Designing a supply system for a productive company

Javier Chávez González[1], Graciela Vázquez Álvarez[2], Efraín J. Martínez Ortíz[3] and Sandra D. Orantes Jiménez[4]

[1,2,3]*Instituto Politécnico Nacional, ESIME, Sección de Estudios de Posgrado e Investigación, Departamento de Sistemas, México*
[4] *Instituto Politécnico Nacional, Centro de Investigación en Computación, Departamento de Investigación en Ciencias de la Computación, México*

[2]*gvazqueza@ipn.mx*, [4]*dinora@cic.ipn.mx*

Abstract

This paper presents the design of a Supply System for a productive company, with the purpose of updating the term of Supply Chain (SC), which has evolved over time to mix with some other elements which conform production and finished products warehousing or distribution; has derived in the concept named Supply Chain Management (SCM) and has mixed in such a way that is confused, with a management system. The proposal designs a specific system to manage just supplies not finished products, and it is been visualized agree with the image of the imaginary lines that seems to be drawn by the incomes of the supplies which is different form of the known chain that is applicable not to all type of productive companies, and in a more precise size of a management system even if the system is closer to a subsystem of all one. As we considered this a soft system, we worked with Jenkins Methodology. To realize a new concept of a Supply System through breaking up the known SCM system to identify characteristics of the different subsystems and analyzing the main aspects in order to determine the parameters of an updated and appropriate system for a productive company we determined that the Supply Pony Tail (SPT) System as more appropriate supply system

Keywords: *System, Supply Chain, Supply Chain Management, Supply Pony Tail System*

1. Introduction

The concept called Supply Chain (SC) has been used for approximately 30 years, has had a highly dynamic growth, and has been closely linked to the development of computer technology. And it is been considered that it supplies the necessary materials income for the production area of every Productive Company.

The concept of "Supply Chain Management" (SCM) has been considered a consequence of the SC and often has been treated similarly, but its coverage is at all levels of the company. The concept of Productive Company is considered appropriate for use in this research; but also, it is applicable for a company that produces services (Sanders, 2012).

In one hand, in the industry, common workers assume that the activities they carry out with the goods, such as receiving, registering, safeguarding and delivering to production (see Figure 1), are those that represent the supply chain because those activities are made in sequence. In other hand, high management

uses the Supply Chain Management (SCM) with complete coverage for the full company and that goes beyond it because it covers suppliers and customers directly related to them and those related to their suppliers, customers, and others; and they consider this relationship as the SC (Farahani et al, 2009).

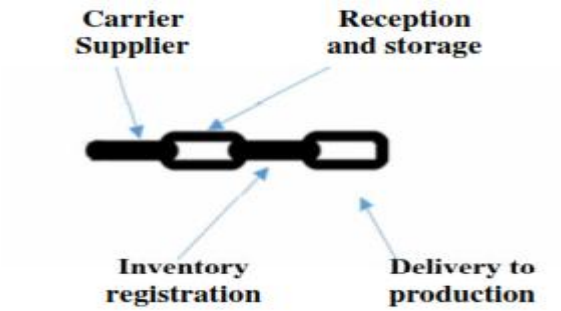

Figure 1. Elementary actions chain [Own elaboration]

Because of this relevant interpretation and manage of the different level of the organizations, is that we design the proposal novelty supply system.

We have considered that it is necessary to clarify interpretations of supplies, chain, production, finished products, and distribution on the different levels of the organization at any industry; and update the system of supplies. Also, we consider that as the best option a new concept, without affect the regular operation and existence of the metasystem (Jackson, 1991) known as SCM or the equivalent Management of any company.

We suppose that part of the benefits of the new concept could be updating, clarification, and re-order for the system to supply goods to any productive company.

2. Evolution of supplies to productive companies

In years prior to industrialization, in which "industry" is considered a workshop or "artisan factory", empirical procedures and "Management" were used. Through the years, supply of goods to the workshops at the beginning and later to industry, have evolved in these both entities.

When the industrial era arrived, new concepts began to emerge for the control of business, starting to generate a vertical development (as managers, supervisors, workers), and horizontal (as manufacturing, accounting, personnel, sales, etc.), and concepts such as the division of wages, productivity, and processes, among others (Salazar Guerrero, 2018).

At the end of the 19th century and the first half of the 20th century entered the basic structures of a Productive Company. Some other advances as technological discoveries, new work procedures, concepts like logistics, acquisition, and distribution; computing and communications processes; and the development of global services, and modes of transportation, prices, orders and delivery times.

From the '60s to the '80s, there were advances like special importance of supplies, making of the inventories the most important aspect; protectionism of the industrialized countries; limits for import; management of inventories and logistics acquired a particular maturity and dynamics, which entailed the control of flows, rotation, and measurements; and the enter into the scene of quality disciplines, the development of computer programs for inventory control (ERP, MRP, MRPII).

In 1982 Keith Oliver, consultant of Booz Allen Hamilton, coined the term Supply Chain (SC).

Finally, in the last 30 years, like SC, aspects like operation with zero inventories, better computer systems, and flexibility of the logistics (already called Chain of Supplies). Optimization of specialized programs entered in the game; in addition to the tendency to reduce inventories, production costs, improve competitiveness, collaboration with customers (CRM), and the inclusion of a great multiplicity of aspects, such as quality systems, logistics, and others, adding to the management systems.

Summarizing, the great development of the SC system by itself, together with the growing of industries and the enormous development of technologies, make necessary a review of the Supply System.

3. Problem to be resolved

Initially, in any industry, the problem has been identified in different ways, like people involved in the Supply Chain, have called "chain" to the supplies they receive from different suppliers when in practice supply goods do not enter consecutively to form a chain and do not enter to production necessarily one after another.

Involved people improperly have called supplies to the finished products; also, they have indistinctly called Production, Purchases, Logistics, Supply Chain Management, as Supply Chain, causing confusion. The chain of companies is also known as a supply chain.

Some companies already collaborate as a "supply network", seeing this as a new form of organization. In the present century, networks of supply chains have been generated, and they have been given names such as "Extended Enterprise", "Global Production Network" or "Next Generation Manufacturing System", to become innovative and productive.

So, we have considered that is necessary to organize the all manage, at least the part of the system, that is strictly related to supplies.

4. Design of a system of supplies for a productive company

A productive company from a systemic (Van Gigch, 2006) point of view is made up of different systems and characteristics; for this, a brief investigation is carried out consisting in identifying the status that the literature related to such supply systems gathers. Likewise, a specific analysis is developed of the aspects of greater impact in a Productive Company and those that are detailed below.

4.1 Subsystems and their Characteristics

As mentioned before, it is summarized that the SC system has evolved in such a way that the complexity of its components is mainly due to the following factors (Eppen et al, 2000):

- The growth of companies and volume of operations.

- The growth of the participation of departments of the organization of the Company and of other entities.
- Advances in various disciplines of knowledge.
- Information Technology.
- The globalization of the economy and operations.
- Program Marketing

For purposes of this research, the above concepts make up the problems, which can also be interpreted not as a problem, but as a need to update the name of Supply Chain, for a Productive Company for the 21st century.

Although the problem is of an integral type, and to find a resolution we have proposed to describe the particular problems that make up the same, for its analysis and subsequent description in a global manner.

The particular description that is shown is based on the changes that the SC has undergone and is based on the interpretation of the system comparing its initial (basic) state with the final (more complex) state of each concept mentioned above.

4.1.1. Subsystem Company and volume of Operations (Growth of Companies): Company with basic operations: In Figure 2, you can see the Company before growth, with the basic operations, between a Supplier and the Company (in this case the person in charge of production), and where the volume of operations are the actions that are carried out between both; same as mentioned below: the company that produces, buys the supply it needs from a supplier who sells it; to subsequently carry out the delivery activities of the supplier and the reception of the company and thus once the receipt of the material or input is confirmed, its payment. The company internally stores, registers, makes a warehouse exit, delivers to production and registers, this being the end of what can be strictly considered supply.

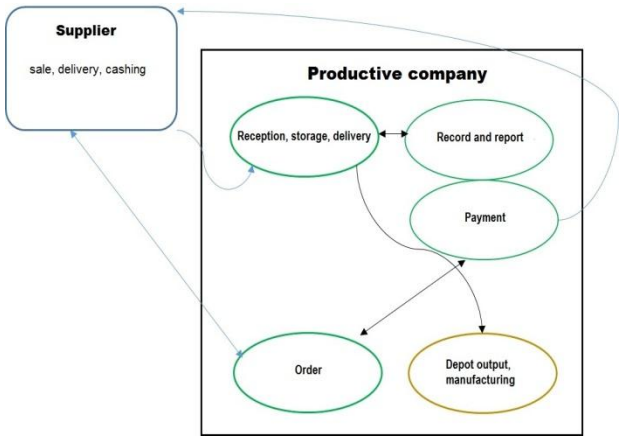

Figure 2. Company with basic operations [Own elaboration]

Though the previous illustration contains a volume of basic operations for a production in which hypothetically a single input is required; operations for two or more inputs would be similar, but the volume of shares is doubled, and if two or more suppliers are required, the shares would also be the same, but with a higher volume.

4.1.2. Company after growth with higher volume operations: In Figure 3, the current company can be seen, with higher volume operations. The way to interpret the notation in Figure 3 is:

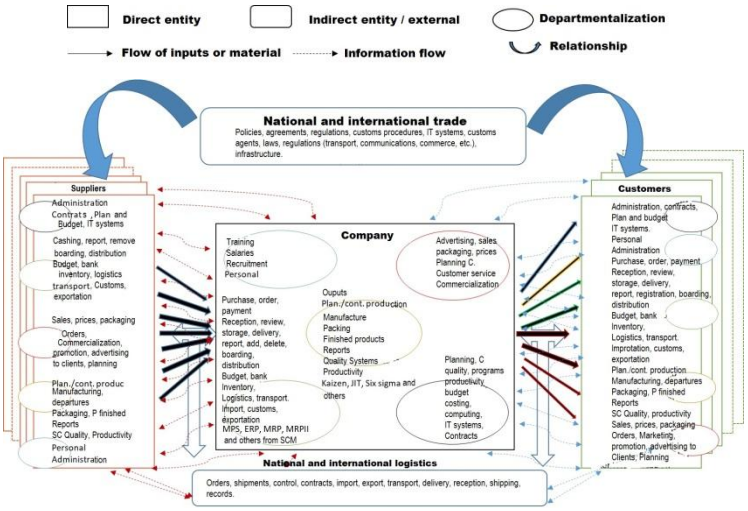

Figure 3. Current company with higher volume operations [Own elaboration]

It is noteworthy that some business managers, academics or writers of the subject come to consider as part of the chain the producers of raw materials, those representing the left and retail customers or end users to those located on the right side, as the last link.

Figure 3 shows an example of a current company, after growth, with a greater volume of operations, a product of the integration of more operations, directly and indirectly, related to the supplies needed by the productive company, but, mainly due to the requirements administrative aspects of the Suppliers-Company-Customers relationship.

In Figure 3 the following aspects can be observed:

- The relationship between suppliers, the productive company and this with the primary customers, is the relationship of the three main entities that make up a chain, as the SC is currently conceptualized.
- The operations or actions carried out by both suppliers, the company and its customers, are indicated in the text more or less aligned with the basic departmentalization of a company.
- The operations or activities are practically the same among the three entities, where the Productive Company gathers most of the operations. In this case, the supplier does not carry out purchasing activities, and conversely, the sales activities do not appear with the Customer.
- Only the activities of a supplier and a client are illustrated, in order to represent them.
- The activities of only one material or product supplied are illustrated. As in the previous case, each material implies a similar number of operations.

As can be seen, it is evident the wide growth of operations that are currently carried out in the companies, to manage and control not only the supplies strictly necessary to the production area (manufacturing or service); rather, these supply systems have

added finished products or services, because they began to establish customer service policies.

It should also be kept in mind that normally any production requires more than two elements to manufacture a product, in such a way that more parts, more suppliers and more operations; of course, more types of business products can generate more customers. This means that operations with suppliers and customers would be multiplied by the number of materials needed in production and the different finished products, regardless of whether some operations are carried out jointly (for example, an order may be for several products). Consequently, the multiplication of operations generates a greater degree of complexity to the system; this being a particular problem (Bertalanffy, 1976).

4.2 Subsystem departmentalization of the company (Growth of the participation of departments of the organization of the Company and other entities)

4.2.1. Business before growth, with basic departmentalization: Figure 4 shows a company before growth, with basic departmentalization. There were two companies, the one that sold the supply called Supplier and the Production Company; and therefore, the departmentalization was minimal, only the Sales, Collection and Warehouse areas with the Supplier and the Purchasing, Warehousing, Payments, Inventories and Production areas in the Productive Company are needed. Initially, the collateral operations were carried out internally by other areas and had no relations with the outside; certainly, if more products or supplies are required, more suppliers may be required; whose areas involved in the process would be the same as those illustrated.

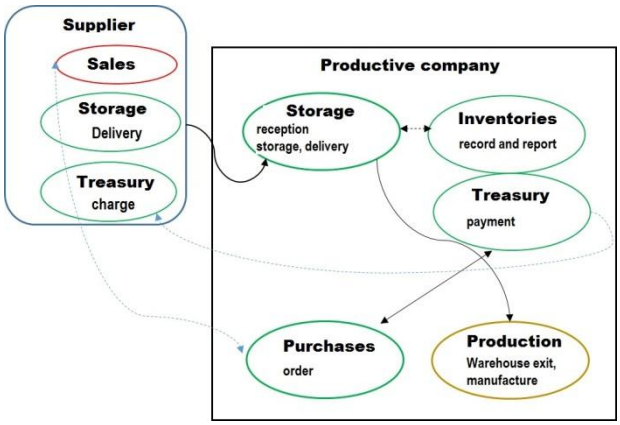

Figure 4. Company with basic departmentalization [Own elaboration]

4.2.2. Company after growth, with greater departmentalization and participation of more entities: Figure 5 represents a Productive Enterprise of the present, in which the departments that have relation with the SC are much greater than when it started with basic operations; in this growth the departments that intervene on the part of the supplier and the customer are practically the same, because the actions correspond to the same departments.

The ovals appear in colors to distinguish the main areas such as Finance, Commercial, Production, and Administration with their staff areas; and within them the departments that currently intervene in the SC and that belong to those main areas of your organization are listed, for example, a treasury department is located within the finance area. Also, as in the previous paragraph, it should be considered that, the

greater the number of suppliers and customers, the greater the number of departments that intervene in the process.

On the other hand, also the commercial entities, of third parties, or related businesses and of course the governmental ones, are of the greater number, due to the growth of the businesses between the different companies that participate in the SC. Particular influence on the growth of departments have businesses immersed in international trade.

Therefore, the second particular problem is represented by the uncontrollable growth of internal entities and the participation of more external entities that have been added to the Supply Chain.

Figure 5. Current company, with greater departmentalization and participation of more entities [Own elaboration]

4.3 Subsystem Disciplines of knowledge (Advances of various disciplines of knowledge)

4.3.1. Company with basic disciplines: Figure 6 shows an example of the basic disciplines that some companies had in their beginnings, before the growth of the industry in general. It is convenient to consider that the "development of scientific disciplines" is not the subject of this document, and it is also difficult to define with how many or what disciplines the different productive companies have started, or in their case when they start. For practical purposes, it is assumed that a referent of the beginning of the growth of disciplines represents the Modern Administration of Henry Fayol, and the Scientific Administration of Frederick W. Taylor; what allows estimating the disciplines before the growth of others.

Obviously, disciplines such as, Trade with Purchase, Sales, and their contracts, have an ancestral existence and a continuous updating and modernization; on the other hand, accounting has also ancient origins and practically a complete development, independently; and the production is as previous as the artisan work that reinforces its status in the times of the industrial revolution and mass production (Salazar Guerrero, 2018).

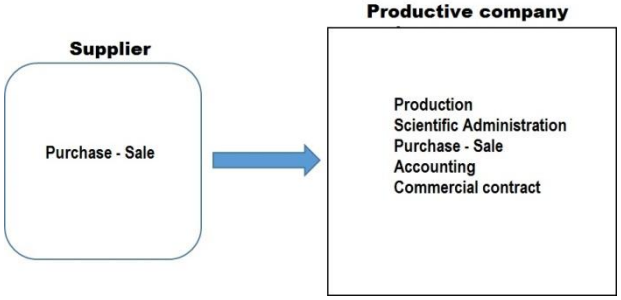

Figure 6. Company with basic disciplines [Own elaboration]

4.3.2. Company after growth with advances in knowledge disciplines: In Figure 7, various disciplines are shown around the productive enterprise, these issues of knowledge appear circumscribed in rounded rectangles in the upper part and forming a spiral, starting with the Administration and ending with the concept of Protection Systems. The representation of the disciplines (and some other areas of knowledge), does not have a chronological order of appearance in the supply system or progress of the same, since it is not the issue, but that allows to know the influence they have had since the beginnings of modern industry; for example, Administration and Manufacturing are among the first disciplines to appear (within the framework of the SC), as well as Productivity, Industrial Safety, Personnel Development, and Inventory Control, were the topics that followed the previous ones.

In order to simplify the representation, some topics are not mentioned despite being twinned with others, for example, finance regarding accounting, inventories, and payments; or the packaging that is important for commercialization, but that is part of the production with less relation to the SC. Others appear independent, although within the SC they have a very close relationship, such as logistics and transport, but also because they are very important and can be very large.

The IT (Information Technology) (CIECAS, 2005) systems will be seen in the following subsection; and the topics that appear as systems belong to the discipline of systems, regardless of whether they have a computer system. As may be supposed, all disciplines are autonomous and have been developed independently of the type of business, but they have been linked as part of the SC.

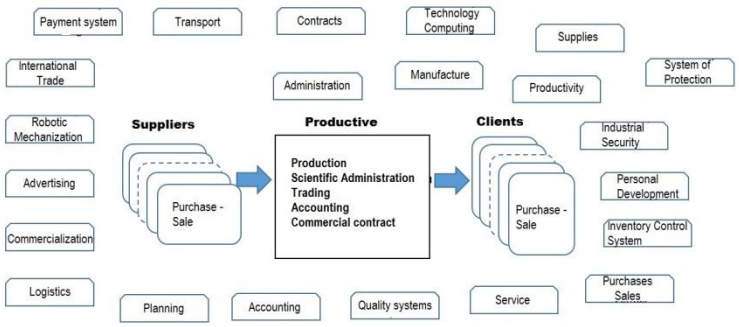

Figure 7. Current company, with advances in the disciplines of knowledge [Own elaboration]

To visualize the company after its growth, it is necessary to imagine the participation of all the disciplines with all the companies (Suppliers, Productive Company and Clients) and with all the products or supplies, which would show the complexity of the system; representing the third problem (Araujo Arévalo, 2016).

4.4 Information Technology

4.4.1. Company with basic technologies: In Figure 8, the most common basic "technologies" of an era that could be prior to the '50s are cited, and that for purposes of this document is valid, given that the term supply chain is not yet known, despite that some functions already exist.

The elementary communication has always been the telephone, along with the telegraph and teletype, however, that the documentary is through the mail, and that the delivery of materials is made through transportation in all its modes (land, sea, and air).

For its part in those years, the technology uses mechanical calculators and at that time they start using the first computers in business, certainly first in the most industrialized countries and then in the rest of the world, like ours. Also, another recognized technology is semiautomatic, as used in industrial processes such as serial production (Salazar Guerrero, 2018) (CIECAS, 2005).

From the point of view of the systems, the first two technologies (related to Communication), allow the linking of two entities and represent parts of a system.

In the case of the knowledge that companies have of the mechanization of their processes, such as the well-known serial production of the automotive industry, and the use of material transport mechanisms based on traveling cranes and rollers or conveyor belts, among others, which are common to the metal-mechanic industry; it can be said that they are proprietary technologies of the company that uses them and have no interaction with another company.

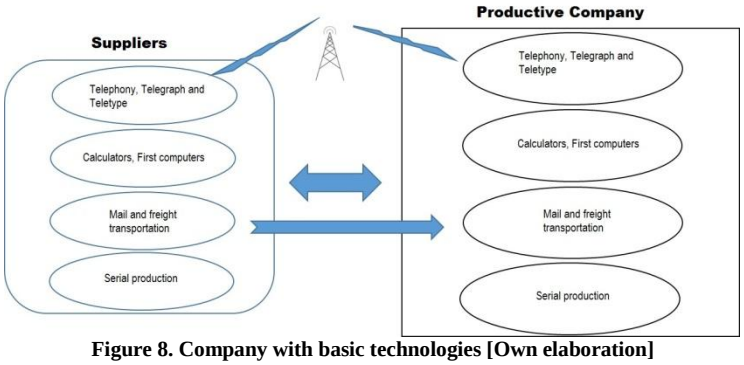

Figure 8. Company with basic technologies [Own elaboration]

4.4.2. Current company and Information Technology: Figure 9 is based on Figure 7 relating to the disciplines, with which Computer Technology has developed in parallel from its entry into the industrial field (Salazar Guerrero, 2018), or after its first development in the military world. Computer technology is the cohesion of all knowledge; mainly because of the large amount of information it handles, such as the speed with which it processes it, as well as the process of algorithms and mathematical operations with particularly high speeds (CIECAS, 2005).

The characteristics of the IT previously exposed, have allowed unlimited use in all disciplines of knowledge, and fundamentally in the conformation of soft systems, which is the type of systems that mostly compose or participate around this chain system of supplies.

In Figure 9, it has been considered that practically all the disciplines have grown with different types of software, but for greater ease, only those that have the most influence and impact on the supply chain are detailed. To do this, circles or ovals are shown connected by arrows to the disciplines; and in circles or ovals, the main functions or operations that contain the different computer programs are described, which appear in almost all software related to that discipline. In some cases, the acronyms of the programs are mentioned, such as ERP or SCM, which are programs identified as part of the SC. In the specific case of IT, it is not necessary to show development, since it is assumed that such development has to do with all the disciplines and all the mentioned programs. There are some areas such as "Payments" for example, which hardly have programs and are rather part of others, such as accounting, Marketing or those of the SC, but that has been left to show their importance in this document (Turban et al, 2011).

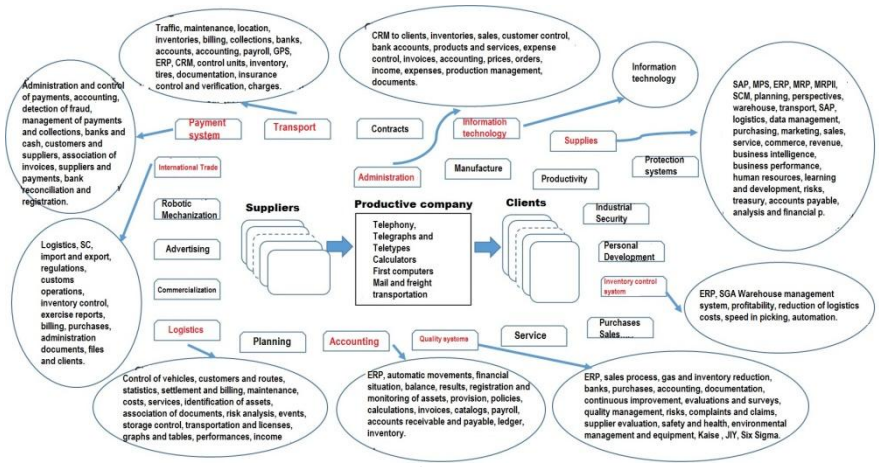

Figure 9. Current Company and Information Technology [Own elaboration]

4.5 Subsystem Globalization of the Economy (The globalization of the economy and operations)

Economic Globalization is the subject of this clause because it is precisely what represents the management and exchange of goods at a global level, that is, the management of international supplies around the world.

Different cultures around the world have contributed to make that the Market extended its influence to places beyond their frontiers where they offered goods which were demanded by other people, and that necessity has made globalization.

In particular, economic globalization has its appearance in very ancient times and its development has been constant and virtually exponential growth in recent years, more specifically the second half of the twentieth century and what is the present.

Due to this, here you cannot give a status of economic globalization before development, as described in the points of growth of companies, volume, departmentalization, disciplines or even computer science.

Therefore, this point is described by pointing out the most relevant aspects that allow showing the specific problem of the globalization of the economy and operations in the supply chain.

Conceptually, globalization refers first to the Earth Globe and as an action to transnationalism, which can be interpreted as reaching certain objectives through different countries of the world. The objectives can be of different types, but history has defined its chronological appearance, rather in the following sequence: Social, Cultural, Military, Political, Economic, Commercial, Technological and finally Industrial. Commitments and obligations have always accompanied trade and are subsequently consolidated as legislated agreements (Sánchez Silva, 2007).

In the principles of antiquity, there are migrations due to the search for food, which entails the culture, whatever its level; then, military actions are generated that entail the importation of economic policies and measures, regardless of the reasons; and later the commerce is generated. Technology, because it is a rather non-negotiable property, is taken to other towns and countries later; and the industry finally moves in recent times. This order of appearance may vary according to the peoples of antiquity and different opinions may be accepted, given that it is not a subject of discussion in the present research.

In reality, this economic expansion has been carried out for thousands of years, both peacefully and as a result of wars and conquests. History has registered trade actions between different nations for several centuries; some of these events are mentioned below: Before the 2nd century, the Jade Route and the Silk Road both in the Asian continent; From the 5th century BC, the commerce of merchandise, copper, tin and precious metals in the cities of the Mediterranean Sea by the Phoenicians; between the 5th century BC and IV century AC during the growth and domination of Rome around the Mediterranean, all kinds of goods of the time are exchanged; and since the fall of the Roman Empire until the Middle Ages mainly in the second part of this, trade between Europe and Asia increased from Venice.

There were also merchandise movements as a result of invasions and conquests as they were: in the 5th century, by the Huns, goods movements between Asia, Eurasia, and Europe implied; between the 8th and 12th centuries the invasions of the Vikings in northern Europe and between the 8th and 15th centuries of the Muslims in the south; in the thirteenth century the Mongol Empire possibly made the largest logistical movement among nations; and between the XV and IXX centuries the Ottoman Empire has a Middle Eastern domination towards the east of Europe.

In the 15th century, after the discovery of America, trade began between Europe and the new continent, taking precious metals in one direction and goods and products for Europeans who settled in America in the opposite direction; from the sixteenth century England and Holland trade new products to Spain and Portugal, who are the conquering and colonizing countries. Similarly, trade between Europe, Africa and some regions of Asia with Portugal, France, Germany, Holland, and England is extended; and this country consolidates its economic expansion between the eighteenth and nineteenth centuries, making use of its advantage as a country in full industrialization.

The twentieth century, is divided into three periods product of the two world wars, even though the two periods prior to both wars are similar, in which there are exchanges of goods between all countries with more or less economic development and excelling the hegemony of Great Britain and the outstanding growth of Japan, Germany and the USA.

The second part of the 20th century is by far the exponential impulse of Globalization, including that corresponding to the Economy. At the end of the Second World War, the development of the Economy takes place, a part in the Soviet Union in Eastern Europe among the countries associated with that regime; and the rest in the so-called West. Both worlds differentiated as Communism and Capitalism and divided symbolically by the Berlin Wall. The expansion of capitalism takes place with greater effect and opens to the entire Western world, impacting all aspects related to globalization (Sánchez Silva, 2007).

The expansion of the Economy is driven by the commercial interests of the nations participating in the Second World War in the last century; basically reactivated with the orientation of industries towards civilian life, including many that were dedicated to military products.

It can be said that during the second part of the twentieth century and so far in the twenty-first century, the globalization of the economy has consolidated, as a result of the pressure from the more developed countries on those in which it is desired to introduce the products of the former. Without omitting the fact that the development of the IT and especially the internet, have been of prime participation in the commercial exchange since they contributed to a more expeditious financial execution.

Finally, at the end of the 80's, globalization has a definitive and total political impulse when Ronald Reagan, president of the United States and Margaret Thatcher, Prime Minister of Great Britain, declare the entry of the economic system called Neoliberalism worldwide, supposedly proposed by the large transnational corporations at world level consisting of the dismantling of governmental institutions such as trade unions, state companies, and elimination of protectionism of the internal market; as well as the privatization of state enterprises, opening of international free trade and the abolition of tariffs.

The Globalization is consolidated, among other great events with: the fall of the Berlin Wall in November of 1989 and of the USSR (Union of Soviet Socialist Republics) in December of 1991; the great advances in internet technology and communications systems that facilitate international trade transactions; the opening of governments that generate free trade agreements; and the concretion of the commercial legislation between companies of different countries; they give rise to a New World Order, which has persisted until 2017, year in which Donald Trump, president of the USA, initiates a change in trade policies by that country from 2018, in which it re-establishes tariffs on products from all over the world, including its Western commercial allies, giving rise to an apparent warning of another New World Order (Sánchez Silva, 2007) (CIECAS, 2005) (David, 1997).

4.6 Program Marketing Subsystem

The other great actor in the problem is the enormous commercialization of the advisory services, in the different disciplines, predominantly computer services, programs or software.

In the search of existing antecedents, an investigation is made regarding some existing programs in the market related to the SC issue.

There is a large number of programs for different disciplines and areas of any Productive Company and particularly related to the Supply Chain, both of which are the subject of this document. See Table 1.

Table 1. Content of Software of knowledge disciplines

Discipline	Software and some contents
Administration	CRM (Customer Relationship Management), inventories, sales, customer accounts, bank account movements, products and services, expense control, invoice issuance, accounting, prices, work orders, income, expenses, product management, document flow
Manufacture	Computer-aided manufacturing, computer design, and manufacturing, EPR (Enterprise Resource Planning), SOA (Service-Oriented Architecture), SAP (Systeme Anwendungen und Produkte, Application and Product Systems), SAP MII (manufacturing integration and intelligence), MRP (Material Requirements Planning).
Productivity	Business plan, Human Resources management, development, applications, payroll staff adjustment, selection process, word processors, history and calculations, CAD's (Computer-Aided Design).
Industrial Security	Occupational safety, industrial hygiene, ergonomics, and applied psychology, occupational medicine, coordination of business activities, integration, customized training, reports, data migration, environmental safety.
Personal Development	EHSM (Environmental Health and Safety). HS (Human Resources).
Inventories Control	ERP, SGA Warehouse Management System, profitability, reduction of logistics costs, speed in picking, automation.
Purchases	ERP (Enterprise Resource Planning), project control, resource management, Gantt charts, control of progress and costs, revenue to warehouses, reduction of intermediate stock, compliance with deadlines, efficiency and production cycles, process engineering, time reduction. Purchase orders, order planning, quotes, accounts payable, merchandise entry, calculation of required quantities and consumptions, MRP (Materials Requirement Planning), account management, supplier reports. Creation and status of purchase orders, documents, purchase history.
Sales	ERP and CRM mail and call control, sales history, quotes and invoices, telemarketing, workflow control, market channel, sales reports, points of sale.
Services	ERP, CRM, resolution of incidents, anticipate the needs of the client to provide support, ensure cohesion of communication channels, reduce waiting times, and analyze the efficiency of attention.
Quality	ERP, streamline the sales process, reduction of expenses, inventory reduction, banks, purchases, sales, accounting, process documentation, continuous improvement, evaluations and surveys, quality management, risk management,

	complaints and claims, supplier evaluation, safety and health at work, environmental management, equipment management.
Accounting	ERP, automatic movements, statement of financial position, balance of proof, statements of income, record and follow-up of assets, provision, policies, calculations, invoices, catalogs, payroll, accounts receivable and payable, general ledger, inventory.
Planning	Planning, scheduling, reporting, project costing, supervision, selection and evaluation of personnel, organization, resource planning, continuous improvement, risk analysis, Gantt, historical work.
Logistics	Control of vehicles, customers and routes, statistics, settlement and billing, maintenance programming, calculation of service costs, asset identification, document association, risk analysis, event and process logs, control of storage generation, transport and of licenses, graphs and tables, performance control, revenue and cost management.
Commercialization	Control contracts, warehouse, billing, purchases, accounts payable and receivable, problem solving, integrated intelligence, customer needs, profitable projects, service improvement; interact with customers, optimization of productivity, intelligence, adaptation to changes.
Advertising	Management of campaigns and tasks, areas of suppliers and customers, types of marketing and advertising, spreadsheets and historical, assignment of tasks, time control, income reports, expenses per customer and product, product catalogs, presentations and documents, advertising agencies, media, telemarketers.
Mechanization and robotics	Robotics, CNC, 3D, CAM, mechanized work, mechanized arms, changers, sensors, tools, ERP, artificial intelligence, waste reduction, laser, controlled measurements.
International Trade	Logistics, supply chain, import and export, regulations, customs operations, inventory control, exercise reports, billing, purchases, document management, control of files and clients.
Payments	Management and control of payments, accounting, detection of fraud, management of payments and collections, bank and cash accounts, list of customers and suppliers, an association of invoices, suppliers and payments, bank reconciliation, registration.
Transport	Traffic, maintenance, location, inventories, billing, collections, banks, accounts payable, accounting, payroll, GPS, ERP, CRM, unit control, inventory, tires, documentation, insurance control and verification, charges.
Contracts	ERP, processes, management and monitoring, control of follow-ups, expirations and changes, registration, automatic elaboration, correlation of matters, historical control.
Supply Chain	SCM, ERP, planning, perspectives, warehouse, transport, SAP, warehouse and SC management, logistics, data management, purchasing, marketing, sales, service, commerce, income, business intelligence, business performance, human resources, learning and development, risk control, treasury management, accounts payable, analysis and financial planning.
Protection	Risk analysis, security, policy analysis, fraud prevention, audit

(Checkland, 2012) (Arboleda Vélez, 2014) (Jackson, 1991)

Through a general, but analytical visualization, the main focus or interest of such

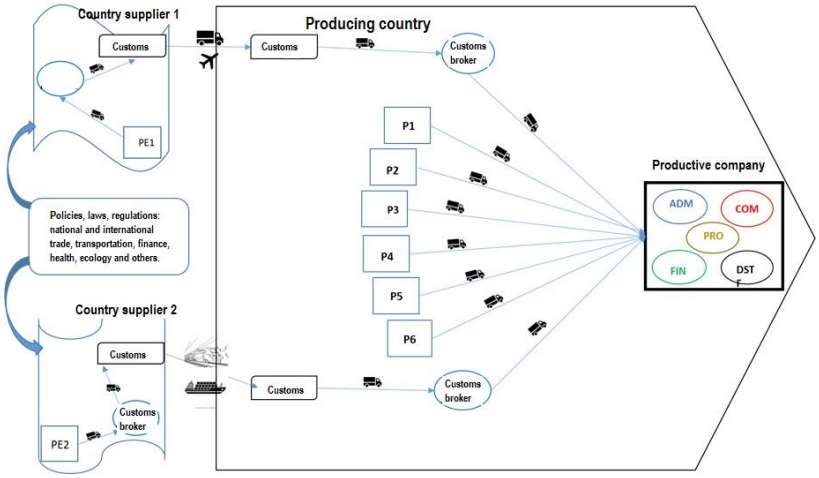

Figure 10 Supply Pony Tail System [Own elaboration]

This figure has been development for a company located in Mexico, but it can be adapted for any country, and variations will be with the custom of regulations of the country for what it be applied. This means that if the company is in Guatemala, is going to need to operate with custom regulation of this country and the countries from where supplies are originated, or suppliers sent the goods.

Square in the right is a Productive company, which receives supplies and vendors, or suppliers are represented with small squares with a numbered P. A line enclosed the image of domestic logistics (Supplier, transport and transportation), and out of that line international suppliers with its logistics elements (Forwarder, mode transportation, customs, etc.).

We should consider that the SPT is not a supply system in chain format but logistics it is.

In case of the inferior chain of logistics, for example, Spain could be the origin of the material, and then a forwarder has to manage the material, has to make the exportation, customs, and commerce regulation, and send supplies by two modes of transportation (air or sea). Then a forwarder in Guatemala should cover the domestic importation and satisfy commerce regulation of this country.

5. Benefits

Some of the benefits of the new Supply Pony Tail system are:

- Adapt your administration to the concept of classification of your system of supplies.
- Have modern manage of supplies if the system is adapted to computer systems that meet your management needs.
- Adapt your administration to the advances of science and disciplines that apply.
- Update both its operations and its organizational structure to the needs demanded by the globalized economy and the changes to come.

Other benefits are mentioned in the introduction of these papers.

For example, in order to update the concepts, companies may introduce light training courses of the new supply system for personnel of the different hierarchical level to people manage same concepts and to have a better order.

6. Conclusions

The systems used as Supply Chain Management (SCM) are the extended Supply Chain and cover the entire administration of the company, as some software providers say, allowing to plan and manage the resources of all areas of the company: finance, production, project management, quality, maintenance or management, and general administration.

For its part, a warehouse worker is for the first time with the concept "Supply Chain" imagines the different steps or elements of the supply process that you know, linked one after the other like links in a chain.

The concept called Supply Chain (SC) has been used for approximately 30 years, has had a highly dynamic growth, and has been closely linked to the development of computer technology.

In the search for information to differentiate the SC from the SCM, an exploration is carried out, having found that the contents are similar; this research does not locate information on a Supply Pony Tail system.

It is found that the term "Supply Chain Network" is used to link companies with similar interests, but no precision is found on how they are organized or how the network is formed.

According to a large number of disciplines, the existence of computerized information programs is very coarse and related to all types of businesses, including those related to supply or production chains.

The subsystem of the volume of operations shows that the growth of the companies that participate in the system implies the growth of the activities and operations of the Productive Company.

The departmentalization subsystem also reflects growth in all areas of productive enterprises and those of supplier companies and customers.

The growth of the disciplines applied to the Company and its supply represent another degree of complexity to the system. The advance of science involves advances in all existing disciplines plus new ones such as computer science, robotics, and others.

Computer Technology is the cohesion of all the knowledge that participates in the Productive Company and its supply system, mainly due to a large amount of information it handles, such as the speed with which it is processed, as well as the process of algorithms and mathematical operations with, particularly high speeds. This results in a large number of computer programs, which also add value and complexity to the system.

Globalization is another factor that adds complexity to the system, reaching a total and definitive political momentum in the 80's when the United States and Great Britain declare the entry of the economic system called Neoliberalism worldwide, consisting in separating government institutions companies of the states, and elimination of protectionism of the internal market; as well as the privatization of state enterprises, opening of international free trade and the abolition of tariffs.

In 2017, Donald Trump, president of the USA, initiates a change in trade policies by that country starting in 2018, in which it re-establishes tariffs on products from China and other countries of the world, including its Western trade partners.

The subsystem of commercialization of computer programs, in addition to being recent, has had an extraordinary growth with respect to others, and its magnitude is such that there are countless programs applicable to the supply system.

Finally, the Supply Pony Tail has been suggested to re-order the Supply System.

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