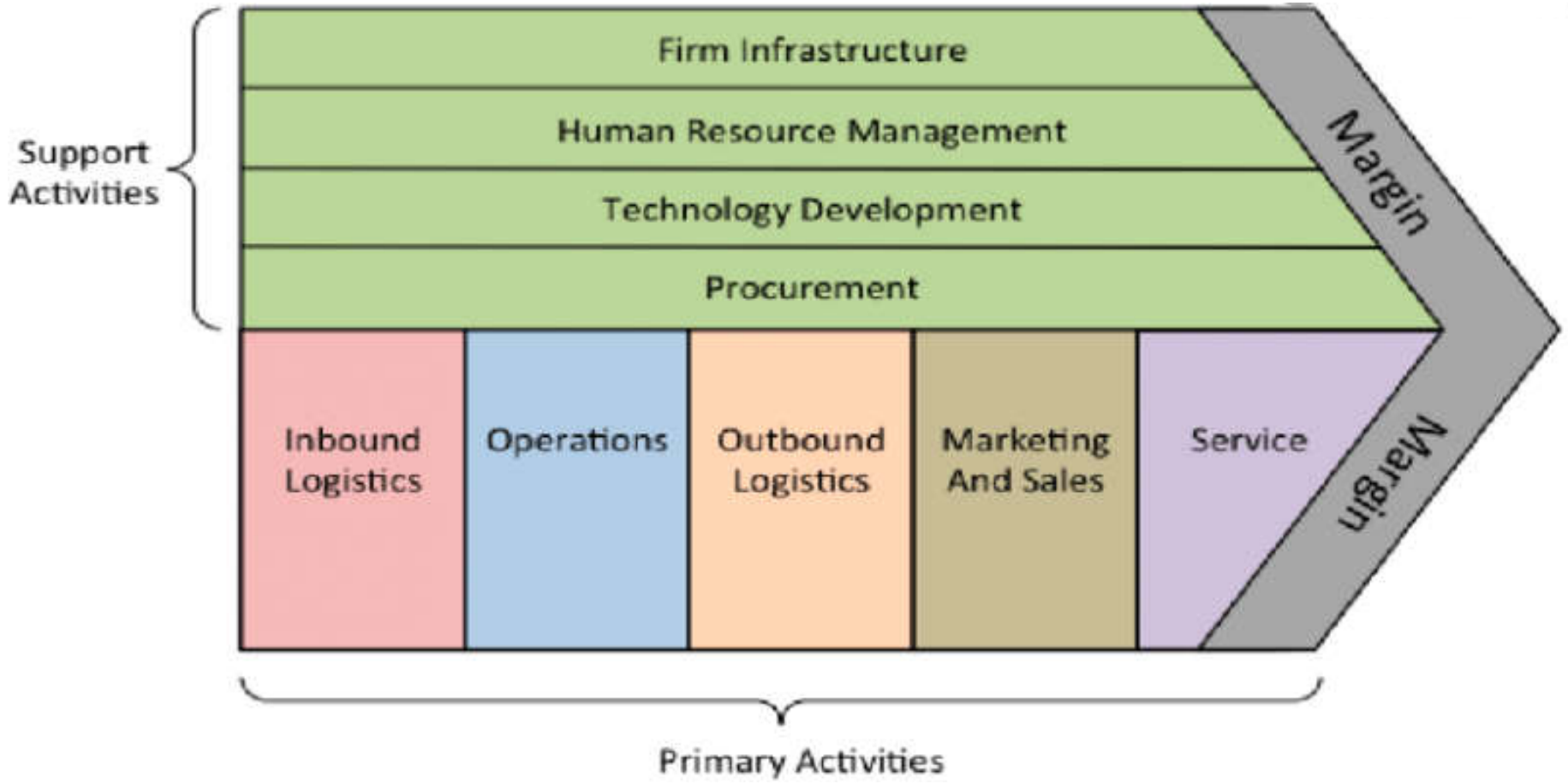
Supply chain

ACTIVITIES THAT GENERATE VALUE

- Primary activities
  - Inbound and outbound logistics
  - Operational activity or operations or production
  - Marketing and sales
  - Services
- Support activities
  - Supplying
  - The development of technology
  - Human resource development
  - Infrastructural activities

Porter's value chain o supply chain



Primary activities

1. **Inbound logistics** or management of input warehouses; the activities included concern the supply of raw materials, parts, components, semi-finished products as well as the management and control of warehouses and the planning and management of transport;
2. **production**; this activity includes factory production, assembly processes, machinery maintenance, testing, printing and plant management;
3. **outbound logistics** includes the storage and physical distribution of finished products, the management of delivery carriers, order processing, shipment scheduling;
4. **marketing and sales**; it includes the management of the sales force, the control of distribution channels, advertising, promotion and pricing;
5. **accessory services to customers**; it involves the provision of services designed to improve or maintain the value of the product or installations, repairs, training, supply of spare parts and accessories

Support activities

1. **Procurement** refers to the purchase of inputs used in the value chain of the company, that is raw materials, spare parts and other consumables as well as slow-cycle goods such as machinery, plants, office machines and buildings;
2. **The development of technology** or research and development; it includes all the development and management activities of the company's technological assets;
3. **Human resource management** includes activities such as research, recruitment and selection of personnel, training and education, the development of remuneration policies and the mobility of all types of personnel;
4. **Infrastructural activities**; include activities such as general management, planning, administration, finance, public relations with entities and quality management.

Drugs and supply chain

- the Supply Chain is the keystone of global economies for new business processes in the Pharmaceutical sector. The evolution of the market and the sudden change in the generation of demand in the sector has given rise to the need for a **new business model** and **new application tools**.
- We are faced with a request for immediate availability of certain components: to cope with the development of a reliable product, an integration of information flows between all company processes is necessary.
- **Dynamic Supply Chain** management is the ideal solution: thanks to the set of information and targeted tools that are able to integrate efficiently and optimized for the production chain, the sector is able to improve the level of service with the necessary quantities at the right cost, by controlling the time factor. It is clear that data evaluation is central in this phase of the evolution of the Pharma 4.0 industry. The plus of companies must be the efficient ability to manage the information flow.

Drugs and supply chain

The production excellence of Made in Italy,

in addition to knowing how to do,

it is linked to innovative technologies

that apply:

- the quality of the productions,
- the flexibility it can guarantee,
- process efficiency,
- compliance with a complex set of regulations governing drug distribution,
- environmental sustainability.

Drugs and supply chain

The logistic operators of the sector have a key role in this process of digital revolution, as supply chain managers of many pharmaceutical companies and the link between the major players in the supply chain: industry, intermediate distribution, and finally the consumer / patient, i.e. pharmacies, hospitals, nursing homes and local health units.

Value-creating activities

- Primary activities are 5 and are:
  - Inbound and outbound logistics
  - Operational activity or operations or production
  - Marketing and sales
  - Services

Logistics

Logistics is the set of organizational, managerial and strategic activities that govern the flows of materials and related information in the company from the origins at the suppliers to the incoming warehouse and from the outgoing warehouse to the delivery of finished products to customers.

It consists mainly of two activities: transport and storage.

Logistics: strategic objectives

The strategic objectives of logistics are cost reduction and service improvement.

The **cost reduction** concerns the strategy of minimizing the variable costs associated with the handling and storage of materials which can therefore concern:

- a reduction in transport costs;
- a reduction in storage costs.

The **service improvement strategy** aims to increase the level of service offered, through:

- an increase in the level of storage (through greater completeness of orders, reduced order fulfillment times, better and faster billing procedures);
- an increase in the level of transport (by increasing the reliability and number of alternatives for deliveries, better condition of the goods at the time of deliveries).

Logistics: operational objectives

As part of the most relevant operational activities of the storage activity, we note:

- inventory management;
- the material handling.

As part of the most relevant operational activities of the transport activity, we note:

- choice of the type of transport;
- the size of the shipment.

Logistics: outsoucing

Logistics can be a simple or complex activity in relation to its use within the analyzed company. Depending on the way the value chain is developed, this activity may be highly developed, underdeveloped or even outsourced.

Outsourcing **or** ***third party logistics*** is the process by which companies permanently assign, through contracts, the operational management of logistics to external suppliers.

Innovation and logistics strategy

Some examples of innovation in the field of logistics strategy and which constitute a new managerial concept or philosophy, are:

- just in time, which was born as an industrial technique but became a real company philosophy;
- total quality management;
- supply chain management;
- e-commerce.

Just in time

Just in time was born as an industrial inventory management technique, adopted in some value-generating activities including logistics and production. This inventory management methodology has overcome the old production method (push logic) of finished products that were produced and placed in the warehouse waiting to be sold with a new method (called pull) that attracts the products requested by customers directly from the market.

Just in time uses methods aimed at improving the production process, trying to optimize all the phases upstream of the various warehouses, both for the warehouse of raw materials, semi-finished products and for that of finished products in order to reduce stocks as much as possible, trying to better coordinate waiting times, acquisitions of new materials / semi-finished products.

Over time, this philosophy allows for a reduction in storage costs, management costs, as well as warehouse loading and unloading costs.

Total quality management

Total quality management means the involvement of the whole company in achieving the corporate mission through the active participation of employees and the reduction of waste with a view to optimizing efforts.

This approach can strengthen the competitive advantages of the company through:

• intervention on the company system through compliance with the requirements set by the ISO 9000 standards and through documentation and continuous quality monitoring;

• the intervention on culture, even more complex, with the aim of pursuing certain values such as greater attention to customer requests and interests, to the responsibility of collaborators and the continuous improvement of the production process with statistical control methods.

Total quality control is, however, an approach that goes to detect not only the quality of the products / services offered by the company but also on all business systems, i.e. on management, strategies, organization, management, etc. The complete pervasiveness of total quality management makes it possible to achieve or improve one's competitive advantage.

Total quality management in health care

- Medical and clinical audit

Clinical audit is a process that has been defined as a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change

- Quality assurance - continuous quality improvement

Quality assurance (QA) is a way of preventing mistakes and defects in manufactured products and avoiding problems when delivering products or services to customers; which ISO 9000 defines as "part of quality management focused on providing confidence that quality requirements will be fulfilled". This defect prevention in quality assurance differs subtly from defect detection and rejection in quality control and has been referred to as a *shift left* since it focuses on quality earlier in the process

- credibly professional

They are tools designed primarily to help the physician make decisions and to improve treatment outcomes. they are also tools for evaluating good practice and professional behavior in clinical practice

- guidelines and evidence based medicine

Supply chain management

Supply chain management can be understood as the set of all innovative strategies aimed at improving certain value-generating activities for the company, including logistics.

This managerial management philosophy that guides the members of the supply chain towards the creation of value for the customer, represents the process of designing, implementing and progressing company systems and value-generating activities in order to create and distribute better products and services.

Supply chain management can be defined as "a systematic and strategic coordination of traditional business functions and tactics first within each company and then along the various members of the distribution chain with the aim of improving the long-term performance of individual members and the entire chain".

It includes the management of organizations and / or individuals involved in the flow of products and services to the end customer, including "reverse logistics", or those flows of return products, for example returned because defective or other than order, for the purpose of total improvement through the total exploitation of sources, recycling, replacement and disposal.

e-commerce

E-commerce is a new mode of commerce based on commercial transactions of electronic flows of information and funds.

This cultural innovation, based on the advent of the internet, allows all companies to interact directly and quickly at low cost with other companies.

In the context of transport, for example, a carrier can establish an online contract directly with companies, without making use of the collaboration of agents. A company can sell directly to a remote customer, without going through retailers or sales agents. By skipping all these steps, the transport costs, included in the final price, due to the movement of the goods to retailers and agents are considerably reduced.

The website that can arise, as an online showcase, allows some further logistical advantages, including:

- serves as a collector of orders;
- replaces the warehouse, as it acts as an online warehouse;
- prepares a channel dedicated to online customers.

Innovation and operational logistics: warehousing - storage

Among the innovative processes that can be included in this storage activity we mention:

- just in time, as a management technique;
- the Kanban;
- the MRP - Material requirements plannings;
- the ERP - Enterprise requirements planning;
- the vendor managed inventory.

Kanban

Kanban, an operational methodology used to circulate information more quickly within the company by eliminating the need for complex production scheduling systems.

Kanban is therefore a technique that allows the Pull Flow of materials, or the implementation of the just in time philosophy. Kanbans are represented by tags that contain the information necessary to produce, purchase or move components and materials in the production system.

Kanbans can be divided into two main types, here we are only interested in handling or transport kanbans that are used to move components and materials towards a production process.

The information that can generally be found on a kanban tag is the code of the component concerned, the supplier of that component, the customer who requests it, the time available for restoration, the quantity to be restored and the container to be used.

Example of kanban in drug management

The Zucchi Clinical Institutes, a structure belonging to the San Donato Hospital Group, the first hospital group in Italy, consist of two hospitals and a clinic with 429 accredited beds and approximately 750 employees and collaborators. In November 2009, a project was launched to revise the methods of managing drugs and hospitals in both centers, which ended in May 2010.

The objectives of the project were to:

- Reduce the average level of stocks and consequently of storage spaces.
- Rebalance the distribution of stocks for drugs and aids by reducing the risk of stock outs.
- Simplify reordering and inventory checks.

The activity, conducted with the support of Healthcare Management, adopted the Lean approach for inventory management.

In general terms, what has been achieved can be summarized in three steps:

- Analysis of the process at the current state ("actual state") and re-design in a pull logic (in order to reduce stocks and make supplies in the minimum necessary quantities).
- Visual system for detecting needs, by introducing a "kanban" system ("tag").
- Construction of an orderly and standardized mode in the arrangement and storage of drugs in the warehouse and in the departments, capable of promptly highlighting the emergence of a need ("5S").

The implementation of the new management model was achieved through a structured training program (classroom and field activities) aimed at people who within the structures deal with the management of drugs with different roles (central pharmacy, room managers, nurses department, administration and control).

Involvement was a fundamental element for the success of the project, having greatly reduced resistance to change and thus facilitating the achievement of the expected results. In quantitative terms, the results achieved were a 20% reduction in the value of the stock and a 30% recovery of the time that the ward staff dedicated to the management of drugs and aids.

Descrizione prodotto				ID prodotto	
Cartellino Kanban				**1/3**	
Quantità	250	Lead time	6 giorni	Data de-ll'ordine	
Fornitore	Soluzioni industriali SA			Data di consegna	
Richiesto da	G. Rossi		Cartellino 2 di 3		
			Posizione	Scaffalatura R8	

Material requirements planning and enterprise requirements planning

Material Requirements Planning (MRP) is considered an optimal technique for calculating material requirements and in particular deals with planning production and purchase orders, managing the warehouse, taking into account the demand market for the product / service, production times, components of the bill of materials (BOMs) and warehouse stocks.

MRP systems are very useful for companies that have very complex BOMs and / or very long supply lead times.

The Material Requirements Planning logic is oriented towards the reduction of stocks. The MRP is used for the planning of production orders.

ERP, Enterprise requirements plannigs is a further evolution of Material requirements plannings 2, or the technical one capable of calculating the company's total information needs.

The "bill of materials" represents the set of all materials and components that are needed to be able to produce a unit of a product. The bill of materials is often represented "as a tree" as it is made up of several levels that also allow you to know the composition of the semi-finished products that are used as components of the finished product. It must contain specific information on the various components including the number of them, weight, code, etc.

Bill of materials – examples

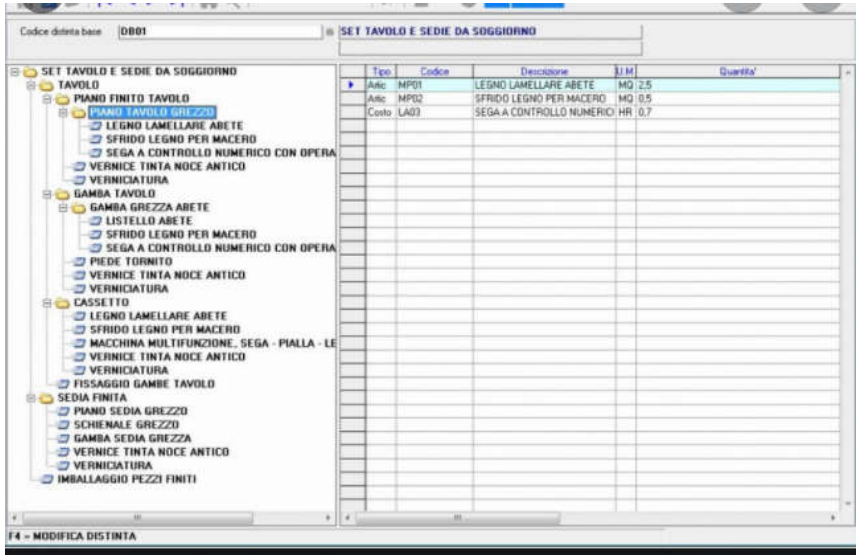
Bill Of Materials

Item #	Quantity	Part Ref	Value	Description	Mfg	Mfg Part Number
1	1	C1	100 nF	100 nF, 275 VAC, Film, X Class	Kemet	R46KI310000M1K
2	1	C2	56 µF	56 µF, 400 V, High Voltage Al Electrolytic, (35 mm x 12.5 mm)	United Chemi-Con	EPAG400VB56RM12X35LL
3	1	C3	1.8 nF	1.8 nF, 1 kV, High Voltage Ceramic	Panasonic	ECK-D3A182KBN
4	1	C4	0.47 µF	0.47 µF, 16 V, Ceramic, X7R	TDK	C1608X7R1C474K
5	1	C5	22 µF	22 µF, 10 V, Electrolytic, Gen Purpose, 1040 mΩ, (11 mm x 5 mm)	United Chemi-Con	KME10VB22RM5X11LL
6	1	C6	2.2 nF	2.2 nF, 250 VAC, Ceramic, Y Class	TDK	CD12-E2GA222MYNS
7	1	C7	2700 pF	2700 pF, 50 V, Ceramic, C0G	TDK	FK18C0G1H272J
8	1	C8	390 pF	390 pF, 100 V, Ceramic, C0G	Epcos	B37979N1391J000
9	1	C9	22 pF	22 pF, 1 kV, High Voltage Ceramic	Panasonic	ECC-D3A220JGE
10	1	C10	10 µF	10 µF, 50 V, Electrolytic, Gen Purpose, 1050 mΩ, (11.5 mm x 5 mm)	Panasonic	ECA-1HHG100
11	1	C11	3300 µF	3300 µF, 16 V, Electrolytic, Super Low ESR, 15 mΩ, (35 mm x 12.5 mm)	United Chemi-Con	EKZE160ELL332MK35S
12	1	C12	680 µF	680 µF, 25 V, Electrolytic, Super Low ESR, 23 mΩ, (20 mm x 10 mm)	United Chemi-Con	EKZE250ELL681MJ20S
13	1	C13	22 µF	22 µF, 50 V, Electrolytic, Super Low ESR, 340 mΩ, (11 mm x 5 mm)	United Chemi-Con	EKZE500ELL220ME11D
14	1	C14	330 pF	330 pF, 50 V, Ceramic, C0G	TDK	FK18C0G1H331J
15	4	D1, D2, D3, D4	1N4006	800 V, 1 A, Standard Recovery, DO-41	Vishay	1N4006
16	1	D5	1N4937	600 V, 1 A, Fast Recovery, 200 ns, DO-41	Vishay	1N4937
17	1	D6	1N914	100 V, 0.3 A, Fast Recovery, 4 ns, DO-35	Vishay	1N914
18	1	D7	SB380	80 V, 3 A, Schottky, DO-201AD	Vishay	SB380
19	1	D8	MUR120	200 V, 1 A, Ultrafast Recovery, 30 ns, DO-41	ON Semiconductor	MUR120
20	1	F1	1 A	250 VAC, 1 A, Radial TR5, Time Lag Fuse	Littelfuse / Wickmann(R)	37411000410

English BOM

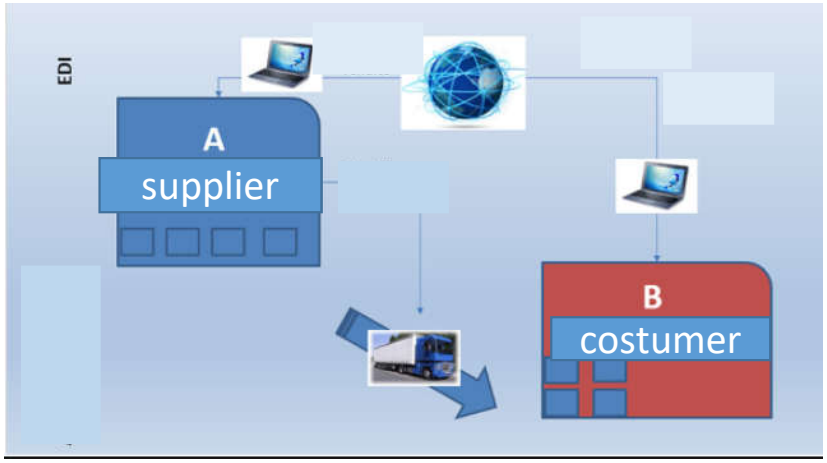
Italian BOM

VOCE	FASE DI LAVORAZIONE	QUANTITÀ	UNITÀ DI MISURA	COSTO PER QUANTITÀ	COSTO MACCHINA	COSTO MANODOPERA	TOT CO
ia prima A	Acquisto su ordinazione presso terzi	0,6	mt	5,2			3,
ia prima B	Acquisto su ordinazione presso terzi	1,3	kg	0,2			0,
sorio 1	Materiali interni officina	2	pezzi	1,35			2
zione esterna 1	Lavorazione presso terzi	1		1,6			1
zione interna 1	Lavorazione per conto proprio				0,55	3	3,
zione interna 2	Lavorazione per conto proprio				0,55	1	1,
						TOTALE COSTO AL PEZZO	12



The vendor managed inventory

Il *vendor managed inventory* is a company policy that consists in transferring from the customer, whether it be wholesaler or retailer, to the manufacturer the issuance of orders based on the demand surveys made by the distributor customer and transmitted to the manufacturer periodically. This allows the manufacturer to have greater control over the order cycle and produces benefits in terms of management efficiency due to the reduction of stocks and inventory management costs.



Innovation and operational logistics: warehousing – material handling

The main operational activities relating to warehouse material handling concern internal warehouse transport, storage, fractional picking, sorting or grouping, addressing, feeding, positioning.

Among the innovative processes that can be included in this storage activity we mention:

- ✓just in time, as a management technique;
- ✓the RFId, Radio frequency identification;
- ✓the automatic warehouse.

RFId

RFId, *Radio frequency identification* is a storage technique that manages RFId tags or transceivers that, when interrogated via radio, reply and identify the object on which they are affixed. This process reduces errors in withdrawals and provides reliable identification.

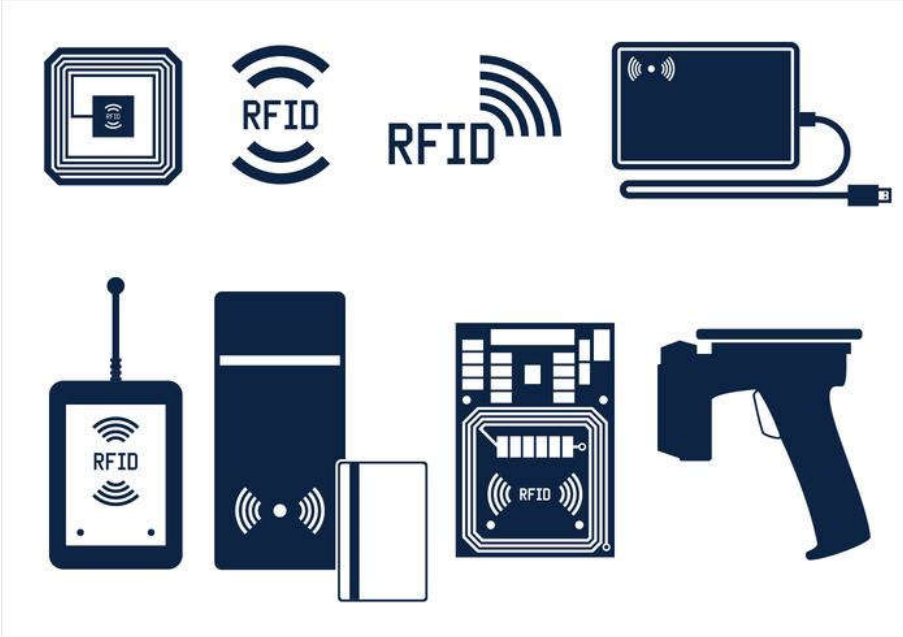
The technology makes it possible to read several labels at the same time (i.e. the tags placed on the boxes) and to know in real time the warehouse stocks in order also to reorder the products / components that are out of stock.

RFId tags can replace barcodes, as they have additional features, including automation of reading, the ability to read the tag without eye contact, the ability to rewrite the code, etc. The tags are useful as they uniquely identify the handling units

How does an RFID tag and label reader work?

RFID technology is based on the propagation of electromagnetic waves in the surrounding environment, and in this way they allow the automatic and remote detection, both in motion and static, of a large number of objects, people or animals. A bit like with the radio, with RFIDs there are high and low frequencies. We can also distinguish passive rfid tags, which operate at both low and high frequencies, and then active rfid tags, which can operate at longer distances, equipped with long-lasting batteries.

The operation of Rfid labels is very simple to analyze and to understand it you need to understand what are the parts that make up the different labels, in order to have a general overview. Each label consists of a transponder, which on some occasions is also referred to as a tag (in English "label", in fact): this is the identifying part of the label itself, that is, that goods are assigned to a specific radio impulse.



The automatic warehouse

The **automatic warehouse**, on the other hand, is a plant, a building, used for the storage of goods and composed of four parts: the electronic system, that is the system that through a computer and an FMCS software, or flow material control system, imparts and performs the operations; the shelving; the stacker crane, that is a robot that moves by means of a rail on the ground and an elevated one and that is able to deposit and pick up the goods from the shelving; the head - also known as handling or the set of automatic conveyors, crossings, rollers and chains that allow you to extract the load units.

The automatic warehouse

The automated warehouse is particularly used in companies with complex logistics. Vertical automatic warehouses allow you to:

- recover space (especially on the ground);
- save time;
- simplify picking, with automated extraction;
- eliminate risks for operators;
- increase the safety of goods;
- increase inventory control thanks to automated control.

Innovation and logistic system - transport

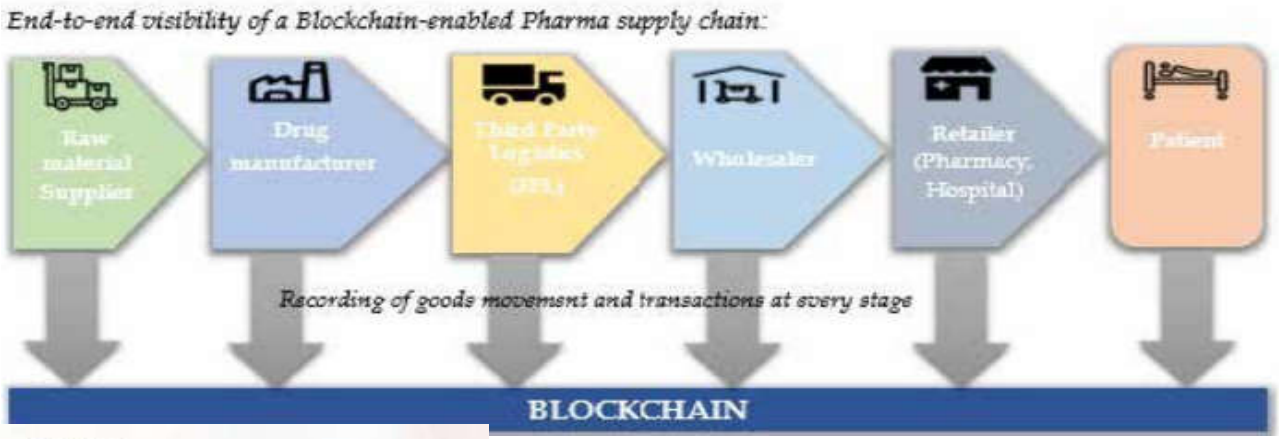
The main innovative solutions in the transport sector concern:

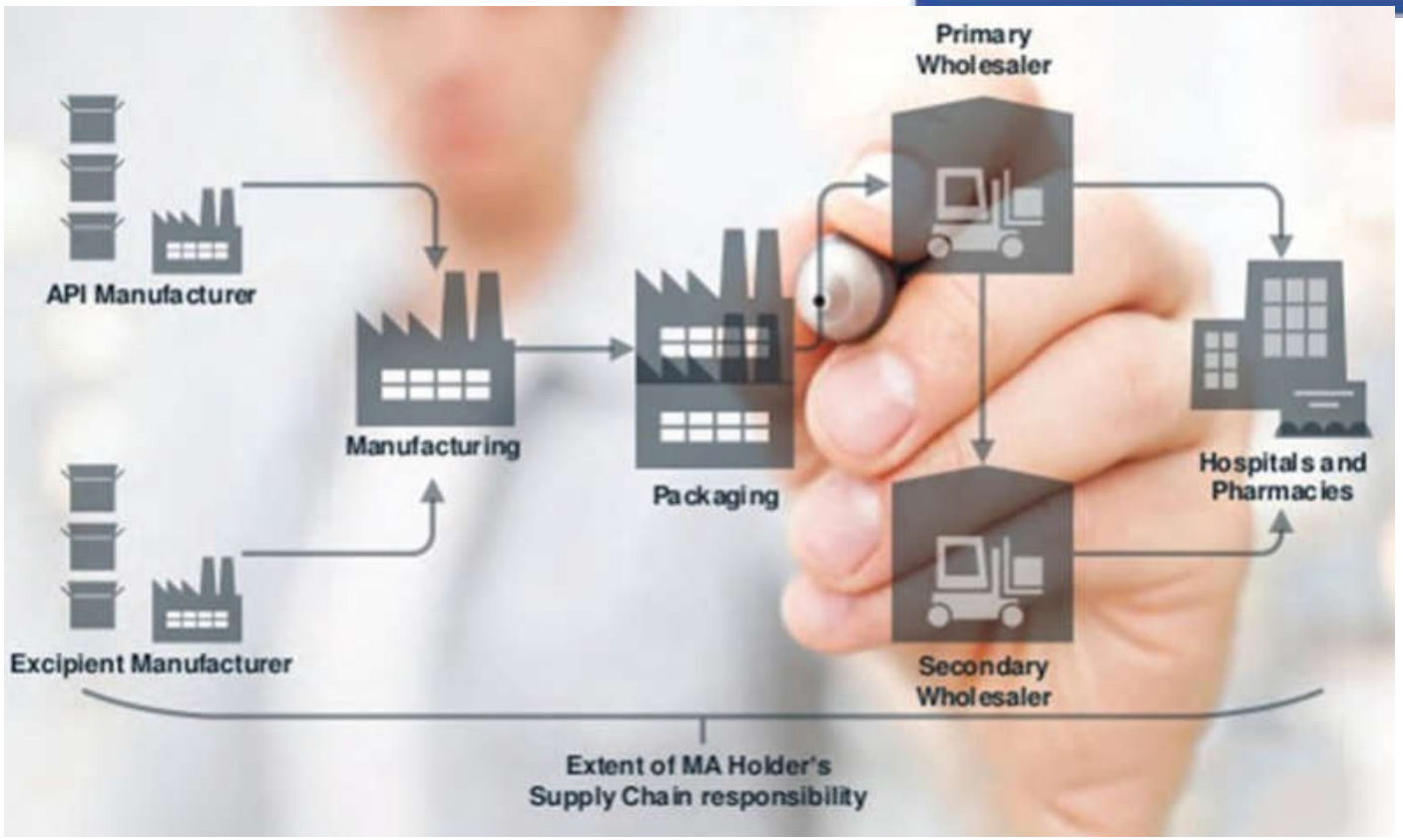
- ***visibility systems***, i.e. technological platforms that make it possible to obtain information on the progress of transport from taking charge of the supplier to the final delivery point (systems for obtaining real-time information on localizations - tracing and archiving and retrieval systems information - tracking, mostly based on global positioning solution - Global Positioning Systems, GPS);
- ***night deliveries and control towers***, in order to monitor the fleet of vehicles and, if necessary, redirect loads; all this allows economic and environmental benefits but also economies of scale, which can be achieved by allowing logistics service providers to plan deliveries for multiple customers at the same time;
- the ***use of vehicles of appropriate size*** (small in urban areas) and hybrid vehicles, with lower consumption and environmental impact; advanced technological improvements in recent years concern, for example, the use of new materials to reduce vehicle weight, greater aerodynamics, better engines and transmissions, more efficient tires and accessories;
- *cross-docking*, i.e. the technique of unloading goods from a means of transport upon arrival in a trading center, such as a port or freight terminal, and of immediately loading such goods on departing vehicles avoiding storage, this technique represents an important tool for the compression of lead times and as part of the achievement of the just in time philosophy;
- FFA (Field Force Automation) tools such as smartphones and advanced palmtops to update the delivery status or to manage the invoicing of goods;
- the application of ***FRId tags*** on pallets.

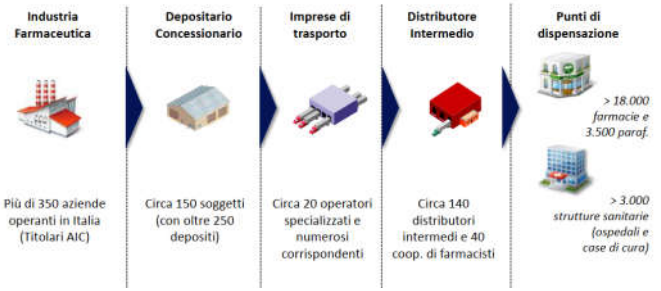
Elements of pharmaceutical logistics

- Mapping of actors: roles and relationships in the supply chain
- quantification and characterization of logistic flows
- determinants of distribution models and outsourcing choice
- success factors, critical issues and future scenarios

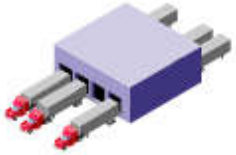
Actors mapping







Some example of companies involved in Pharmaceuticals



pharmacies and corners

hospitals and nursing homes

abbvie

AstraZeneca

Chiesi

BAYER

ITALFARMACO

Lilly

Pfizer

RECORDATI

Roche

SANOFI

TEVA

COLUMBUS LOGISTICS

DHL

neologistica

SILVANO CHIAPPAROLI LOGISTICA

STM Group Logistica Integrata

VIVISOL Home Care Services

XPOLogistics

B-LOG BARBIERI LOGISTICS GROUP

EDF ELIRODIFARM

pHse

UNIVEX

GRUPPO COMIFAR

FarmaCentro

UNICO

unifarm

Industria farmaceutica

AstraZeneca is a Swedish-British biopharmaceutical company operating in the scientific research, development and marketing of prescription drugs for cardiovascular, metabolic, respiratory, inflammatory, autoimmune, cancer, infections and disorders of the central nervous system.

Main products:

The company was officially born on 6 April 1999 from the merger of two pharmaceutical groups:

Astra AB, a Swedish company based in Södertälje, established in 1913 and specialized at the time in gastrointestinal, cardiovascular, respiratory and anesthesia drugs.

Zeneca Group PLC, an English company with headquarters in London, born in 1993 from the split into three different companies of the business of ICI - Imperial Chemical Industries, which had been operating since 1926; the company specialized in oncological, cardiovascular, respiratory, central nervous system and anesthesia drugs; it also had a branch specializing in the production of agropharmaceuticals.

Pharmaceutical industry

- Abbvie
- Bayer
- Chiesi
- Italfarmaco
- Lilly
- Rercordati
- Roche
- Sanofi
- Teva

EXAMPLE OF DEPOSITARY DEALER

LIFE SCIENCES E HEALTHCARE

we care about connecting, caring, complying with regulations and innovating.

The life sciences and healthcare sector is experiencing a rapid transformation of the Supply Chain, a greater need for efficiency, differentiated paths to reach markets and access to new geographical areas and is facing the challenge of introducing digital solutions for the Supply Chain.

Transport companies

Univex

A law provides for medicines to travel at a temperature between 2 and 8 degrees. It is not difficult to intervene, it would take very little: a microchip, to check the temperature on the transport vans, and scrupulous pharmacists who, upon delivery, check that everything is in order.

Intermediate distributor example

Farmacentro Servizi e Logistica

The Cooperative of Pharmacists of Central ItalyFarmacentro Servizi e Logistica was born on 1 January 2009, from the merger of the two historic Cooperatives SAF Jesi and UMBRAFARM Perugia.

It was an equal merger between two "twin" companies that concluded a process that began about 2 years earlier at the behest of the Presidents Sandro Cerni (Jesi) and Claudio Falini (Perugia), with the support of their respective Boards.

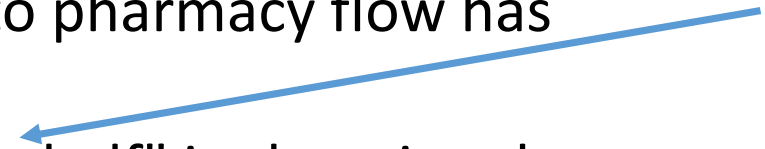
Since June 2018, the President of Farmacentro Servizi e Logistica is Stefano Golinelli, assisted by a Deputy Vice President Claudio Falini and by a Vice President Ruggero Golinelli.

Farmacentro Servizi e Logistica operates in the field of intermediate distribution, fully respecting the founding values of Cooperativism: lack of profit, and therefore reinvestment in Members with the consequent possibility of the latter being competitive with their customers-patients, and solidarity among the Members, a fundamental element to ensure the same standards of commercial and service quality to small rural pharmacies as well as to large urban pharmacies. Furthermore, another fundamental characteristic of Farmacentro Servizi e Logistica is that linked to the local roots and the consequent creation of jobs, about 170, a matter noteworthy when it is emphasized that the merger not only did not question the on the contrary, creating further employment development.

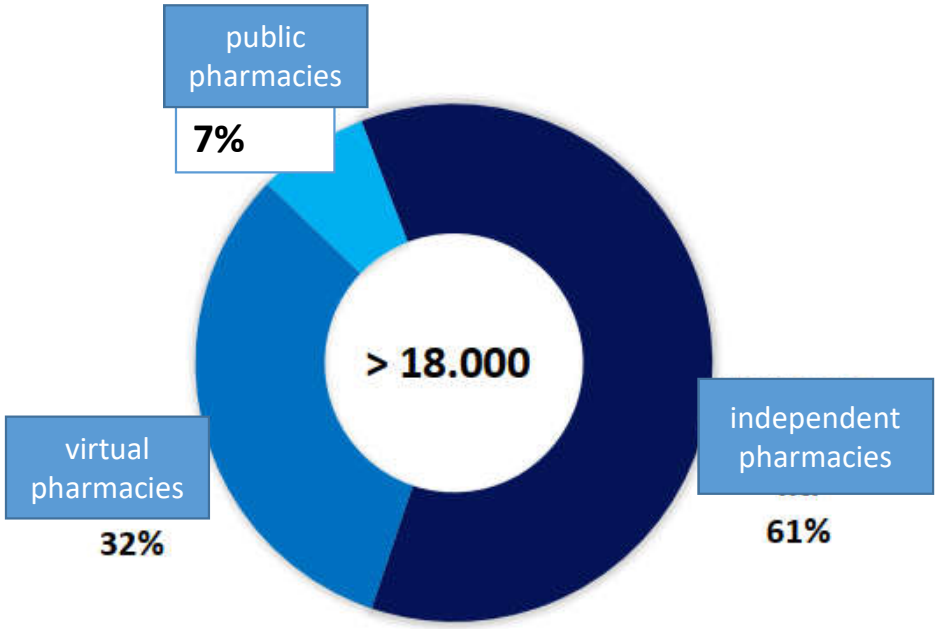
Needs in pharmaceuticals

- quantification and characterization of logistic flows
- in the last 10 years the direct to pharmacy flow has doubled
- the advent of "dispensing on behalf" is changing the logics of indirect distribution
- in the hospital channel the need for deliveries with the 2-8 ° C regime is growing

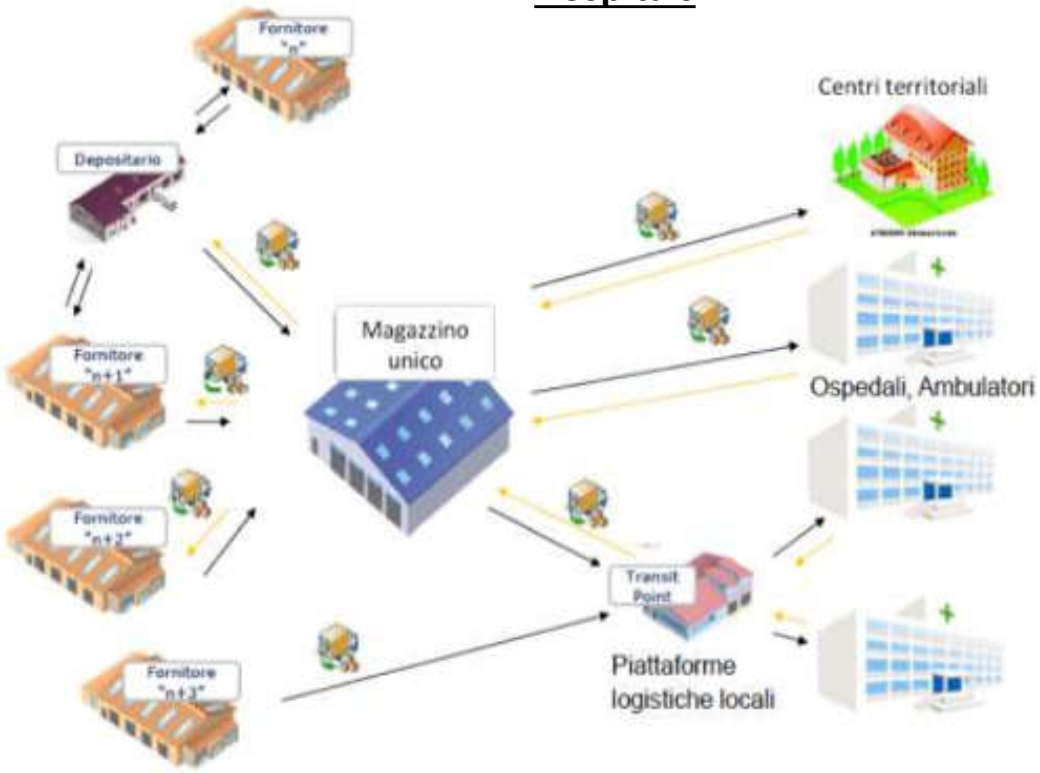
The abbreviation DPC is the abbreviation for "dispensing on behalf". The DPC is a way of dispensing drugs that are purchased directly from the local health authorities and distributed through pharmacies located in the area. With this distribution system through pharmacies open to the public, patients are allowed to collect medicines close to home, without having to go to more distant hospitals each time.



In Italy



Hospitals



Future challenges

monitoring of the cold chain transport

new services offered by distributors, warehouses and transporters

serialization 2025

The serialization of prescription pharmaceutical products is the system that allows you to trace the path of the drug throughout the journey, from the moment of production to when it is purchased by the consumer

supply chain collaboration (vertical integration)

new distribution models in healthcare

Logistics and covid 19

- https://www.biopharma-reporter.com/Article/2020/11/19/COVID-19-vaccine-distribution-Gaps-remain-in-immunization-logistics-and-real-time-tracking-of-vaccine-storage-and-demand

- https://www.supplychaindive.com/news/pfizer-vaccine-supply-chain-BioNTech-fedex-ups-dhl/588784/

- https://www.sciencenews.org/article/covid19-coronavirus-vaccine-last-mile-logistics-pfizer-moderna

Hospital Logistics

For an improvement in hospital efficacy / efficiency, the following are necessary:

- a different management of hospital logistics, starting with a better planning of the reordering of medicines and medical products by health facilities;
- without adequate planning there is a risk of impacting on the efficiency of the logistics system and, in turn, on that of the hospital itself.

Also from this point of view, it would be desirable that the National Health Service (NHS) resorted more to 'distribution on behalf'.

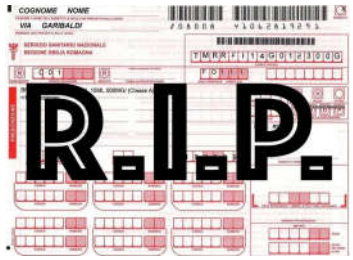
Distribution on behalf - the role of pharmacies

Pharmacies, thanks to their territorial capillarity, can dispense medicines to the patient without necessarily having to go to the hospital to receive them.

Leaning more on 'distribution on behalf' would not only lighten the activity of hospitals, but would be more functional for the patients themselves, since the pharmacy is the only truly proximity healthcare point of reference that citizens have at their disposal.

A particular method of direct distribution is based on an agreement between the Region / local socio-health units / Intermediate Distributors and affiliated pharmacies (distribution on behalf): in this case the drugs are purchased by the local socio-health units / Region but distributed to the patient, on their behalf, by the territorial pharmacies open to the public.

E-commerce and electronic prescription



The dematerialization of medical prescriptions has been a known topic for years, but the Italian healthcare world has always put a stop to the development of similar options.

From this point of view, the measures applied to contain the epidemic have contributed significantly to the digital evolution of the health supply chain.

Of course this is a positive legacy of this crisis, which has facilitated the client-patient relationship with the healthcare world.

How the electronic prescription works

But what is the dematerialized medical prescription and how does it work?

Our doctor's old prescription book has been replaced by a series of electronic prescription numbers (NREs). These unique numbers are provided centrally by SOGEI (Sogei - Società Generale d'Informatica S.p.A. is an Italian company operating in the ICT sector) and provided to doctors via the local socio-health units.

At this point our doctor, instead of writing the prescription by hand and removing a sheet of the booklet, will prescribe the treatment through his PC, directly online, virtually going to detach an NRE. A copy of the NRE information and tax code of the client will be sent to the centralized management system of SOGEI: the tax code will then be validated and all the exemption information calculated with respect to it. All the doctor has to do is fill in the prescription with the prescribed drug and wait for SOGEI to confirm receipt of the prescription by email. A reminder of the prescription will be given to the citizen, showing all the significant information of the prescription.

The citizen, equipped with a reminder, can then go to the pharmacy and pick up the drug. Through the key information, in particular NRE and CF, it will be possible to find the electronic medical prescription, and the pharmacist will be able to close the process by notifying SOGEI of the delivery.

The benefits of the change certainly lie in the fact that now all medical prescriptions can be traced promptly by providing a measure of volumes, and will allow the monitoring of pharmaceutical and specialist expenditure borne by the National Health Service. It is clear that the Digital Transformation is bringing changes not only in private realities, but also in the Public Administration.

Elettronic prescription

Via mail

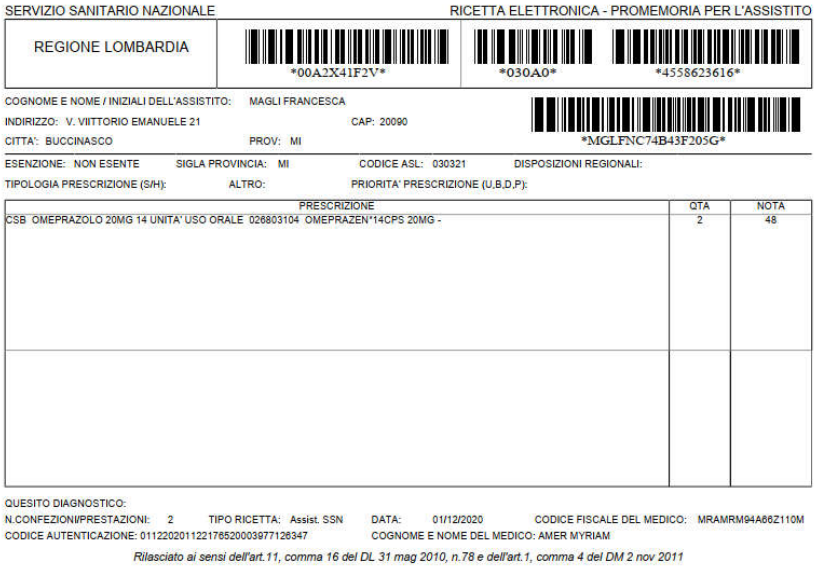
MGLF*

030A0

4558623616

Via SMS

- Lombardy Region ***
  For citizens born on ……. The prescription code 0234578930 is available. Go to the pharmacy with the code and health card.



SERVIZIO SANITARIO NAZIONALE — RICETTA ELETTRONICA - PROMEMORIA PER L'ASSISTITO

REGIONE LOMBARDIA — *00A2X41F2V* *030A0* *4558623616*

COGNOME E NOME / INIZIALI DELL'ASSISTITO: MAGLI FRANCESCA

INDIRIZZO: V. VITTORIO EMANUELE 21 CAP: 20090

CITTA': BUCCINASCO PROV: MI *MGLFNC74B43F205G*

ESENZIONE: NON ESENTE SIGLA PROVINCIA: MI CODICE ASL: 030321 DISPOSIZIONI REGIONALI:

TIPOLOGIA PRESCRIZIONE (S/H): ALTRO: PRIORITA' PRESCRIZIONE (U,B,D,P):

PRESCRIZIONE	QTA	NOTA
CSB OMEPRAZOLO 20MG 14 UNITA' USO ORALE 026803104 OMEPRAZEN*14CPS 20MG -	2	48

QUESITO DIAGNOSTICO:

N.CONFEZIONI/PRESTAZIONI: 2 TIPO RICETTA: Assist. SSN DATA: 01/12/2020 CODICE FISCALE DEL MEDICO: MRAMRM94A66Z110M

CODICE AUTENTICAZIONE: 011220201122176520003977126347 COGNOME E NOME DEL MEDICO: AMER MYRIAM

Rilasciato ai sensi dell'art.11, comma 16 del DL 31 mag 2010, n.78 e dell'art.1, comma 4 del DM 2 nov 2011

E-commerce, logistics and covid-19

"Some sectors that have collapsed - such as airlines, tourism, catering and public transport - are being replaced, in the current contingency, with new areas of demand, represented by online shopping and the so-called" last centimeter " (the last mile is that of the supermarket, while the last centimeter is the one that takes the delivery home)». With the pandemic, the sharing Economy has also been hit hard, and to cope with the crisis has sought alternative solutions: someone, such as the startup GoVolt, has moved from dealing with mobility in sharing (scooters and scooters) to food delivery where the means that deliver basic necessities at home.

Adapted from: L'Economia, «La trasformazione dei trasporti e della logistica e le soluzioni post Covid-19» di Emily Capozucca Novembre 2020

Multichannel - online in pharmaceuticals

Lastly, a special mention to multi-channel. Manufacturers and distributors find themselves serving a variety of different channels and this entails a considerable commitment and growing specialization for the logistics operator. The online channel therefore also joins the traditional channel, in which logistics plays a key role: speed in implementation, cost efficiency, visibility of the entire supply chain, flexibility and integration are the basic requirements for a successful e-commerce.

The pharmaceutical sector also faces a multi-channel model, albeit to a lesser extent than other industrial sectors. Online in the pharmaceutical sector is not yet established, since it must naturally comply with the regulatory constraints of the sector, but it has a strong potential for development for the future.

Production

It has become evident that the Supply Chain is based on continuous adaptation between the demand and the **Production Capability** that takes into account the supply time and transformation time into the product so as not to create fluctuation problems that can lead to blocks along the supply chain.

In the design and industrial production of the product, collaboration and involvement of the warehouse is the starting point: companies must optimize the supply cycle in relation to **the supply chain of raw materials and semi-finished products**, optimize internal stocks, calculate and optimize times of the productions.

Production - serialization

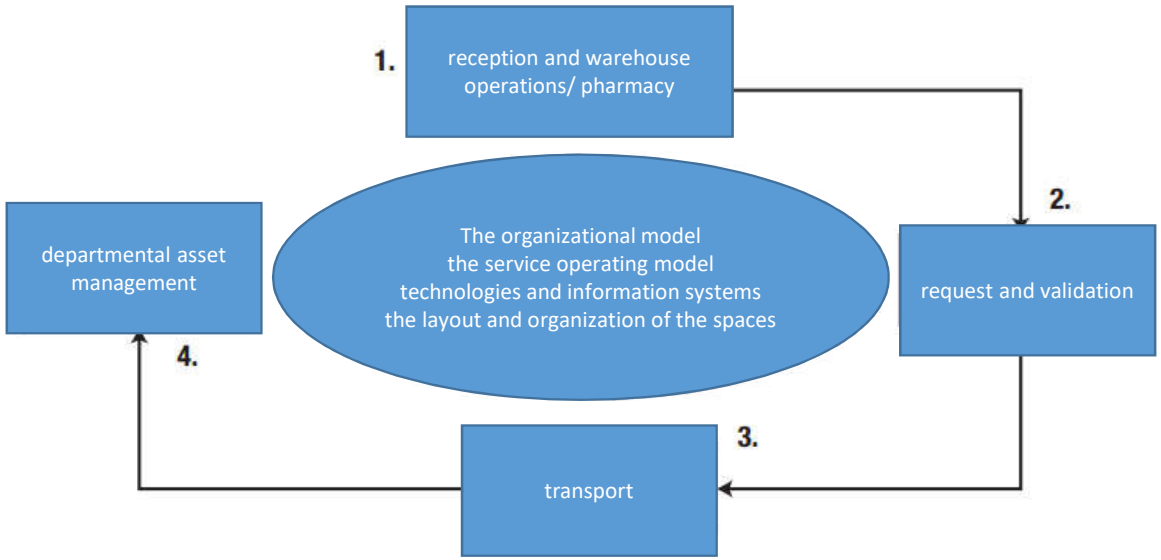
Another phenomenon that is impacting the digital transformation process of the pharmaceutical industries is the so-called “serialization”. This provides that the manufacturer code, product code, serial number, lot number and expiry date are shown on the box of each prescription drug. This information must be generated at the time of drug production and verified before dispensing to the patient, in order to verify upstream and downstream that all products integrate safety features. The measure was imposed in the countries of the European Union with Directive 2011/62 / EU (known as the "*Falsified Medicines Directive*", Fmd) which entered into force on February 9, 2019.

Italy, Greece and Belgium, since they already had a “stamped” verification system, they enjoy a *grace period* of six years, but only for their internal market. It should be remembered that Italian companies export 80% of their production.

Logistic system design in a healthcare organization

In the logistics system of a healthcare company we find four relevant elements:

- The organizational model
- the service operating model
- technologies and information systems
- the layout and organization of the spaces



Adapted from:
Riprogettare la logistica nelle aziende sanitarie: esperienze a confronto
di Giuliana Bensa, Isabella Giusepi, Stefano Villa

Hospital Supply chain