout the system. Christopher (1998, p. 15) makes an important contribution to itsdefinition,describing the supply chain as "a network of organisations involved, through upstream anddownstreamlinks,in

different processes and activities that producevalueintheform of goods and services to the final consumer".
In: Portuguese Innovation Society (2021), Logistics has the mission to get the right physical goods or services to the right place, at the right time, under the desired conditions while trying to make the greatest possible contribution to the company / organization.
Analyzing this perspective from a supplier/customer perspective along the supply chain, it is verified that logistics reoccupations are reflected several times throughout the chain, whenever finished products or services move from one "actor" to the next to be incorporated into the manufacturing process as raw material *or know-how.*Usually, a single company/organization cannot guarantee or control the entire flow of materials, services, and information from the source of raw material to the place of consumption.
In this way it is necessary to ensure the supply of the link / company / next organization within the supply chain since they do not coexist in the same physical space. The supply cannot be made in a logic of maximising the income alone by each intervener, but in all of them, so that the product or service provided to the final consumer is as competitive as possible.
The integrated management of supply between the various actors until the product reaches the final consumer is commonly called Supply Chain Management.
This is a cycle that begins and ends in the consumer, through which materials, finished products, information and transactions flow. In terms of synthesis, the Supply Chain represents the set of interdependent companies/organisations that work together to control, manage and improve the flow of materials, products, services and information, from their point of origin to the point of delivery to the final consumer, in order to meet the needs of the end consumer, at the lowest cost to all stakeholders.

Figure 7 - Global Supply Chain View

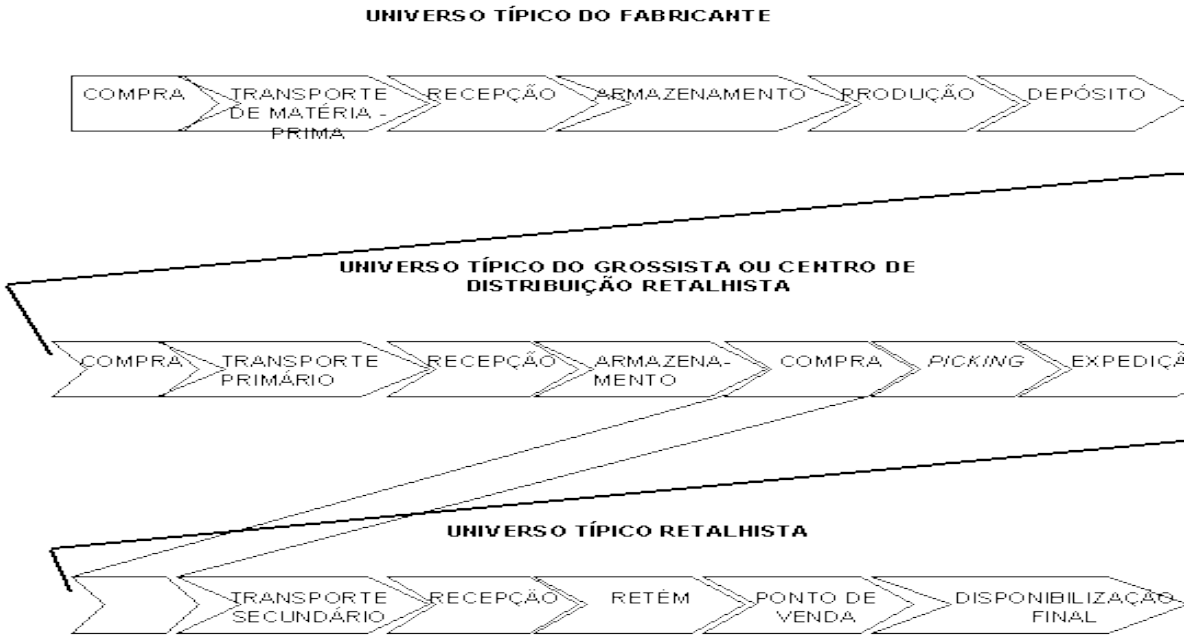


Figura 1.3 - Abrangência logística. Óptica processual.
(Fonte: adaptado de CARVALHO, 1996, p. 22.)

The Supply Chain is an ongoing process that includes the traditional functions assigned to each player in the chain alone, in order to avoid duplication. Each player in the supply chain has suppliers and a set of consumers and these in turn, other consumers, we have a vision not of a supply chain, but of a network of suppliers – customers, who, as a whole, seek to reach the final consumer with the product or service, more tailored to their needs, at the lowest possible cost, for the network.

Logistics Components

Goods

It is an essential prerequisite for management toidentifyall materials / raw materials and auxiliaries that are used in the manufacture of each product and also have the ability to optimize the structure of each of them. The information associated with the products is at the heart of the nomenclature.
A product is identified by its number and trade name and other additional information, such as the handling unit and the family to which it belongs. Raw materials and auxiliary parts, acquired or handled, together with a subset used in the manufacture of another product, are called components.

Shopping

The management of purchases ranges from the selection of the supplier to the entry of goods in the warehouses; therefore, the order must meet the needs and requirements of customers in terms of quality, quantity,time and cost, among other requirements, and should involve a high volume ofresources.A Purchasing Manager in any organization is responsible

for purchasing materials in the desired quantity and quality, in the time required, at the best possible price, and from the right supplier. The success of purchasing management is related to order management, aiming **at total customer**satisfaction. Based on strategic information about its potential customers, the organization identifies their needs by developing a partnership relationship. The partnership is intended not only for customers, but also for suppliers, as they are extremely important for maintaining low stock levels. By partnering with suppliers, organizations can negotiate the volume of orders, dividing deliveries into smallerquantities,thereby reducing their reserves and satisfying their customers.

Stock

Organizations try to immediately meet the needs of their customers by providing the desired amount of product to overcome the competition, which sometimes results in a large volume of products in stock. Mismanagement of stocks can lead to unnecessary capital investments and, consequently, the loss ofconsumer markets.

Stocks range from raw materials, products and process parts, packaging, finished products,auxiliary materials for maintenance and office, to supplies. As a result, companies seek to reduce the amount of products in stock. For greater control and risk management, organizations are usingincreasingly sophisticated systems to determine the level of safety stock and the quality of goods or services, in addition to the optimal amount to be purchased.

Storage

Storage deals with procedures for the protection and controlofstored goods for furtherdistributionandconsumption. At the time of receipt, the goods are stored in warehouses or distribution centers,chosen according to the type of productsandtheirquantity; in addition to consideringthedistance between customer and transport, applying the best cost-effectivenesstoallinvolved.

Distribution centers may have their own warehouses managed by the company,or use public or contractual warehouses, which share the same characteristics as the former (Bowersox andCloss, 2001). Storage management, if well conducted, gives the company an advantage with regard to cost reduction,travel time, and greater business agility to provide quality customer service.

Distribution

The distribution process does not relate only to the transport of raw materials or products;is an activitythat encompasses all the procedures adopted, services and transport of materials and products in order to meet the needs and desires of customers with quality and timely at the lowest cost.

The various phases that make up the distribution channels of products and materialsbegin with the customer's order, which is transmitted and processed before being set aside, transported and deliveredto customers. Therefore, if the customer is satisfied,a virtuous circle will becreated, that is, a loyalty between the supplier and the customer.

Transport

The transport function covers the various forms of mobile materials or products, eitherinternally or externally. The choice of an appropriate means of transport is directly related to the quality of the services offered to customers,varying according to the product, distanceandcosts.

The transport of products or raw materials may involve, such as roads, railways, aerialmeans or marine pipelines, which depend on the cost, delivery time and possible variations in adaptability of the relatedcargo and destinationmodes.Currently inBrazil, road transportis themost widely used, representing 63% of the total movement (Bertaglia, 2003), providing the delivery in an agile and precise way, on-site conditions desired by customers, as well as offering reliability and availability throughout the country.

Fleury (2000) classifies modes of transport according to the structure of costs, where railways have high fixed costs and low variable costs; road transport has low fixed and medium variablecost;waterways have average fixed costs and variable low costs; pipeline mode has high fixed costs and a lowervariable; while air transport is a fixed cost and a high variable.

IV LOGISTICS PERFORMANCE INDICATORS (KPI's)

According to Goldsby and Martichenko (2005), measurement is central to the success of a company, in that it can only improve if measured.To evaluate the Logistical tools, the most relevant indicators need tobe selected, assigningweighting factors to each indicator to allow an overall value of performance to compare the organization'sresults with those of the bestmarket practices (Oak & Carvalho et al., 2001). Logistics can be understood as a complex process, in that there is a dependency relationship among the various logistics sub-processes;and the relationships between thevarieds policies (customer service, transportation and distribution, warehousing and storage) can be measured by means of Key Performance Indicators **(KPI's).**

According to Carvalho and Carvalho et al., (2001) and Martins and Carvalho (2012), the use of a dashboard of indicators aims to quantitatively shows the impact of actions on the improvement of indicators globally and of the business units and or areas/ responsible individually. Organizations using an appropriate set of Performance indicators at all levels (financial, productive, time and quality) may obtain an optimization of information flows, physical and financial, between suppliers and customers and, eventually, at the Supply chain level.

Table 1. Modands of transport

Transport Type	Features - Costs
Railway	High fixed costs in equipment, terminals, railways;costs low va riable.
Road	Low and average variable cost Fixedcosts(fuel, tires, maintandnance).
Watandrways	Medium-high fixed cos t (shipsana andquipment) analowvariablecos t(capacity to transport large quantities).
Pipandline	Higher fixe d costs (access rights, pipeline construction) and lower variablecosts.
Airway	High fixedcost(aircraft) anahigh-cost variable(fuel manpower, maintandnance).

Source:adapt ed from ADM Brazil - Logistics (2005).

The Performance Indicators groups, evaluated simultaneously, separately and/ or in a complementary manner, allow for analysis of the performance of organizations as a whole and with the aim of improving indicators.For business sectors in volatile environments, the most appropriate set of Performance Indicators includes cost indicators, time, productivity, and quality of service, in order to measure the speed and flexibility of logistics in response to the customers' real needs. These indicators can be compared a posteriori with industry standard indicators (determined from the organizations' best practices), with the purpose of verifying the performance of the organization against the competition (Carvalhoand Carvalho et al., 2001) and (Martinsand Carvalho, 2012);(Goldsby and Martichenko, 2005).So, briefly, and by way of example, the main performance indicators are outlined below:

- Financial Indicators measure the total cost of the logistics system.These indicators include two types of expenditures: operating and capital. While the former includes space rental, labor force, equipment rental and maintenance, transport fleet, among others; the latter includes the organization opportunity cost of investing in assets (Carvalho & Carvalho al., 2001).
- The Productivity indicators reflect the degree of the logistics system capacity for the efficient and effective use of the resources allocated to the various activities. The purpose of logistical re sources is customer satisfaction, where profit should exceed resource costs, thereby increasing thecompany's productivity (Carvalho & Carvalho et al., 2001.)
- Time Indicators are a critical variable for the competitiveness of organizations, as their logistics systems will have to ensure an effective response regarding the availability of goods and services in a timely manner (Carvalho & Carvalho et al., 2001; Oak & Ramos, 2009; Day, 2005; Goldsby &Martichenko, 2005).

Table 2.Cost indicators

COST	Managers Top	Intermediate Managers	Operational Managers
Distribution	Annual change	Monthly evolution	Daily andvolution
Transportation	Annual Evolution	Evolution by truck/ cargo	Evolution by request
Storage	Annual change	Monthly developments in local / warehouse	Daily Evolution
Staff (drivers, dispatchers, administrative)	Annual change	Monthly evolution	Daily Evolution
Fleet (a)	Annual evolution	Monthly evolution	Evolution fleet by truck
Communication	Annual change	Monthly developments Weekly stats	Average price of fuel per liter
Fuel consumed per 100 km	Evolution average annual	Average monthly evolution by fleet	Evolution by truck
vehicle depreciation costs	Yearly	By Fleet	By truck
Maintandnance	Annual evolution	Evolution of fleandt	Evolution by truck
Penalties for exceeding the working time of drivers	Annual evolution (number and value)	Monthly Evolution by fleet (number and value)	Evolution by truck (number and value)

Table 3.Productivity indicators

Productivity	Managers Top	Intermediate Managers	Managers Operational
Number of containers per hour	Evolution annual	average monthly evolution	Daily Evolution
% Utilization equipment	Evolutitheannualn	average load evolution	Evolution by request
Container Number Busiest	Evolution annual	average monthly evolution	Daily Evolution
Number of drivers Evolution	Evolution average annual	monthly average per fleet	average Evolution by truck
Distance Evolution	Evolution average annual	monthly average per fleet	average Evolution by truck
Number Working days of	Evolution of thand average annual	Average of evolution by fleet	Average of Evolution by truck
Number of pallets (stolen or los t)	Evolution of average annual	Average of evolution by fleet	Average of Evolution by truck

Table 4 -. Time indicators

Tea m	Managers Top	Managers Intermediate	Operational Managers
% Of orders delivered in timand	Annual changand	Monthly evolution	Daily evolution
% Of dand live red complete orders in time	Annual change	Monthly evolution per charge	Daily evolution per order

Container No. / separate volumes per hour	Annual changand	Monthly evolution	Daily evolution
time spent per employee on separation of a request	A1111ual change	Monthly evolution	Daily Evolution
Frequency of requests	Annual changand	Monthly evolution	Daily Evolution

Service quality Indicators measure the likelihood of an order being fulfilled timely and at the lowest cost. An indicator of excellence **in** this category is the degree of customer satisfaction (perfect order) (Carvalho & Carvalho et al., 2001;Goldsby & Martichenko, 2005.)

VI I - NFORMATION SYSTEMS FOR LOGISTICS AND DISTRIBUTION MANAGEMENT

Information System for Logistics Management

General Description

Transportation of goods from the end of the production process to customers implies a certain number of physical operations: storage, distribution, maintenance, delivery, and control. Trade logistics facilitates all physical distribution activities under the best possible conditions, i.and., it plans and controls the physical, informational, and financial flows of the products from the production center to consumer locations.The main activities of commercial logistics are listed as follows:

Table 5 - Service indicators

Ice Serv	Top Managers	Intermediate Managers	Operational Managers
Customer satisfaction Grade	Annual change	Monthly evolution	Daily Evolution
% Of delivered therders in time	Annual change	Monthly evolution per charge	Daily evolution per order
% Complete orders timely delivered and no complaints	Annual change	Monthly evolution per charge	Daily evolution per order
Case Fill (Amounts delivered in relation to the quantities applied)	Annual change	Monthly evolution	DailY Evolution
Order Fill(% complete orders delivered well and at first)	Annual change	Monthly evolution	Daily Evolution
No complaints	Annual change	Monthly evolution	Daily Evolution
Number of requests not satisfied/motive s	Annual change	Monthly evolution	Daily Evolution

- **Delivery:** Order Grouping, Management of transport fleet, Staff management, Delivery planning
- **Receipt/Shipment:** Discharge of incoming goods, Order preparation for delivery, loading orders to be transported
- **Storage:** Location and lay-out of warehouses;organization of products in warehouses
- **Stocks:** Control, Stock cost calculation; replenishment method

Logistics operations can be grouped into transport activities aimed at overcoming the obstacles (distance, deadlines, cost, etc.) that separate the company from its customers and storage activities designed to address the challenges of storage and maintenance.

Organizationscanchoosethe means of transport to ship products to customers, i.e.using their own means of transport, carriers (rail, air, water, and Post Office combined, etc.), or other suitable transport of goods.It also may happen that customers pick up their products themselves with their own or by any other means of transport, thus assuming full liability and costs for shipping.

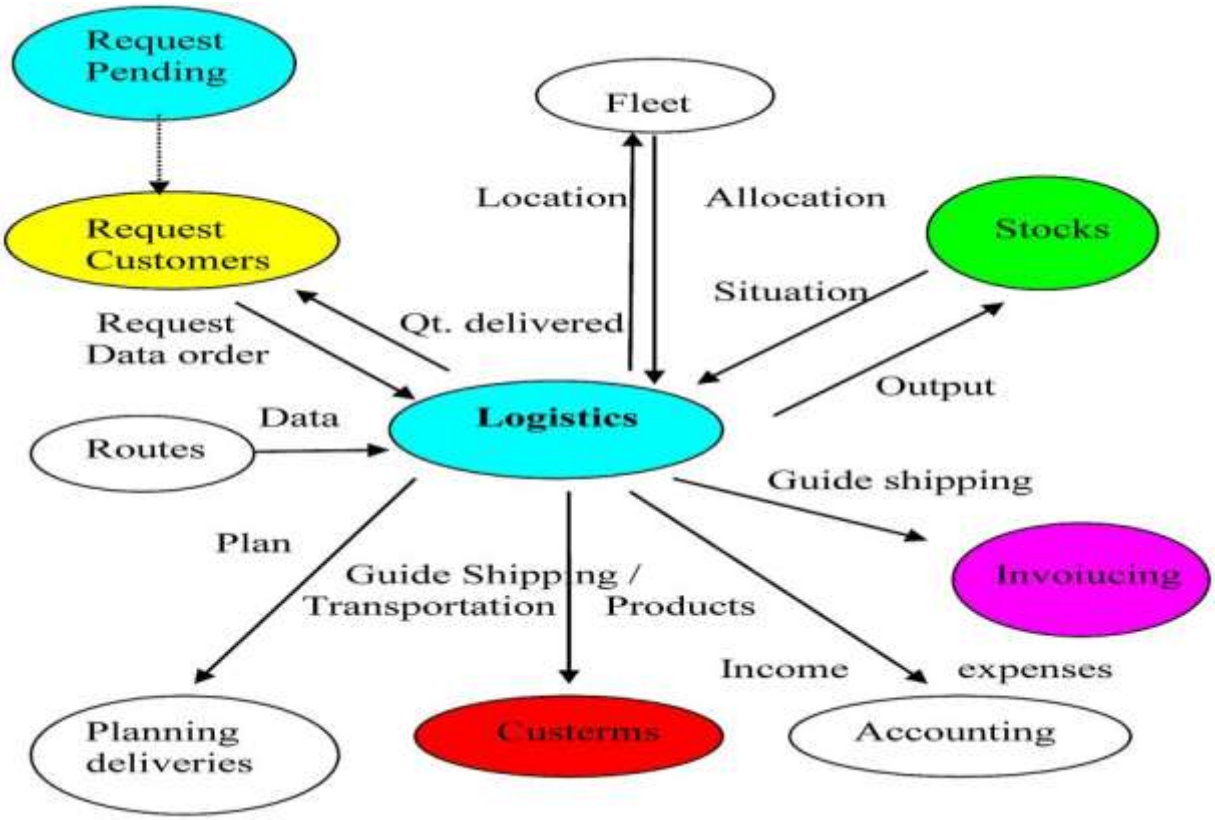
Information System for the Logistics Management

Objectives

A Logistics information system plans objectives, manages and controls the physical, informational and financial flows of transport and storage of products activities, in order to overcome the distance, time and cost that separates the company from its customers, but at a lower cost, regardless of the means of transport used for this purpose.

Customer order data provide a source of information and include, among other data, the customer's name, place and date of delivery, products and their quantities, and those of fleet and staff.Quantities may be delivered in entire or partial shipments, depending on the agreed conditions.

Figure 8.Logistics information flow



Information Processing

The number of warehouses or stores and their location depend on various factors, among which we highlight the nature of the market: its size, the density of points of sale served, their location; the nature of the product: its origin, its weight and volume; the exploration foreseen costs and the financial capacity of the company (costs of the facilities, personnel, operating costs, etc..).

The shipping cost of the production unit to the warehouse, delivery costs to current customers; the problem of supplying warehouses or customers from supplier's warehouses require the study of routes for transportation (roads) and the calculation of the number of means of transport to conduct deliveries.**An** insufficient stock of raw material delays production and causes companies to lose sales when it comes to finished products that cannot be provided. Over stock in brings about unnecessary costs: costs of orders and storage charges.

Thus, the data gathered undergoes the following process:

- **Route Delivery Planning:** Daily and weekly planning of deliveries by: Road, Fleet, Workforce.
- **Stocks:** Deduction of delivered quantities from the stock (goods outwards).
- **Orders:** Deduction of delivered quantities to complete satisfaction thereof.
- **Invoicing:** Prepare data for invoices issuing.
- **Costs:** Determine Transportation, storage, opandrational, personnel costs, lost sales.
- **Accountancy:** Post warehouse movements (inward- outward process) and costs.

Information Storage

In terms of storage, data can be summarized as follows:

- **Invoicing Data:** Data for issuing invoices.
- **Order Data:** Update customers' orders, deduction of delivered quantities.
- **Planning Data:** Data related to order deliverie s, locations, customers, etc.
- **Inventory Data:** Keep stock information updated and always available.
- **Accounting Data:** Keep updated accounting records.
- **Unfilled Order Data:** Keep updated statistics of unfilled orders as well as of the reasons why.

Table s 6 and 7 show themain KPi s for management.

Information System for Order Management

Description

The first module (sub-system) of the Information System for Order Management corresponds to the routine of

Customers' Order's Record, to provide the required information to individual responsible for shipment as a way of ensuring that the ordered quantities for each product will be sent/delivandred to customers.It also offers information about thelack of stock, when iti'm not enough to satisfy customer's requests, as well as price, discounts, and the VAT and total values. It also allows a quick response to customer s when they ask the company about the status of their orders.

Before accepting an order, the personresponsible for receiving them should check bothif customers have credit and if there is enough stock to meet their needs. If customers have no credit, they should be immediately informed that orders are only accepted against advance payment or cash-on-delivery (cash) sales). If there is no stock the responsible for purchasing is informed and a production order is issued to the manufacturing company.

*Tale 6.Top **KPIs** planning and logistics control*

Description	Top Managers	Managers Intermediate	Operational Managers
Planning	Anunal l/monthly	Weeklydeliveriesby: • Transporttype • Routand	Dailydeliversby: • Transporttype. • Fleet(includingdriver); • Issuanceofshipping/transportguide. • Issuanceoflabels.
Volume	Githabul	DeliveryVolumeby: • Transporttype. • Route. • Fleet.	Volume deliveriesbytruck
Control	Annual/monthly	Weekly deliveriesby: • Transporttype. • Routand	• DeliveryFlee t Daily by: • Transporttype • Route. • Fleet

Table 7.Top KPI'slogistics

Description	Top Managers	Managers Intermediate	Operational Managers
Cthet	Deliver y;Stocks Salesunrealized; Ponderation. Transport.Stora ge.	By: • Warehous e/Product • Rtheute • Fle and t	Cost of deliveries per vehicle
Profitability	Glthebal	By: • Warehouse • Transporttype. • Route. • Flee t.	By Car.
Margin	Global	B y: • Warehouse • Transporttype. • Route. • Fleet.	B y Car.

If there is stock and if the customer hascredit, a delivery order will be sent to the responsible for shipments. This document is also called shipment order and itcontains, in addition to the customer's name, the place and date ofdelivery, and the nature and quantities for products requested.

Objectives

The main purpose of this module or information subsystem is to keep the record of the customer's order backlog updated (new orders, changes, cancellations, partial deliveries, etc.) to have ready information on the status of each order.

Information Sources

The sources of information are drawn from the order processing database; companies can receive orders in a variety of ways. Companies have their own formats for recording data of orders, which are latervalidated and accepted or not; information such as thecustomer's name, addres, as well as the location, delivery date, requested quantities, conditions of sale, and other specifics of products.

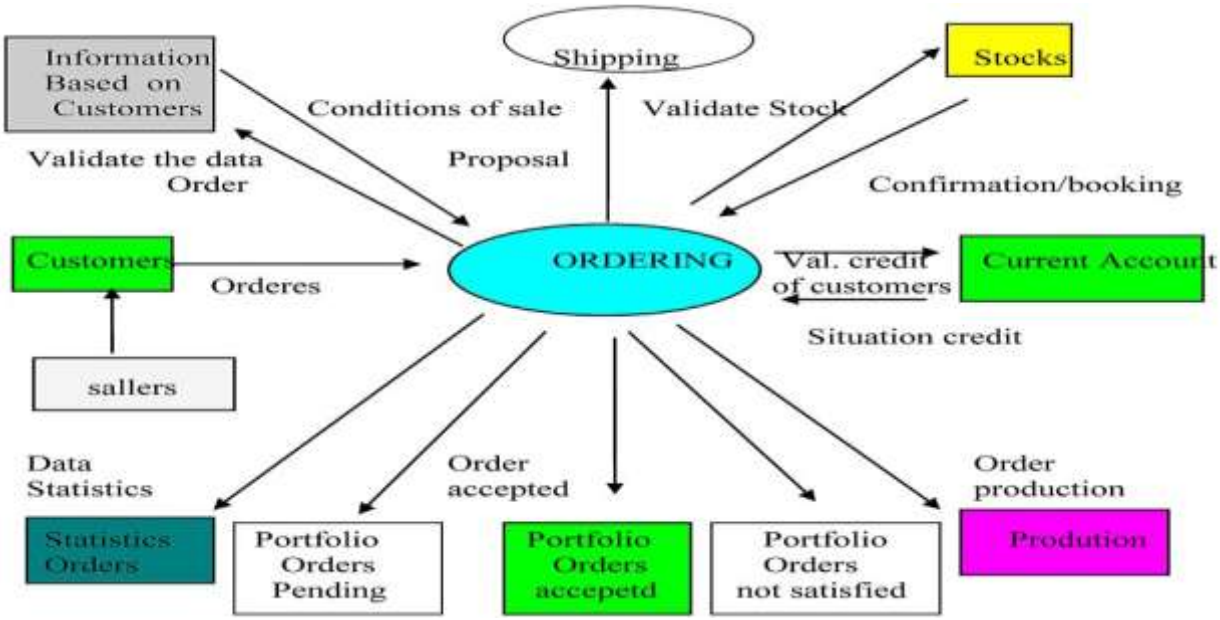
Information Processing

Data processing is performed as follows:

- **Customers:** For existing customers, conditions of sale (possible contracts), credit limit,

etc.should be checked.Otherwise, a new customer file would be created, bearing terms and conditions of sale.

Figure 9. Customer orders of information flows



- **Customer Credit Situation:** When customers' credit is in good standing, orders are confirmed.Otherwise, orders are accepted only when prepaid or against cash (cash sales). In case none of the above conditions are fulfilled, orders are rejected.
- **Stock Control:** Verify there is enough stock to meet demands, allocating/reserving the quantities ordered so that they are not sold to other customers. If there is in stock, issue a Production Order against the Sales order to the manufacturing company.The intended purchase must be considered from the order point or the minimum stock perspectives, considering the economic quantity to be bought, according to how seasonal the products are.

Orders that can be immediately filled would be filed in the Confirmed Order Record. "Awaiting stock" orders should be recorded in the Pending Order Record. Unfilled orders are to be kept on file **in** the Order Backlog Record, together with the corresponding reasons.
The data of all orders should be compiled in the order statistics for further analysis. Sales conditions agreed upon with customers should be reviewed, considering contracts that had eventually been made and/ or trade discounts offered,etc.
Information Storage

Data storage must include the following:

- **Order Data:** Customer orders are recorded in the customer order book (order forms) by adding new orders, changing existing ones, considering any order changes, such as the quantity, delivery date, etc. Eliminate orders already cancelled by customers from the Order books.

- **Unfilled Orders Data:** Record of unfilled orders and the corresponding reasons for further analy sis (buying habits of customers, number and value of unfilled orders, volume of orders by geo graphical area and seller, etc.).
- **Pending Orders Data:** Record of pending orders (e.g. awaiting stock, production, etc.).
- **Inventory Data:** Update the stock in the warehouse, to reserve quantities already allocated to customers (reserved amount) to be delivered on the requested or agreed date, preventing items to be sold to another customer.
- **Order Statistics Data:** Update statistical applications (e.g.level of customers, seller, products,geographical areas, etc.).

Management KPl's

By way of example, the following main items of information are given for the three levels of management:

Operations Management

- **List of Customers' orders Record (orders) arranged by:**
  - **Customer:** Shows how all customers' orders interface with each other.
  - **Date of Orders:** Shows orders in chronological order.
  - **Products:** Shows the relationship in which orders and products interface.
  - **Delivery Date:** Shows the relationship of orders by delivery date.
  - **Seller:** Shows the relationship of orders by the seller.
  - **Order Status:** Indicates the status of order, i.e. tracking of orders to customer's complete satisfaction (e.g. awaiting stock, in-the-works product, etc.).
- Pending Order List arranged by:
  - **Customer:** Provides a list of pending orders for each customer (awaiting stock or in-the works product for example)
  - **Product:** Displays a list of orders that are pending for a given product
  - **Purchase Proposal Issuance:** Issues a product or raw materials purchase proposal focusing on the order point or the minimum stock variables, determining the economic quantity to be bought, and always bearing in mind the possible seasonality of the product sales; or
  - **Production Order Issuance (in the Case of Manufacturing Companies):** Issuing of re quests for product manufacturing based on the quantity necessary to satisfy demands, and the economic lot size to be produced.

Middle Management

- List of Order statistics arranged by:
  - **Customer:** Shows a year-to-date evolution of customers' orders compared to the previous year;
  - **Product:** Gives us the evolution of the amount of goods requested by customers to date, and also a year-to-date comparison in both, quantity or percentage;
  - **Geographical Area:** Shows us the evolution of orders by geographical area or route, taking into account the customer and the product as compared to the previous year.
  - **Average Order Value:** Gives us the average value of daily, weekly, monthly orders, etc.

Top Management

- **Order Control:**
  - Shows the evolution of the Order Backlog Value in the current period and the accumulated year-to-date, as well as the comparison of the previous year evolution.
  - Displays the evolution of quantity and value of unfilled orders and their causes/ reasons.

System Information for Purchasing Management

General Description

When buying stock products, a company must first determine the best supplier in terms of price, payment terms, delivery time, product quality, etc.; and then, issue a commercial document called Purchase Order indicating the quantity desired to the provider.

In the case of purchases, **it** is necessary to consider the company's activity. If it were a commercial company, it would buy marketable products; whilst a manufacturing one purchase raw and auxiliary materials. Service companies, and either of those in the above-mentioned sectors, can buy services, associated or not to the type of products they buy.

The Purchasing Manager is responsible for purchasing by getting **in** contact with suppliers to negotiate prices, delivery time, product quality, payment terms, supply contracts, etc.

When the supplier's invoice arrives to the company, it must be matched against the delivery docket to ensure that the product ordered and received is invoiced accordingly, verifying that all calculations are accurate, and terms and conditions are met. Once verification is complete, the invoice may be ap proved for payment.

Objectives

The main objective of this module or information sub-system is to provide information to carry out the purchase order control, in terms of supplier, product, quantity, delivery time, supply conditions, etc.

Another objective is to keep an updated Suppliers Portfolio, always with available information on the quality of supplies (product quality, delivery times, prices, etc.).

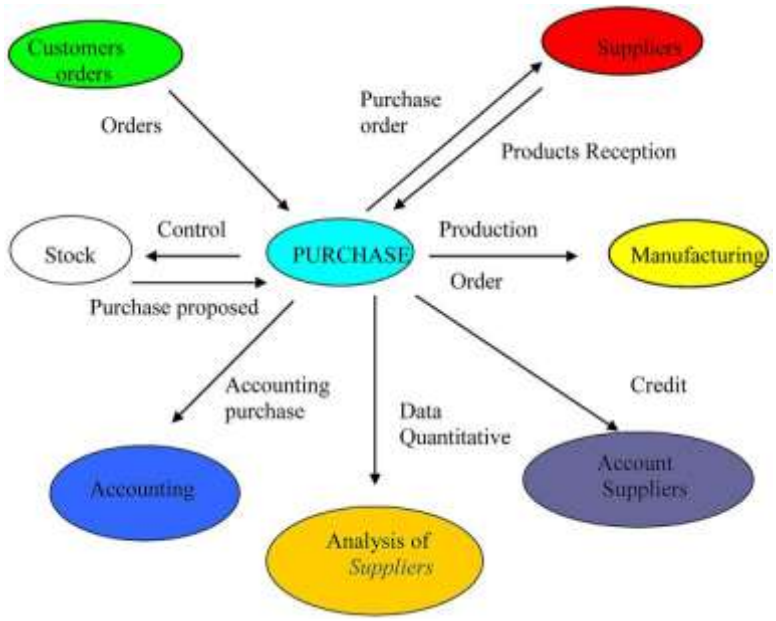
Data Collection

Available data are drawn from purchase order proposals issued by the Inventory manager. Purchase orders indicate the economic quantity[4] intended to be bought per product, and the Purchase Manager can adjust the amount and select the supplier that offers the best service and conditions to the company.

Data Processing

Purchase proposals should be analyzed based on the occasional seasonality of sales of each product, using their algorithm to determine the economic quantity to be bought, as well as choosing the right supplier among the potential ones.

Figure 10 -.Purchase information flows



Supplier selection can be based not only on price but also on the delivery time, quality of products, and/or other factors companies deem important. Beyond the vendor name, product description and estimated quantity to be acquired, all purchase orders must bear date and place of delivery, since the latter may differ from the corporate headquarters, such as a civil construction site.

Information Storage

A purchase order portfolio must stay updated according to the purchase order data to forecast futuresupplies.Thus, making it possible to know what the status of each purchase order is at any moment; for instance, the supplier, the quantity ordered, the quantity delivered and missing, the date of the next delivery, etc.

With regard to the supplier portfolio, it should be used to record all especially relevant data for the analysis of future supply scenarios, such as compliance with deadlines, average delivery time, average price, price of the last purchase, price of the first supply purchase, occasional purchase of auxiliary products, etc.

Top KPl's for Managing

The key management information shown in the table below is listed by way of example:

Information System for Inventory Management

General Description

Toensurand that there areenough warehouse productsto meetdemands, all companies should keepan inventory stock record of each product and issue apurchase proposalas soon as the stock level is below the order point or new products are marketed by the company.

Thi's information is usually handled by the head of stock control, in chargand of monitoring product stocks in storage.The data are collected from the customer orders which indicate the desired quantity of each product and are made by various means, suchas telephone, fax, email, vendors, or others.

Output processing of warehousand goods should be carried out according to internal records, such as production requests from the processing plant to the raw materials warehouse or delivery ordersi'msued by the responsible manager for invoicing goods, either to the general or the finished In manufacturing industries, any movement of stocks between the various stages of production should be executed following transfer or production orders.

The physical control of warehouse stocks is becoming increasingly important both **in** commercialor industrialcompanie,along with Annual Report outcomes or the analysis of the company's financial position. To such control, there are two types of inventory syshass, perpetual and periodic (or intermit tent) in which physical counts are done on an occasionalbasis, making it difficult to assesthe warehouse operation throughout the year since it does not always make a total count of stocks available.Rather, the perpetual inventory system provides permanent up-to-date information by keeping continuous track of inventory balance, and it only requires a total annual physical count.

Other relevant information is constituted, on the one hand, by purchase proposal orders, when the stock level is belowthe ordandr point[5]or the minimumstock level, and on the other hand, by creating a valuation map of the warehousand stock.

Table 8.Main KPI's on shopping

Variable s	Top Managers	Intermediate Managers	Operational Managers
Purchasand Orders	Supplier rrpurchase s volume (in the period ana accumulated)	Purchasand Proposals.	List ofpurchase orders by: • Provide r, • Product , • Delivandry date, • Amount, • Warehousand r store, • Delivandry place, • Andtc.;
Suppliandrs	• Annual growth of prices, product quality, deliver ytim e, etc. • Statistics on product t purchases.	List of suppliers and their supply conditions;	List ofdeliveringoutstanding products ordered by: • Product, • Dandli very date, • EtC.

Objectives

This module or information sub-system aims to provide the Product Manager with information needed to control stocks and the inbound and outbound movements of products in all stores or shops, as well as statistical data and other indicators for better stock management.

Information collection

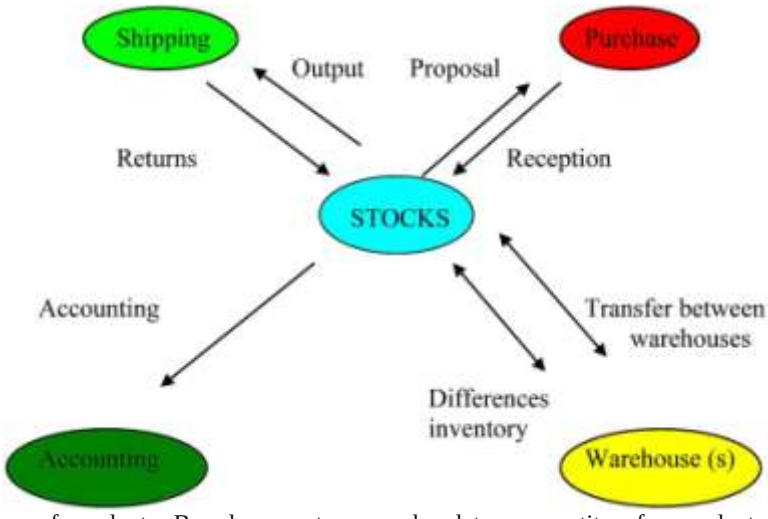
Data are gathered from different sources: product receipt orders (inputs) prepared by the warehouse manager, delivery notes matching customer orders (outputs); as well as the data obtained from transfer orders issued when stock is sent between warehouses and even those of inventory difference orders, when ever a physical count is done and between it and the related accounting record there is no coincidence.There are also situations at industrial manufacturing enterprises in which the end product of a pro duction line and the raw material of another production line will make it necessary to create a transfer order to track the internal inventory movement and reflect the accounting record update.

Information Processing

Inventory data processing seeks, firstly, to ensure that products received from suppliers correspond to what was requested in the purchase order, either in terms of products or in quantitative terms, crosschecking the receipt and purchase orders; secondly, to ensure that the products to be shipped to customers match the products and the quantities ordered, as well as the delivery times.

After product receipt, the Purchase Portfolio should be updated by deducting the quantity delivered by the supplier from the one requested in the purchase order, to keep it always current. It is also necessary for warehouses and stores to maintain their stock up to date to improve sales efficiency. By means of inventory movement, it is possible to determine the reorder point of each product, its minimum and maximum stock levels, as the economic quantity to be purchased considering

Figure 11 - Inventorymanagementof information flows



any seasonal variations of products. Based on customer order data, a quantity of a product can be reserved until delivered on the date requested or agreed upon.

The stock record of each product in storage should reflect, among others, data such as the last entry date, the last exit date, the minimum amount (minimum stock level), the order point, the economic quantity to be bought, the available quantity, the quantity allocated to customers' orders - not delivered or invoiced, the "in transit" quantity (transfer between warehouses), the number of suppliers' outstanding orders, the defective goods (not salable but physically in stock), and

the order quantities and values (cumulative) to date (inputs.)
Whenever there is any movement of stocks (inputs or outputs), they shall be reflected in the company's accounting records; so that a perpetual inventory of each product in the warehouse or store is kept. To determine the value of stocks, one of the following valuation methods should be applied: LIFO (Last In First Out), FIFO (First In First Out), or calculating the average price.

Information Storage
Based on data from the receipt orders, delivery orders, inventory difference, transfer and "in-transit" orders, it is possible to keep the stock of each product, placed in stock or store, updated; either in quantitative or value terms, so that the stock quantity and their value are easily accessible.
The product file will, among other data or fields, contain information about the selling price to the public, the warehousers, and the retailers. In the unusual case that all three situations simultaneously occurly, it should also show the price of the last purchase and used to obtain the average purchase price for a given period.

Top KPl's for Managing

The following information is presented as an example:

Information System for Distribution Management

General Description
Distribution shows some aspects that are of particular importance due to its inertia since a distribution circuit cannot be altered with the same ease with which an advertising campaign or prices are changed.Distribution is an activity that concerns all companies.
All consumers like to easily find the goods and products they need without having to cover longer distances. However, on the one hand, production centers and consumption sites have separate locations,
i.e. manufacturing plants are located away from large urban centers (cities); while production periods do not point to the moment of consumption, on the other.For example, summer clothes are produced in winter.
Thus, the main functions of distribution are as follows:

- **Transport:** Bringing goods from production centers to consumption sites.
- **Breaking Bulk:** Products are produced in large quantities (bulks) and must then be divided into smaller lots to meet the needs of each customer, wholesaler, or retailer.

*Table 9.Major **KP**Is for inventory control*

Variables	Top Managers	Managers Intermediate	Operational Managers
Products	stocks volume	Inventory (permanent or inter mittent) the le vel of warehouse and product or level of independent product warehouses where they are stored, as well as family(s) of product(s),the quantity in stock, value and unit costs;	Daily movements of thewareho use or store (entry and exit), in quantitative and valuand terms.
COST	Analysis of global deviations fromthe standard cost or average and real, if the company uses the method of standard or average costs.	Analysis of thand costs of standard deviations or medium and the current product level in the case of using the method of standard or medium cost;	
Stocks	• ABC Analysis by product; • Rotation of stocks in the period, or yearly to confirm the phase of the product life cycle and determine which products are in the decline phase (mono) or that are unprofitable for the company and for which there is to make decisions to reverse the situation of the sale of that product(s).		

- **Supply:**Tobetterserve customers' needs and selection, every selling point should offer a several models of the same product;
- **Storage:** Allows the storing of products during the time lapse between production and consumption.
- **Information:** Transmitted to customers by advertising and falls upon the nature of the product, its features, its price, and the place where it is available.
- **Services AssociatedwiththeProduct:**Answer to the offer of services associated with the product, after-sale.

A product may passthrough several intermediaries (wholesalers and retailers) from the production siteuntil it reaches the

end consumer through the distribution channels. Today, and increasingly, managers of large manufacturing companies aspire to be able to guide and control the distribution of the products they manufacture, mainly branded products, through the company's points of sale (POS).The distribution channel creates a barrier between manufacturing companies and consumers.
Whenever possible, producers are involved in part of their distribution activity by establishing a sales network,setting up warehouses, ensuring deliveries and even participating in retail sale activities (sales promotion, merchandising, etc.).

Information System for Distribution Management

Objectives

Managing and controlling the ift of activities carried out by the producer or by other companies to bring products to consumers, is the main aim of this module or information subsystem.

Information Collection

Data are gathered from the supply of goods and/or services, as well as data from customers and suppliers, such as the company name, its location, address, contact, telephone number and other possible data collection at the time used in order recording, including payment.

Information Processing

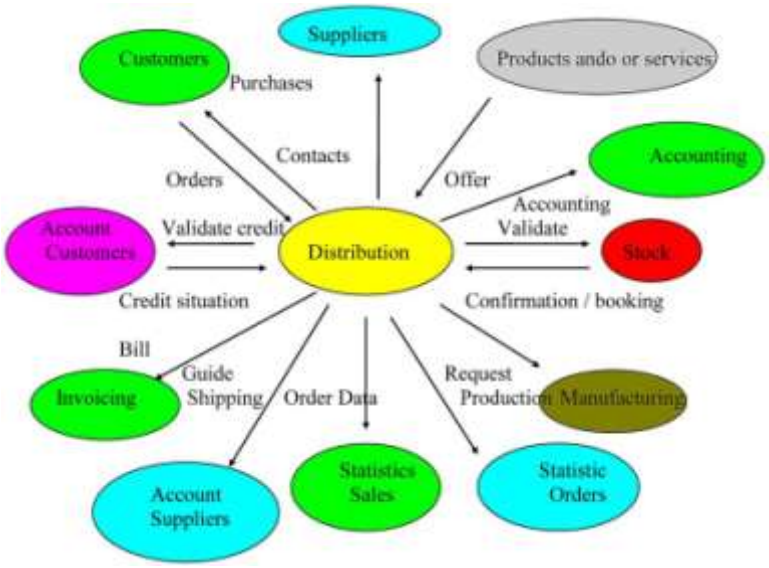
There are several possibilities between two extreme positions:

- Commercial officers delegate the responsibility of distribution operations to intermediaries, whether wholesalers (warehousers), agents, franchisees, or buying centers.
- Producer takes on the reports of tasks, creating points of sale or warehouses, organizing a fleet of trucks, and hiring sales teams.

Selecting distribution channels depends on numerous that factors can be grouped as follows:

- **Market Factors:** Concentrated or dispersed customers, whose buying habits cannot be ignored;the economic development of the country, as well as the modes and costs of transport.
- **Factors Inherent to the Product Itself:** The price that customers are willing to pay, the volume, weight, and value of the product
- **Company's Own Internal Factors:** The financial situation, the number and qualifications of its personnel, and the marketing policy

Figure 12 *-Distributionofinformationflows*



Information Storage

In terms of storing information pertaining to distribution, the following should be used among other procedures:

- **Distribution Planning:** Daily, weekly, monthly.
- **Distribution Costs:** Transportation, inventory, warehousing, lost sales, operations, etc.
- **Volume of Distribution:** Route, fleet, etc.
- **Profitability:** Route, fleet, etc..
- **Distribution Margins:** Route, fleet, etc.

Top KPI's for Managing

Examples of performance indicators are illustrated as shown in Tables 10 and 11.

Information System for Distribution Order Management

General Description

The first module (subsystem) information of a system for the managemandnt of any organization concerns the recording routine of customer requests (orders).

The information system for management provides the necessary data to the area responsible for product delivery, to ensure that the quantities requested of each product will be sent to customers. It also makes other piece of information available like a stock-out, when inventory is not enough to satisfy customers' requests, as well as price, discounts, the VAT and the total price. Equally, it allows a quick response to customers when they ask the company on the status of their orders.

Before accepting an order, the employee **in** charge of processing customers' orders must check whether the customer has credit, or the stock has enough quantity to satisfy demands.If there is lack of credit,

Table 10.Distribution planning and control

Description	Top Managers	Middle Managers	Operations Manager
Planning	Annual/monthly	Weekly deliveries by: • Transport mode • Route	Daily deliveries by: • Transport mode • Route • Fleet (includingdr iv er) • Isuance of delivery/transport orders • Issuance of labels
Volume	Global	Distribution Volume by: • Transport mode • Route • Fleet	Volume deliveries by truck
Control	Thennual/monthly	Weekly deliveries by: •Transport mode • Route • Fleet	Daily delivery by: • Transport mode • Route • Fleet

Table 11.Key outputs of the logistics system

Descripti on	Top Managers	Middle Managers	Operations manager
COST	• Deliver ie s • Stocks • Lost SaL • Operations • Transpthert • Storage	• Warehouse / Prtheduct • Route • Fleet	Cost of deliveries per vehicle
Profitability	Global	Per: • Warehouse • Transport mode • Route •Fleet	Per Car
Profit margin	Global	Per: • Warehouse • Transport mode • Route •FlEE T	Per Car

the customer will get immediate feedback and orders will only be accepted against advance paymentor cash-on-delivery (cash sales). Once a stock out occurs, either the purchasing manager is informed or, **in** the case of a

manufacturing company, a production order is issued (production request).
When there is stock and the customer has credit, a delivery order is created and sent to the dispatching manager. Also called shipping order, this document contains the customer's name, the place and date of delivery in addition to an indication of the quantities requested.

Objectives

The main purpose ofthismodule or informationsubsystem is to keep customers' order record updated (new orders, alterations, cancellations, partial deliveries,etc.) to readily get all information regarding the status of each order.

Information Sources

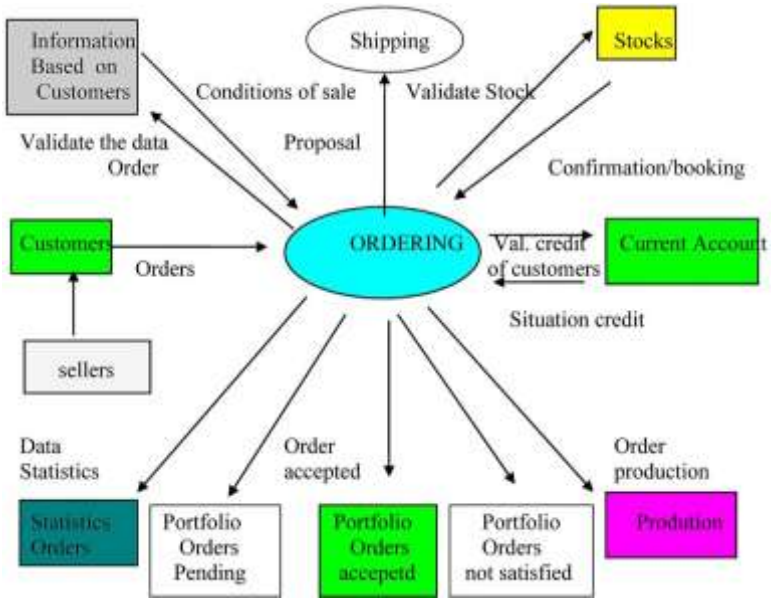
In this case, the primary source of information is constituted by the customers' order data which withpanies can gather in a variety of ways.Companies use their own formats to record customers' order data which are then validated and accepted or not, such as the customer's name, address, contact information, location, delivery date, the requested quantity of each product, the sales conditions, etc..

Information Processing

The processing of order data is conducted along these lines:

- **Customers:** For existing customers, Conditions of sale (possible contracts), credit limit, etc. are to be checked.Otherwiif, a new customer file would be created, stating all sales conditions necessary deemed.

Figure 13 -.Customer orders of information flows



- **Customer Credit Situation:** Orders will be immediately accepted when customers have credit, or else only advance payment or prompt payment (cash sales) would be received. If none of the above conditions are satisfied, orders will be rejected.
- **Stock Control:** Verify there is enough stock to meet demands, allocating/reserving the quantities ordered so that they are not sold to other customers. If there is no stock, a manufacturing company will issue a production order,or a purchase proposal. The intended purchase must be consideredfromthe order point or the minimumstock perspectives, taking into account the economic quantity to be bought and the possible seasonality of the product sales.

All orders that can be filled right away would be recorded in the Confirmed Order Record. Orders awaiting stock would be registered in the Pending Order Record. Unfilled orders should be recorded in the Order Backlog Record, together with their matching reasons.
The data of all orders should be recorded in the Order statistics records for further analysis. Addition ally, a check of the customer's conditions of sale is conducted, considering any contracts that had eventually been made and/ or trade discounts offered, etc.

Information Storage

Data storage must include the following:

- **Order Data:** Customers' orders are recorded in the customer order record (order forms) by adding new orders, changing existing ones, considering any alteration requests made either as regards quantity, delivery date, or other items. Eliminate from backlog records those orders already canceled by customers.
- **Unfilled Order Data:** Recording of unfulfilled orders and their reasons to be used in further analysis

(buying habits of customers, quantity and value of unfulfilled orders, volume of orders by geographical area and seller, etc.).

- **Pending Order Data:** Recording of pending orders (e.g. awaiting stock, in-the-works product, etc.).
- **Inventory Data:** Update stocks in the warehouse and reserve the amount already allocated to customers (reserved amount) to be delivered in the requested or agreed date, preventing the items to be sold to another customer.
- **Order Statistics Data:** Update statistical order statistics(e.g.customer levels, sellers, products, geographical areas, etc.).

KPI's for **Management**

Example of Management indicators are listed as follows:

Operations Management

- List of Customers' orders Record (orders) arranged by:
  - **Customer:** Shows how all customers' orders interface with each other.
  - **Date of Orders:** Shows orders in chronological order.
  - **Products:** Shows the relationship in which orders and products interface.
  - **Delivery Date:** Shows the relationship of orders by delivery date.
  - **Seller:** Shows the relationship of orders by the seller.
  - **Order Status:** Indicates the status of order, i.e., tracking of orders to customer's complete satisfaction (e.g. awaiting stock, in-the-works product, etc.)
- Pending Order List arranged by:
  - **Customer:** Provides a list of pending orders for each customer (awaiting stock or in-the works product for example)
  - **Product:** Displays a list of orders that are pending for a given product
  - **Purchase Proposal Issuance:** Issues a product or raw materials purchase proposal focusing on the order point or the minimum stock variables, determining the economic quantity to be bought, and always bearing in mind the possible seasonality of the product sales; or
  - **Production Order Issuance (in the Case of Manufacturing Companies):** Issuing of re quests for product manufacturing based on the quantity necessary to satisfy demands, and the economic lot size to be produced.

Middle Management

- List of Order statistics arranged by:
  - **Customer:** Shows a year-to-date evolution of customers' orders compared to the previous year.
  - **Product:** Gives us the evolution of the amount of goods requested by customers to date, and also a year-to-date comparison in both, quantity or percentage;
  - **Geographical Area:** Shows us the evolution of orders by geographical area or route, considering the customer and the product as compared to the previous year.
  - **Average Order Value:** Gives us the average value of daily, weekly, monthly orders.

Top Management

- **Order Control:**
  - Shows the evolution of the Order Backlog Value in the current period and the accumulated year-to-date, as well as the comparison of the previous year evolution.
  - Displays the evolution of quantity and value of unfilled orders and their causes/ reasons.

Information System for Stock Distribution Management

General Description

To ensure that there are enough warehouse products to meet demands, all companies should keep a stock record of each product and issue a purchase proposal as soon as the stock level is below the order point or new products are marketed by the company

This information is normally processed by the employee in charge of controlling stocks in storage. Input data are taken from the customers' orders indicating the requested quantity of each product, and which had been placed by various means, such as telephone, fax, email, vendors, or others.

Output processing of warehouse goods should be carried out according to internal records, such as production requests from the processing plant to the raw materials warehouse or delivery orders issued by the responsible manager for invoicing goods, either to the general or the finished product warehouse.In manufacturing industries, any movement of stocks between the various stages of production should be executed following transfer or production orders.

The physical control of warehouse stocks is becoming increasingly important both in commercial or industrial companies, along with Annual Report outcomes or the analysis of the company's financial position. For such purpose, there are two types of inventory systems, perpetual and periodic (or intermittent) **in** which physical counts are done on an occasional basis, making it difficult to assess the warehouse operation throughout the year since it does not always make a total count of stocks available.Rather,the perpetual inventory system provides permanent up-to-date information by keeping continuous track of inventory balance, and it only requires a total annual physical count.

Purchasing proposal orders become one example of information output when the stock level is below the order point[8] or the minimum stock, or as well as the valuation map warehouse stock.

Objectives

The present module or information sub-system aims to provide the information needed to control stocks and the inbound and outbound movements of products in all stores or shops, as well as statistical data and other indicators for better stock management.

Information Collection

Inbound data is made up of receipt orders (input) which had been prepared by the warehouse manager, the delivery orders relating to customer orders, the data taken fromtransfer orders between warehouses, and even from Inventory discrepancy orders, that is created whenever a physical count is performed and matched against corresponding accounting records and they do not agree.

There are also situations at industrial manufacturing enterprises in which the end product of a pro duction line and the raw material of another production line will make it necessary to create a transfer order to track the internal inventory movement and reflect the accounting record update.

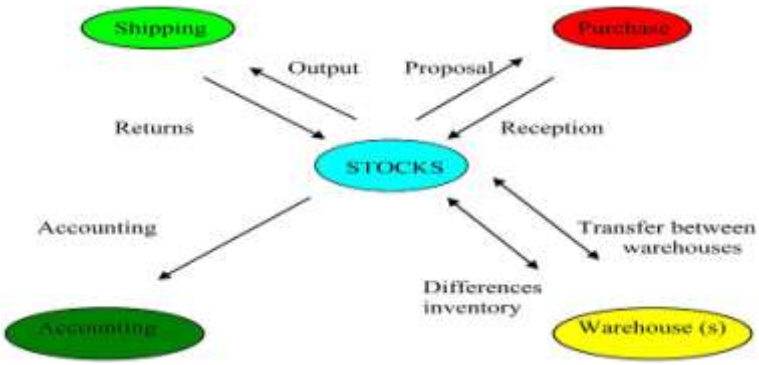
Information Processing

Inventory data processing seeks, firstly, to ensure that products received from suppliers correspond to what was requested in the purchase order, either in terms of products or in quantitative terms, crosschecking the receipt and purchase orders;secondly, to ensure that the products to be shipped to customers match the products and the quantities ordered, as well as the delivery times.

After product receipt, the Purchase Portfolio should be updated by deducting the quantity delivered by the supplier from the one requested in the purchase order, so as to keep it always current. It is also necessary for warehouses and stores to maintain their stock up to date in order to improve sales efficiency. By means of inventory movement, it is possible to determine the reorder point of each product, its minimum and maximum stock levels, as the economic quantity to be purchased considering any seasonal variations of products. On the basis of customer order data, a quantity of a product can be reserved until delivered on the date requested or agreed upon.

The stock record of each product in storage should reflect, among others, data such as the last entry date, the last exit date, the minimum amount (minimum stock level), the order point, the economic quantity to be bought, the available quantity, the quantity allocated to customers' orders - not delivered

Figure 14 - Information flows distribution inventory management



or invoiced-, the "in transit" quantity (transfer between warehouses), the number of suppliers' outstanding orders, the defective goods (not salable but physically in stock),and the order quantities and values (cumulative) to date (inputs).)

Whenever there is any movement of stocks (inputs or outputs),they shall be reflected in thecompany's accounting records;so that a perpetual inventory of each product in the warehousand storeis kept. To determine the value of stocks, one of the following valuation methodshould be applied: LIFO (Last In First Out), FIFO (First In First Out), or calculating the average price.

Information Storage

Based on data from the receipt orders, delivery orders, inventory difference, transfer and "in-transit" order s, it is possible to keep the stock of each product, placed in stock or store, updated; either in quantitative or value terms, so that thestock quantity and their value are easily accessible.

The product file will, among other data or fields, contain information about the selling price to the public, the warehouses,and the retailers.In the unusual casand that all three situationsoccur simultaneously, it should also show the price of the last purchase andu'sed to obtain the average purchase price for a given period.

KPl's for Top Managing

The information contained in Table 12 constitutes **an** example of the performance indicators.

*Table 12.Top **KPI**s on the stock distribution products*

Variables	Top Managers	Managers Intermediate	Operational Managers
Products	stocksvolume	Inventory(Permanent or intermittent)thelevelofwarehouseandproductorl evel of independentproductwarehouse and re theyare stored as well as family (s) of product(s),the quantity in stock, valueana unit costs;	Dailymovementsof the warehouse or store (entry and exit), in quantitative ana value terms.
Cost	Analysisofglobaldeviationsfrom the standard cost or average an a real, if the company uses the method of standard oraverage costs.	Analysisofthecostsof standarddeviations or medium ana the actual product level in the case of using the methodof standard or medium cost;	
Stocks	• ABC Analysisbyproduct. • Rotationof stocks in the period, or yearly to confirm the phaseof the product life cycle and determine which products are in thedecline phase (m o no) or that are unprofitable for the company and for which there is to make decisions to reversethe situation of the sale ofthatproduct(s).		

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