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TESI DI LAUREA

DIGITALIZATION AND RESILIENCE IN TIMES OF COVID-19: AN EMPIRICAL RESEARCH ON FREIGHT FORWARDING COMPANIES

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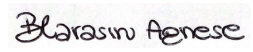

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1. Introduction

On December 31, 2019, Covid-19's world pandemic began its dramatic spread. The emergence of this outbreak was not only ruthless from a humanitarian perspective, since it provoked a considerable amount of contagious diseases and fatalities in an extremely brief time frame, but it also triggered an irreversible and instantaneous destruction of the world economy. The last-mentioned was called upon to tackle, employing exclusively its own assets and facilities, sweeping alterations to the conventional operative paradigms on which it was founded and practised. As a direct consequence, worldwide organisations were forced to immediately embrace contingency policies to guarantee the sustainability of their activities in a highly volatile and ambiguous environment.

In the middle of the new global emergency, many economic actors devoted considerable interest and attention in the elaboration of instant papers to capture and explore the impacts, challenges and opportunities Covid-19 has delivered, and will continue to deliver, to forwarding enterprises throughout the globe. In depth, they underlined two entirely opposite faces of the same coin. On one hand, they emphasised the negativity of the phenomenon in the sense of an instant drop in the demand, a reduction in the liquidity and managerial and operational constraints (Cascetta et al., 2020). On the other hand, great importance is attributed to the positiveness of the coming of this socio-economic downturn, intended in terms of an energetic push towards all the processes and operative plans that had been stuck for a very long time in the *"to-do list"* of many businesses (Lars, 2020; Jorgensen, 2020; D'Auria et al., 2020; Casali, 2020; Veicoli, 2020; Antonucci, 2020; Scotti, 2020; Pesce, 2020). The acceleration is of crucial relevance as it supports enterprises, in an unstable operating environment as the one left by Covid-19, in the efficient deployment of a powerful capability: resilience (Sneader and Singhal, 2020a). This skill, widely examined and discussed in the current scenario, is very interestingly associated with the digitalization projects, supply chain restructuring plans and diversification strategies (Gastaldi et al., 2020; Sharma, 2020; Perona, 2020).

Motivated by the highly contemporaneity of this unforeseen event and by the determination to develop an empirical research focused on the investigation of such contingencies in the logistics and transport field, this analysis was carried out. This thesis was specifically designed to identify the approaches by which the restrictive regulatory framework and the lockdown of manufacturing activities have disrupted: the profit mechanisms, in terms of price structure, cost and revenue models (*value capture*); the supply of services and the value promise (*value proposition*)*;* the sales channels and the purchasing behaviour of customers (*value delivery*);

and the activities, the skills and the internal business procedures (*value creation*). Additionally, driven by the strong awareness of the pressure that is stifling global supply chains, firmly connected and based on super lean systems, the impact of the pandemic on them was also examined. Finally, the research wanted to focus attention on the managerial challenges imposed by the advent of Covid-19, in order to capture the nuances in the way different economic realities have reacted. Specifically, it was intended to analyse the degree of resilience demonstrated by enterprises and the connection between this ability and three main other factors: digitalization, supply chain reorganization and diversification strategy; in order to discover the role these tactics could have in the present, to efficiently face challenges and in the future, to increase the corporation's capability of being resilient.

The investigation has been developed in two distinct but extremely connected phases. In the first stage a qualitative exploratory analysis has been conducted from March to June 2020. This was addressed to six forwarding corporations and it was implemented by the adoption of a structured interview protocol. In the second step of examination, developed from July to October 2020, a quantitative research was directed. This scrutiny was advanced through the usage of a questionnaire addressed to forwarding firms located in Northern Italy.

In details, the thesis opens providing a thorough literature review of the mostly unknown world of freight forwarding companies, their digital evolution and their features and attitudes in the past and present challenging times. Subsequently, it presents the methodology with which the empirical research was conducted and the consequent results derived; these were divided in the ones that arose from the qualitative research and the one from the quantitative side. Finally, the elaboration closes with a detailed conclusion which also emphasizes the managerial implications, the limitations and some suggestions for further research.

2. Theoretical background

2.1. Discovering freight forwarders

The European Union has observed little knowledge in the field of transport logistics (Topolsek et al., 2018) albeit it is a crucial component of distribution. Most of the costs related to logistics derive from the handling of goods; in particular, several studies state that this amount ranges from 25% to 50% (Lancioni et al., 2000; Swenseth and Godfrey, 2002; ELA/A. T. Kearney, 2004). More in detail, transport logistics includes all the activities related to the transfer of goods along the supply chain, meaning that it is specialized in covering «…full business and operational frames within which the movement of cargo is planned, managed and ultimately carried out» (Button, 2010). Its relevance derives from the provision of high quality, reliable, flexible and punctual services (Perego et al., 2011).

Inside this sub-field of logistics, a great variety of players collaborate (Crainic and Laporte, 1997) to allow the supply chain to work efficiently and effectively. Among these, the freight forwarders play a far-reaching role as «flow orchestrators» (Cattaneo et al., 2015). Despite their centrality and their ability to bring added value to the entire transport logistics sector, the freight forwarders' world is almost unknown to many people. Inspired by the curiosity and by the interest in this current subject it was decided to create this section, totally aimed at deeply analysing, through a literature review, freight forwarders agents.

2.1.1. A brief analysis of the shipping process

To construct a complete framework of investigation and before starting with the discovery of the freight forwarders players, it is helpful to recognize which are the positions that these relevant figures occupy in the traditional shipping process.

As stated by Wagenaar (1992) there are five main categories, composed of different types of actors, that constitute the complete transportation process. Specifically, these groups are categorized according to the roles and the liabilities they typically carry out and respond to in the transportation system, as reported in ***Table 1***.

First of all, the *customer group* is composed of the consigner, also known as the sender, and the consignee, the so-called receiver. These two players are placed at the extreme of the transportation network and they sign the beginning and the end of the cargo movement.

The *organization group* includes players such as freight forwarders, shipping line agents, and fourth-party logistics service providers (4PL) that are in charge of organizing the transport. The performance of the transference can be carried out in different ways, as claimed by Van Oosterhout (2008).

Inside the *physical group* there are those organizations liable for making actual transportation and handling the cargo from the sender to the receiver. They are operationally liable for the modes of transport and the conditions of the goods delivered (Van Oosterhout, 2008). This group is composed of agents as the sea terminal operators, the rail operators, and the third-party logistics service providers (3PL).

Additionally, the *authorizing group* is made of by authorities that are specifically liable for public safety, security, and inspection of compliance with the law. In this category, it is possible to find customs as well as port and inspection authorities.

The latest group, the *financial* one, is responsible for all the financial transactions that can occur between different organizations among the entire path of the forwarding process. For this reason, the main players involved are commonly banks and insurance companies.

Table 1. Actors involved in the shipping process

GROUPS	*ACTORS INVOLVED*
Customer Group	▪ Consigner ▪ Consignee
Organization Group	▪ Freight forwarder ▪ Shipping line agent ▪ Fourth-party logistic service provider (4PL)
Physical Group	▪ Sea terminal operator ▪ Rail operator ▪ Third-party logistic service provider (3PL)
Authorizing Group	▪ Custom ▪ Port authority ▪ Inspection authority
Financial Group	▪ Bank ▪ Insurance company

Source: Personal elaboration from (Wagenaar, 1992)

Thanks to this marked distinction by categories and following the idea expressed by Willis and Ortiz (2004), it is now possible to recognize three different but interrelated sets of activities that govern the whole cargo supply chain: the physical logistics layer, the transaction layer, and the governance layer. Respectively, these layers correspond to the physical, the information, and

the financial flows. Unfortunately, the literature available for a detailed review of the three flows above-mentioned is limited. Hence, it was decided to study these topics taking as principal framework of research the studies conducted by Van Oosterhout (2008) and Hammadi et al. (2018), which analysed the process of shipment utilizing containers. On the report of the latter study the number of activities that constitute the forwarding process, which begins from the shipper and ends to the receiver, is almost 13.

With the primary target to highlight the position of freight forwarders agents among the great variety of players that constitute a forwarding process, the research proceeds focusing the attention principally on the description of the physical flow (***Figure 1***), providing only few characteristics concerning the complex world of the remaining two streams. The analysis of the information and the financial flow requires a deep and time demanding investigation that is, for now, out of our main objective.

Figure 1. Physical flow in the shipping process

Source: Personal elaboration from (Hammadi et al., 2018)

The *physical flow* corresponds to all those activities concerning the physical handling and the actual transport of freight in containers. In detail, during this step, the containers may be empty container load (ECL), full container load (FCL) or, also, less than full container load (LCL). Each of these acronyms refers to different states of containers (Van Oosterhout, 2008). The first process, through which the shipment of freight begins, is the downstream transportation from an initial supply location to a final production and/or assembly point. Once the first phase of production and/or assembly is completed, an empty container is selected and filled with the freight that should be exported. This type of activity is typically carried out in a warehouse located at the manufacturer's plant. At this moment the roles of origin freight forwarders are crucial; in fact, they are engaged by the exporter to manage the process of export, although this situation depends on the terms of trade[1] (Hammadi et al., 2018). In other words, they are

[1] i.e. *Incoterms*: Acronym standing for international commercial terms. According to the definition provided by Freight Leaders Club (1996), these are international rules regulated by the International Chamber of Commerce (ICC). These discipline the transfer of risks, responsibility for expenses, delivery methods, and a series of accessory formalities, attributing the obligation to the seller or the buyer to the clause. For more details see: *Inconterms_2020*

responsible for deciding the carriers, the port of loading, the port of discharge, and, additionally, in ordering a container from the carrier to be sent to the consignor. After the load, the container is ready to begin the transportation via road until reaching the maritime terminal of the loading port. Checks on export goods are foreseen at this stage. Once arrived at the loading port, the container is charged into a specific ship and, at this point, the transport of the goods by sea to the port of destination begins. Consequently, the import process starts. Specifically, once the cargo arrived at the destination port, a physical container management process begins, through which the goods are unloaded according to careful stowage plans. When in the stacking area cargo may be subject to customs inspections. These kinds of screening are characterized by automatic scanning of the containers through X-Ray technologies. Customs generally apply risk management strategies to determine whether shipments are selected for documentary and/or physical verification (Martincus et al., 2015). After these checks and after the payment of both customs duties and general transport costs, the container is ready to be released from the port terminal. At this stage it is taken in charge by a further downstream transport of the supply chain. The container then reaches a distribution centre or a container transport station where the goods are unloaded and the repackaging activities are not excluded. From that point, the freight is transported to the retailer who will take charge of it until the actual delivery to the end consignee. In this stage, the reverse flows, which are characterized by the re-shipment of used products or waste materials, useful for repackaging or reassembly in the supply chain, begins. Once the goods reach the receiver, the empty container can be either returned to the warehouses or reloaded.

The second important stream is the *information flow*. Contrary to the above-mentioned flow, this typically moves downstream among the players who realize the activities (Hammadi et al., 2018). In the entire shipping process, more than 40 different parties are involved and more than 100 documents or electronic data interchange (EDI) messages are required (Van Oosterhout, 2008). To define some of them it was followed the definitions provided by the British Chambers of Commerce (1998).

Among the *transportation documentation*, it is possible to find certificates such as the Bill of Lading, the FIATA Forwarder Certificate of Receipt, the Certificate of Shipment, and the Packing List. The Bill of Lading is a contract for the transportation of freight. It has three main functions. Firstly, it acts as a receipt of goods and it is signed by an agent who certifies the shipment of the cargo; secondly, it declares and highlights the terms according to which the shipment must be carried out; and, thirdly and lastly, it is used as a document of title by the consignee who can thus approve the personal property on the freight. The FIATA Forwarder

Certificate of Receipt is a document issued by a freight forwarder agent to confirm the transfer of the goods has been taken in charge by him. The Certificate of Shipment attests the delivery of the goods is taking place in full compliance with the information reported in the certificate. Finally, the Packing List is nothing but a detailed list of the goods that are being exported or imported.

The *commercial documentation*, instead, includes records as the Commercial Invoice and the Certificate of Insurance. The former is a document typically used to conclude the payment of the goods shipped, while the latter is a certificate issued directly by an insurance company and it is aimed at highlighting the presence of an insurance contract that is regulating the transfer of goods.

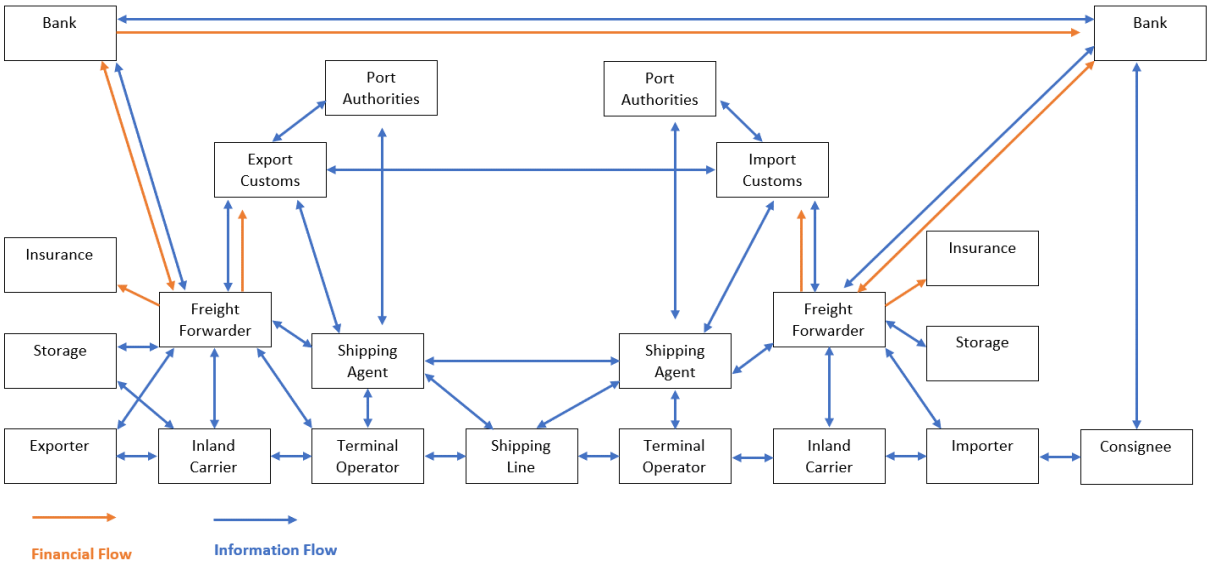
Among the *official documents*, it is common to find the EC Certificate of Origin and the EUR 1 Movement Certificate. On one hand, the EC Certificate of Origin is a document that declares the goods have been produced in a specific country and it is signed by an agent which signature must be registered in the Chamber of Commerce. On the other hand, the EUR 1 Movement Certificate is a document issued by a customs broker. Specifically, it is used to obtain a preferential, lower or zero, rate of duty when transactions occur between the state's members of the European Union and the states that are in commercial agreements with them such as Egypt, Norway, Morocco, and Tunisia.

The third and the last flow composing the transportation network is the one related to monetary issues: the *financial flow*. The actors receive monetary resources through payment transactions (Hammadi et al., 2018).

A simplified but still complex representation of the information and financial flows that typically composed and linked different players of freight transportation is reported in ***Figure 2***.

The lesson it is possible to extrapolate from this brief analysis of the shipping process is that freight forwarder is placed within the supply chain as a true stream organizer. He is an expert in coordinating and managing the physical, the information, and the financial flow equally (Cattaneo et al., 2015).

Figure 2. Information and financial flow in the shipping process



Source: Personal elaboration from (Van Oosterhout, 2008)

2.1.2. A legislative framework

Having discovered the intermediary position of freight forwarders along the complex path of the forwarding process it is now important to define an analysis framework based on the legislation in force.

The figure of the forwarder is ruled by the Civil Code, specifically from article 1737 to article 1741; only the most relevant ones will be examined for the research purposes (***Table 2***).

The concept of freight forwarder is fully and clearly specified in art. 1737 [2]. The law defines the shipping contract as a mandate (Freight Leaders Club, 1996; Cattaneo et al., 2015). This agreement is without any representation because the forwarder acts in his name and on behalf of the final customer (Cattaneo et al., 2015). The forwarding agent is called, by his nature, to stipulate the transport contract while remaining exonerated from any responsibility related to any risks that may occur during the handling of the goods. He is in charge of carrying out ancillary operations that are defined as necessary and essential for the continuity of the transportation process such as the packaging, the loading, the unloading, the customs clearance of the goods, and the payment of duties (Jan and Kiryukhina, 2005). More in detail, once the contract between the parties is signed, the freight forwarder has the duty of organizing the entire shipping process selecting the best route, gathering a contract of carriage and securing the transfer of the cargo (Pavlo et al., 2016).

[2]Civil Code, Book IV, Chapter IX, Section III - The shipment, art. 1737 - Notion

Art. 1739 [3] focuses, in contrast, on the obligations of the forwarder. From a careful reading of this article, the liability of this plaintiff is limited to the selection of the way, the means, and the methods of transport of the goods. Therefore, any liabilities related to the result of the handling of the cargo and the damages of the latter during the shipping process are excluded. In accomplishing all services required by his professional figure, the forwarder must operate in full compliance with the directions issued to him by the final client and, if they are missing, he is obliged to proceed and adopt decisions following the best interests of the customer.

The responsibilities above-mentioned are to be linked to the figure of the forwarder-carrier, described in art. 1741 [4]. This player differs from the «pure freight forwarder» (Cattaneo et al., 2015). Specifically, he is in charge of transferring the cargo from one place to another using his means, or those provided by third parties. His responsibilities are exhausted only once the goods have reached the final scheduled destination. It is a vector liability which, therefore, includes any risk connected to the actual handling of the goods.

Table 2. Freight forwarders legislation

ARTICLES	
Art. 1737 c.c	*"The forwarding contract is a mandate by which the forwarder assumes the obligation to conclude, in his name and on behalf of the principal, a contract of carriage and to carry out ancillary operations."*
Art. 1739 c.c	*"In the choice of the route, means, and means of transport of the goods, the forwarder is obliged to observe the instructions of the principal and, failing that, to act in his best interests.* *The forwarder shall not be obliged to insure the goods dispatched unless ordered otherwise and subject to contrary usage."*
Art. 1741 c.c	*"The forwarder who by his means or those of others assumes the performance of the transport in whole or in part has the obligations and rights of the carrier."*

Source: Personal elaboration

So, freight forwarder, also known as the middle man of the international transportation network, (Davies, 1981) is a crucial player in international trade and it is well-defined by Murphy et al. (1992) as «…an international trade specialist who can provide a variety of functions to facilitate

[3]Civil Code, Book IV, Chapter IX, Section III - The shipment, Art. 1739 - Duties
[4]Civil Code, Book IV, Chapter IX, Section III - The shipment, Art. 1737 – Forwarder-carrier

the movement of cross border shipments». Companies, of all sizes (Murphy et al., 1991), are highly dependent upon freight forwarders because of their prominent know-how in topics related to cross-border trade (Lambert et al., 1998) and also thanks to their talent in performing fast, flexible and reliable services (Clausen, 1970). In other words, these actors assist and support small and medium-sized businesses by supplying them several logistics solutions. Despite their importance in the movement of cargo worldwide, it is confirmed by Murphy and Daley (1996), there is little empirical research about these agents. The earliest empirical study was promoted by Pope et al. (1985) and it was grounded on an American sample. These authors found evidence about the small dimensions of the freight forwarding corporations and the constant evolution toward an integrated supply of services.

2.1.3. Defining freight forwarders roles through their historical evolution

2.1.3.1. Historical evolution

Already at the time of the Roman Empire, the merchants used to transfer goods from one land to another always accompanied by an actor in charge of organizing and personally taking care of the shipment (Schramm, 2012). In detail, imprint of first international trades can be dated at the time of the big republics of Genoa, Florence, and Venice. In this period dealers were used to transporting cargo among nations employing caravans, catapults, and sailing ships (Freight Leaders Club, 1996).

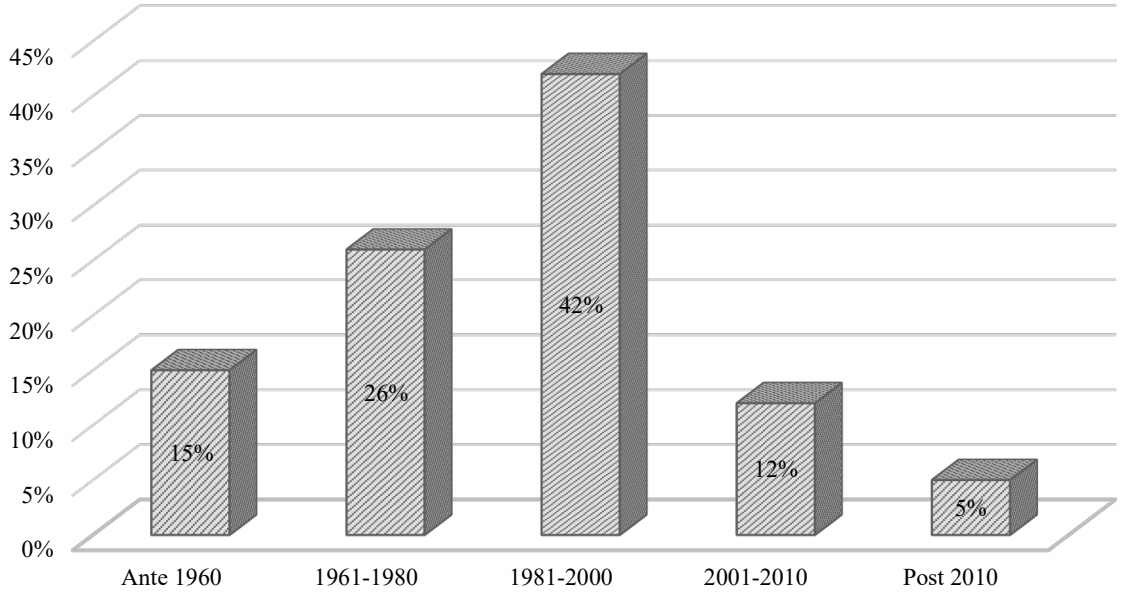
Freight forwarders started to build their actual offer in the early '900s, years in which they were recognized as «shipping house» (Cattaneo et al., 2015). During this time their main tasks concerned the collection and the delivery of goods from an initial sender to a final boarding point. The mandate of these agents expired once the goods were ready to be shipped. When these properties reached the port of landing, another destination freight forwarder was called to take care of the unloading process and of the cargo transfer until the scheduled destination point. Starting from the second half of the 20th century, thanks to the ever-deeper expansion of commercial traffic, to the new modes of transport based on efficient containers able to save 86% in turnaround time in port (Clausen, 1970), and driven by the interest in pursuing a business model capable of balancing the time and cost trade-off, the old shipping house became real freight forwarding businesses.

A survey[5] conducted by *Fedespedi,* the federation of international freight forwarding companies, reports the number of these industries, consequently to the advent of containers, has

[5] Survey reported in (Cattaneo et al., 2015). For more details about *Fedespedi* see: *fedespedi.it*

grown 2.5 times; from a percentage of 15% in the period preceding 1960 to a percentage of 26%, between 1961 and 1980 (+ 11%). Another explosive increase in the numbers, as shown in ***Figure 3***, occurred in the years between 1980 and 2000, when the percentage reached a quote of 42%. After this imponent peak, the growth proved a downstream trend to a percentage of 5% in the periods after 2010 (- 37%). Among the many important events that marked the evolution of freight forwarders, it is worth remembering the year 1993. It was the 1st January 1993 when the single market characterized by the free movement of goods, services, people, and capital is approved and sanctioned[6]. The fall of customs barriers between countries belonging to the European Union occurred. This revolution has brought about considerable simplifications to the whole international trade of goods. From that time on the domestic freight forwarders became international players able to serve terminals worldwide; spreading and expanding their break bulk activities[7] (Clausen, 1970) and performing the transportation of cargo to destination points placed in every part of the world (Rajasekar and Sandeep Prabhakar, 2015).

Figure 3. The growth of freight forwarding companies through the years



Source: Personal elaboration from (Cattaneo et al., 2015)

It is now stimulating to investigate which are, in specific, the tasks freight forwarders agents can perform and offer to their end customers. The next paragraph will provide an overview of the main roles these actors are capable of offering.

[6] For more details see: *EU.it*

[7] *Breakbulk activities:* According to the definition provided by Cattaneo et al. (2015), is a system of transporting particular types of cargo as separate pieces, for instance in bags, boxes, drums, rather than in containers. This way of freight transport is more time consuming than containerization because require specific modes of loading and unloading.

2.1.3.2. Roles of freight forwarders

In the opinion of Pavlo et al. (2016) the main functions these players are capable of performing are: organizing, coordinating and ensuring the shipment of cargo from the consigner to the final consignee. For this reason, they are recognized as «the architects of transport» (Fisher, 1988) expertise in supplying an exhaustive range of services for the international transfer of merchandise (Ran et al., 1993). More in detail and following the idea provided by Shyriaieva and Selivanova (2014), the broad extent of functions that a forwarding agent can offer includes principally 10 different services. Specifically, these cover the transportation, the loading and unloading processes, the warehousing, the arrangement and the equipping of vehicles, the registration of document reception and delivery of goods as well as logistics functions, customs activities, cargo insurance, financial tasks and, finally, information services. In detail:

- the *transportation services* include the activities related to the actual transfer of cargo from a sender to a receiver by means of personal or in chartering vehicles;
- the *loading and unloading cargo services* embrace the process of cargo handling, forming and un-forming the unit load and packaging, linking and fastening goods;
- the *warehousing services* refer to the storage of freight, the creation of identification code to easily recognize cargo attributes and the reception of goods;
- the *arrangement and equipping vehicles services* incorporate activities of cleaning wagon, lower hold and containers and providing equipment of packaging, wagons, vehicles and automobiles;
- the *registration document reception and delivery of goods services* include the process of registration accompanying inventory, registration forwarding goods and delivery of cargo to the port of destination;
- the *logistics services* refer to activities like distributions, warehousing, and procurement;
- the *customs services* embrace the declaration of goods in customs, the cargo counselling on issues related to a declaration and the payments for customs duties;
- the *cargo insurance services* include the preparation of cargo insurance, the payments of premiums and the execution of relevant documents in the insurance case;
- the *payment and financial services* incorporate the registration and the payment for freight service, custom duties, penalties, operations of cargo delivery, handling and storage;

- the *information services* include the activities of informing the consignee about the location of cargo arrival, checking the location tracking of the goods delivered and messaging the consignee of cargo crossing the border.

To simplify the comprehension of the broad range of services a freight forwarder agent is capable of offering it is reported ***Table 3***.

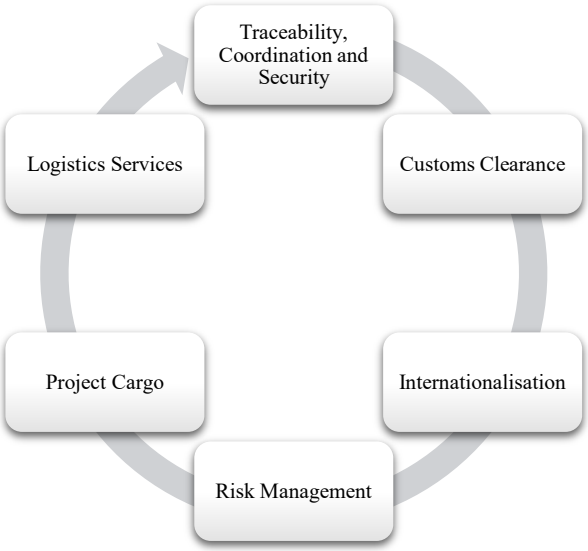
Table 3. The broad range of services offered by freight forwarders

BROAD SERVICES	*SUB-SERVICES*
Transportation services	▪ Chartering vehicles ▪ Transport of cargo
Loading and unloading cargo	▪ Cargo handling ▪ Forming and un-forming of unit load ▪ Packaging, linking, fastening of cargo
Warehousing	▪ Storage of freight ▪ Create identification code of cargo ▪ Reception and delivery of cargo
Arrangement and equipping vehicles	▪ Cleaning wagon, lower hold, containers ▪ Provision of equipment of packaging for owners ▪ Equipment of wagons, vehicles, and automobiles
Registration document reception and delivery of goods	▪ Registration accompanying inventory ▪ Registration forwarding goods ▪ Delivery of cargo to the port of destination
Logistics services	▪ Distribution services, warehousing, procurement, and logistics information
Customs services	▪ Declaration of goods in customs ▪ Cargo counselling on issues related to a declaration ▪ Payments for customs duties
Cargo insurance	▪ Preparation and contract cargo insurance ▪ Payment of premiums ▪ Execution of relevant documents in the insurance case and get him indemnity
Payment and financial services	▪ Registration and payment for freight service, custom duty, penalties ▪ Payment for operations of cargo delivery, handling, storage
Information services	▪ Informing consignee of the location of cargo arrival ▪ Checking location tracking of cargo ▪ Messaging consignee of cargo crossing the border

Source: Personal elaboration from (Pavlo et al., 2016)

In recent years, the constant evolution of the market, even more characterized by high levels of volatility (Murphy and Daley, 2000; Armbruster, 2003), and of customers' needs, has moved freight forwarders toward the development of end-to-end services capable of providing an ever wider and more integrated range of tasks. Customers are both even more demanding for supply chain services and decreasing the number of shippers employing to carry out their businesses (Murphy and Daley, 2000). This evolution is the direct result of a combination of factors such as the internationalization of the productivity, the expansion in IT, the even deeper competition in the different modes of transport, and the externalization of relevant logistics functions (Murphy and Daley, 2000). The evolution in the service field culminated with the development and the spread of the so-called *one-stop-shop* business model. This, following the definition provided by Cattaneo et al. (2015), is a paradigm able to offer a complete and diversified supply that guarantees high levels of expertise in the satisfaction of all customer requirements. This model allows the final client to avoid to resort different specialized figures finding completeness in one single player. The «…changes in the international freight forwarders' environment have witnessed the emergence of new forms of forwarders incorporating a broad spectrum of services under one roof» (Ozsomer et al., 1993). In other words, the *one-stop-shop* model can be viewed as a complex diagram of services highly integrated one each other's (***Figure 4***). This paradigm covers six different but complementarity areas linked to specific tasks that freight forwarders offer to their customers.

Figure 4. One-stop-shop model



Source: Personal elaboration from (Cattaneo et al., 2015)

The *traceability, coordination, and security* area includes, for example, the efficient use of a control tower, a system of track & tracing, X-Ray scanners and digital temperature detection sensors. All these solutions have been positively influenced by the advent and the constant

evolution experience in the IT field; thanks to the Internet the services provided can be faster, more reliable, and less time and cost consuming.

The freight forwarders are also expertise on *customs clearance*. They act as a solid link between the final client and the customs authorities in order to facilitate the customs operations of every business by ensuring quick and effective results. Customs-tax consulting, document support, customs or tax warehouse are the most common services provided, inside this area, by freight forwarders.

Additionally, in the field of *internationalization*, these agents are highly capable of offering consistent support. They can operate minimizing the risks and maximizing the opportunities; they «…solve customer headaches for landing in new countries» (Cattaneo et al., 2015). In other words, freight forwarders provide all the necessary information to their clients allowing them to enter new markets avoiding to get penalties that could arise for some neglect concerning international law.

Given the responsibilities of the freight forwarder, (see ***1.2. Legislative framework)*** an additional service offered includes *risk management* activities. In details, these services comprise the identification, the analysis, and the measurement of the risks, the development of immediate strategies for the management of the risks, the provision of insurance services to protect the goods in transit along the entire supply chain, the consulting service aimed at checking and reviewing insurance policies and, finally, the insurance assistance.

Another specialization concerns the *project cargo's* sphere. Reference is made to the freight forwarder's ability to manage complex cargo defined as extraordinary and oversized. The main activities carried out in this field are the order studies, to support the customer in the entire delivery process; the preventive feasibility studies, to analyse in detail the new market in which the client would like to enter, and, finally, the *ad hoc* designs for what concerns, for example, packaging.

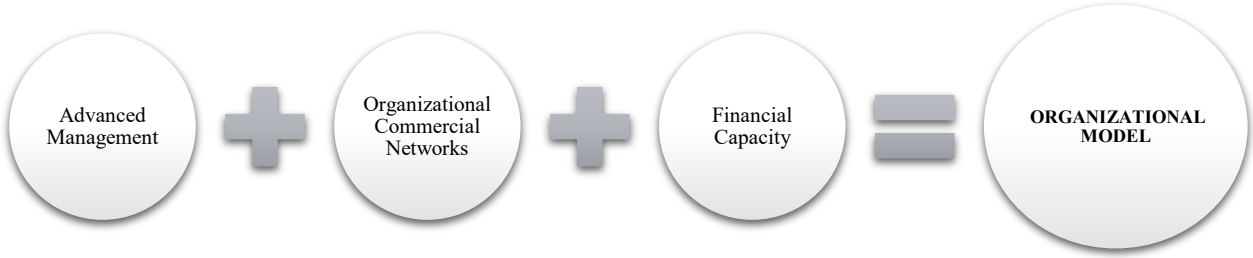
The last but not the least area in which the *one-stop-shop* model finds its basis is the *logistics services*. When it comes to logistics services references are made to those tasks such as operational activities of goods processing, management of goods in warehouses, 3PL activities, distribution and preparation of orders, E-fulfilment activities, and, finally, a logistic consultancy aimed at increasing the potential of the supply chain thanks to the innovative and customized solutions supplied.

2.1.4. Organizational model and phenotypes of freight forwarders

Before starting to talk about the organizational model that typically characterizes freight forwarders corporations and of the phenotypes that are possible to find among these players it is important to make a premise. The literature related to these topics is scant but, at the same time, it was deemed useful to report it because it is believed to provide a more complete picture and a broader definition of these actors. For the reasons mentioned, the research is now going to analyse these two issues taking into consideration the study conducted by Cattaneo et al. (2015).

As seen before the increasingly strong shift of freight forwarding companies towards a *one-stop-shop* model is the direct result of the change in demand deriving from end customers. Clients, ever more, seek the support of highly specialized figures who can satisfy efficiently all the operations that characterize the whole cargo supply chain. This request can be fully satisfied only through a renovation of the organizational model on which the forwarding companies typically rely on. To be effective and, at the same time, efficient the model requires some specific characteristics: an advanced management, organizational and commercial network, and a solid financial capacity (***Figure 5***).

Figure 5. The organizational model of freight forwarding companies



Source: Personal elaboration

From the human capital perspective, it requires a high level of professionalism and expertise as well as the capability to be predictive and proactive. These players must possess the right abilities to manage complex and completely new situations with a critical and a developed entrepreneurial spirit. The reaction to the unexpected should be driven by creativity without losing the perfect compliance with the law.

Given the nature of the functions a freight forwarder is every day called to manage, these enterprises must be able to create long-term and stable relationships with the most relevant country placed worldwide. This can be done either through the direct establishment of sites near

interesting places or by means of networks of agents and/or correspondents. Collaboration plays a crucial role because it allows the transfer of know-how among different specialized actors leading them to the efficient management of a broad range of processes and activities.

From a financial point of view the art. 76 presented in D. Lgs n.59 of 2010[8] argues freight forwarders corporations must demonstrate to have a stable and adequate financial capacity that equals to a share capital subscribed and paid-up of at least 100.000 €.

Moving the attention to the composition of the sectors, the federation of international freight forwarders, *Fedespedi*, argues the presence of four categories of freight forwarders: the office-based, the external, the owned, and the global networks (***Table 4***). The categorization is the direct result of the combination of five main factors of analysis: the governance; the corporate form; the extension of the network; the ownership of means; and the modal and product specialization.

Table 4. Phenotypes of freight forwarding corporations

	GOVERNANCE	*COMPANY*	*NETWORK*	*OWNERSHIP*	*SPECIALIZATION*
Office-Based	Italy	General Partnership Limited Liability P.	External	None	Modal Product
External Network	Italy Branches in EU	Limited Liability P. Joint Stock Company	External	Few	Modal Product
Owned Network	HQ in Italy or worldwide	Italian or foreign company or group	Personal	Some	None
Global Network	Corporate foreign HQ	Foreign multinational	Worldwide	Many	Global expertise Cross-sectoral skills

Source: Personal elaboration from (Cattaneo et al., 2015)

The first phenotype recognizes, the *office-based*, is typically a general or a limited liability partnership with several employees that can vary between 10 and 15 and a revenue of 2 million euros per year. The headquarters are usually located only in Italy and can serve small-medium clients providing them only standard solutions. Consequently to the small dimensions, this type of company is engaged in few international relationships that are carried out by third parties as happened with the more complex activities as could be the ones related to the customs and the

[8] For more details see: *Art. 76 D.Lgs n.59/2010*

risk management. It is also characterized by little room for investment in infrastructures, information, or IT systems, meaning that it has no ownership of means.

The *external network* is a typology of freight forwarding company characterized by a head office located in Italy but with branches spread all over the European country. It usually has a corporate form of a limited liability company as well as a joint-stock company and it is composed of many employees that vary between 20 and 30. Its revenues are almost 10 million euros per year. The most important activity that it performs is the groupage. For this reason, it usually has it owns or third-parties' warehouses and some vehicles. It is characterized by a large number of international relationships that it has established thanks to the membership to different networks of freight forwarders.

The *owned network* includes all the companies that successfully faced the transformation from *"shipping house"* to real freight forwarding company. These companies are characterized by revenues higher than 10 million euros per year and they provide employment to more than 50 workers. They can be an Italian foreign company or a group with the headquarters placed in Italy or all around the world. Additionally, these kinds of companies invest a lot in their branches, most of all in traceability given the fact they are liable for the entire shipping process of the good. Contrary to the first type, these are characterized by high levels of expertise in customs and fiscal issues and they own their international network.

Finally, among the *global network*, it is possible to find companies with annual revenues of more than 50 million euros. These are global freight forwarding businesses highly specialized in providing integrated solutions utilizing, for example, control towers or developed and sophisticated IT systems. They are global expertise able to solve even the more complex situations thanks to their cross-sectorial skills. Usually, they are foreign multinational characterized firstly, by a corporate foreign head office, and secondly by substantial capital deriving from their participation in financial, postal, or railway groups. They are also known as «integrators» (Van de Voorde, 2010). That is «…vertically integrated express companies that perform their pick-up and delivery services, operate their fleet of aircraft and trucks to support their extensive door-to-door delivery operations and tie it all together with advanced information and communication technologies» (Jones, 2000). Worldwide it is possible to count only four integrators companies of which two are from the USA, UPS and FedEx, and two from Europe, DHL, and TNT.

2.1.5. Environmental challenges and opportunities to growth

It appears the environment in which the forwarders figure is evolving and changing over the years is deeply volatile (Ozsomer et al., 1993). This feature is a direct response to the changes registered in the export needs, in the business model of the freight forwarders industry, and in the surrounding conditions shocked by the Internet's advancement (Murphy and Daley, 1996). The mix of these ingredients, on one side, has generated the perfect conditions that have led to an increase in demand for the services offered by freight forwarders (Pavlo et al., 2016) and, on the other side, has created important implications for the corporate strategies of these players that have been called to proactively review them (Murphy and Daley, 1996). This mandatory action is confirmed also by Corsi et al. (1991) which argue that «…a firm's strategy must fit the environmental conditions it faces; as these conditions change, so must the strategy if the firm is to survive». In other words, the fundamental principle on which the forwarding businesses are based is «…the only constant is change» (Murphy and Daley, 2000), meaning that if they want to survive, they must change and adapt their operative and business models according to evolution experienced by the external environment. Over the years, forwarders have proven to be proficient in dealing with the dynamism that marks the environment in which they typically operate (Murphy and Daley, 2000). Many of them have responded processing merger and acquisition deals, others have decided to diversify their supply by offering more integrated and innovative services, and still, others have moved towards the digitalization of processes by implementing, for instance, information management systems (Sowinski, 2000).

Among the literature, the company size, the quality of services offered, the customer stickiness, and the digital readiness seem to be the most relevant success factors on which forwarders are called to invest more in order to survive even the more problematic circumstances.

For what concerns the importance of the size in times of environmental revolution Schwartz (1998) believed the smaller a freight forwarding company is, the less is its propensity to efficiently cope with an unstable and uncertain environment. In other words, the researches available argue company dimensions are an extremely significant element of resilience, as large sizes can efficiently sustain considerable challenges (Murphy and Daley, 2000).

As argued by Huang et al. (2019) the recipe for effectively and efficiently tackling the challenges posed by an unpredictable external factor, such as the massive financial crisis that occurred in 2008, is to increase the quality and the productivity of the services offered by the companies to the final customers. The thought here expresses, therefore, goes against any cost reduction or increase in IT investment. The motivation for this ideal stem from the belief

competitive advantage cannot be based solely on pricing strategy. Since the industry in which freight forwarding companies bid is service-oriented, is crucial the increase in the quality offered. The above-mentioned paper asserts there is a lack of a unique concept able to describe a high-quality service in the literature. For example, on one hand, it is possible to found authors like Liang et al. (2006) who measure the quality of a service based on the presence of operations convenience and responsiveness, integrated services, transport ability, and price competitiveness; on the other hand, a more recent study proposed by Lu and Yang (2010) measures the quality according to the degree of innovation, the attitude of immediate response to the customer's requirements and the operational flexibility.

The consolidation of the promise of value to the end customer is a direct consequence of the increase in service quality given the fact that once a company decided to improve the efficiency of its supply it strengthens customer satisfaction. This is another important key success factor that, if efficiently improved, can help companies to face the uncertainty and the volatility of the external environment (Murphy and Daley, 2000). Customers, the main actors of freight forwarding businesses (Yang and Xue, 2020), are becoming even more demanding for what concerns integrated and innovative services since their know-how on international trade field have developed during the recent years (Murphy and Daley, 2000). For this reason, the collaboration, the engagement, and the nurture of stable and long-term relationships with clients are the key to face every challenging time (Huang et al., 2019). In detail, the study conducted by Yang and Xue (2020) highlights the importance of customer stickiness[9] in improving advantages and market position of corporations. The identification of the main factors that can deeply influence customer satisfaction can lead to the improvement of the company's capability of meeting, responding, and constantly monitoring the outside changes.

The last key success factor, that can support freight forwarding companies to proactively face and grasp the threats and the opportunities brought by the evolution of the surrounding conditions, is the digital readiness. The investments in the digital field are both relevant to maintain a high level of customer satisfaction and to increase the quality, in terms of efficiency and effectiveness, of the broad range of services supplied (Huang et al., 2019). It is clear that the surrounding environment in which forwarding companies daily run is shaped by a revolution in a completely digital area. The advent of powerful digital technologies is perceived as a vital ingredient for survival on which transport enterprises, like all businesses, are more and more forced to dedicate their efforts and their capital investments (Murphy and Daley,

[9] *Customer stickiness:* According to Sheri (2001), customer stickiness concerns customer retention, loyalty, and repeats purchases

2000). In support of this idea, several field specialists have asserted that «…a failure to embrace the Internet is akin to rolling the dice» (American Shipper, 1999). In other terms, the developed and accurate digitalization process has been one of the most important managerial challenges posed by the 20th century (Ricker and Kalakota, 1999). This is a path capable of enhancing the efficiency of all the activities and services proposed and elaborated by freight forwarding companies (Pavlo et al., 2016). The massive pressure into a fully digitalized reality is, as mentioned, an urgent and challenging task, but in the meantime, it is an occasion that companies should be able to grasp in a reactive mode. An opportunity that enables an efficacious re-positioning in the market, ever more marked by high competitiveness levels, through the complete integration of digital technologies; with the ultimate goal of achieving an end-to-end systematic service expansion (Yang and Xue, 2020). In this context, many relevant freight forwarding companies have affirmed themselves, some through the implementation of real digital platforms (i.e. Freightos and Flexport) and some through the creation of complex end-to-end IT systems (i.e. FedEx and UPS).

Having grasped the importance and the centrality of the role played by freight forwarding corporations in the international trade of cargo and after having stressed the need for a revolution concerning the business model towards the digitalization of processes, it is now considered fundamental to build a further section based principally on the digital revolution experienced by the transport logistics.

2.2. Digital evolution in transport logistics

2.2.1. Overview

The context in which transport enterprises are typically operating is subject to continuous and sudden transformations that are driving them, more and more, towards the progressive adoption of digital technologies. The rise in competitiveness (Bowersox and Daugherty, 1995; Sauvage, 2003; Davies et al., 2007), a natural outcome of globalization that has welcomed new competitive players (Lemoine and Dagnaes, 2003), combined with the growing size of the sector (Janghyuk, 2019), the ever increasing sophistication that dominates the entire supply chain, composed of a great variety of figures whose expectations are rapidly evolving and changing (Aberle, 2003), the transformation of the surrounding environment, the reduction of traffic, the need for higher levels of security and stability in the management of activities (Bander et al., 1998; Loebbecke and Powell, 1998) and, finally, the explosive growth experienced by e-commerce, constitute the global scenario which requires a fast and reactive, albeit thought, revolution. These conversions lead to new opportunities, challenges and threats that the entire transport logistics sector is called upon to grasp, face and overcome. Aimed at achieving an efficient and, sometimes, radical change in the *modus operandi*, several experts have expressed their positions in the available literature. On one side, authors as Perego et al. (2010) deemed necessary the creation of an articulated information network and the implementation of an efficient management, in order to be able to run the business successfully, by preventing the upsurge in the expenses and the cut in the value of the services supplied; on the other side, Chopra (2020), stated that «…challenges can be achieved by having a paradigm shift to thinking toward independent and decentralized command of complex processes in current demanding logistics system».

In spite of that, among the disposable empirical researches the shared tendency, on which everyone agrees, is the relevance and the centrality of the role the digitalization of processes might play in an uncertain and volatile environment (Bowersox and Closs, 1996; Closs et al., 1997; Bharadwaj, 2000; Spanos et al., 2002; Golob and Regan, 2002a; Giannopoulos, 2004). Given the fact the explosive spread of digitalization has impacted every business and every sector worldwide, the freight logistics, as well, has experienced the pressure and the influence of this complex phenomenon (Chopra, 2020). Digital solutions developments and efforts are seen as «…critical elements in the effective management of logistics and supply chain processes» (Janghyuk, 2019). For this reason, transport companies are gradually focused on the active progress of digital technologies; paths capable of both guaranteeing high levels of

collaboration within the entire supply chain (Evangelista and Sweeney, 2006; Radivojevic et al., 2017) and of generating original and innovative business models (Osterwalder et al., 2005; Chesbrough, 2010; Andal-Ancion et al., 2012; Fitzgerald et al., 2014; Colbert et al., 2016). The first available publications that have explored these innovative applications in the logistics of transport date back to the mid-1900s (Wotton et al., 1995; Garcia-Ortiz et al., 1995). These are guided by an initial awareness of the positive benefits technology can convey to a great variety of business functions as well as to the socio-economic environment. Over the years, thanks to the ever-widening supply of digital solutions and the considerable and proven support that these constitute both for the internal operating models (Kia et al., 2000; Corsi and Boyson, 2003; Pokharel, 2005; Evangelista and Sweeney, 2006) and for the pricing systems (Perego et al., 2010) the interest in this current and sophisticated topic has progressively enlarged.

2.2.2. Digital transformation in the logistics of freight

The progressive transition of transport enterprises towards business models ever more focused on the rational and the efficient employment of digital technologies began in the middle of 80s when the concept of ICT started to apply in the logistics and transport field. ICT is the acronym of *Information and Communications Technologies* and it defines a set of different categories of both technologies and systems «... in various stage of development from research prototypes or even concepts to commercially available products and applications» (Giannopoulos, 2004). Moving forward, the end of the 20th century, seen the growth of the freight *Intelligent Transport System* (ITS). ITS is the mixture of technologies, as the virtual transport platforms, and their correlated organizations, activities and rules (Giannopoulos, 2009). In other words, it is an «…operational system of various technologies that, when combined and managed, improve the operating capabilities of the overall system». (Auer et al., 2016). Generally, the first digital solutions implemented were aimed at achieving high degrees of effective and efficient data management, at eliminating complex and, sometimes, sluggish bureaucratic procedures, at remotely booking and monitoring cargo deliveries and at creating integrated systems completely based on Internet platforms (Lim, 2019).

2.2.2.1. Drivers of digitalization

Enterprises are driven and influenced by a wide range of factors which sustain and encourage them to undertake the tricky and complicated digitalization path. The available publications suggest several interpretations of these major contributory elements, as reported in ***Table 5***.

Table 5. Drivers of digitalization

EMPIRICAL RESEARCHES	*DIGITALIZATION DRIVERS*
Crowley (1998)	▪ Competitive advantage
Perego et al. (2010)	▪ Cost reduction ▪ Service quality improvement ▪ Monitoring and control enhancement ▪ Security and safety increase
Lim (2019)	▪ Management of information improvement ▪ Capacity enhancement ▪ International transport and logistics network upgrade
Lambrou et al. (2019)	▪ Drastic innovation ▪ Market push ▪ Innovation pressure ▪ Institutions ▪ Date monetization business model ▪ Functions and activities improvement ▪ Cost reduction and efficiency ▪ Higher capability in meeting customers' expectations

Source: Personal elaboration

Starting from as early as 1998 it is possible to detect empirical researches, such as the one conducted by Crowley (1998), which have found a positive relationship between high levels of digital preparedness and high degrees of competitiveness in the sector. In other words, companies were typically stimulated by the higher competitive advantage the introduction and the efficient application of digital technologies in their traditional business models allowed them to pursue. Conversely, Perego et al. (2010), argue the reasons that pushed companies towards a digitalization of processes are to be found in terms of cost reduction, higher quality of services supplied, greater monitoring of corporate processes and enhancing security in operations. More recent analyses, in addition to validating the findings of the previous studies, propose further drivers. On one hand, Lim (2019) stated the developments and the efforts in IT technologies are heavily affected by three advantages they can provide to enterprises: the improvement of an efficient management based on the exchange of data between the actors involved in the entire supply chain; the capacity and the productivity levels enhancement and, finally, the opportunity to upgrade and to expand a high-performance international transport and logistics network. On the other hand, Lambrou et al. (2019) conducted a specific research aimed at discovering the digital solutions employed in the shipping operations. In particular, the authors developed a theoretical list of digitalization pilots through a deep analysis of a wide

range of case studies. As reported in the table, from the research has emerged height different drivers. In particular, the increasing exploitation of digital technologies, in the authors' perspective, derives from three key forces that can be ascribed, in the very first place, to local and global institutions, which set norms and rules to be observed, but at the same time provide the occasions to grasp benefits the technology provides and, in the second and third place, to the growth of the market competitiveness, fuelled, more and more, by the need for innovation, which pushes companies to survive such an environment, towards the adoption of drastic and radical digital solutions, as the blockchain is capable of being. The direct consequences of these implementations are several. Specifically, they allow, firstly, the enhancement and the improvement in the data usage providing enterprises the ability to earn greater returns from a completely new business paradigm. Secondly, the upgrading in the functionalities and in the operations performed both in terms of quality-enhancement and efficiency and, finally, the opportunity to achieve a downstream tendency in the cost system and the acquired capability of better meeting the customer's expectations increasing their satisfaction and loyalty.

In conclusion, the deployment of digital technologies in the field of transport logistics has proven to be efficient and effective as it is capable of generating a wide range of benefits for every business involved in this complex digital evolution. The major relevant drivers of the digitalization of processes are: the downward trends experienced in the operating and storage costs (Piplani et al., 2004; Pokharel, 2005) as well as in the functional time (Button et al., 2001) and the improvement experienced by the overall quality of services supplied, which is a direct consequence of the higher levels of safety, control, data management, productivity, collaboration among actors involved in the networks and customers' satisfaction. The right combination of these elements can bring companies to an ever-higher degree of competitive advantage by means of novel and innovative business models principally focused on the digitalization of capabilities, processes and infrastructures. This is demonstrated by a broad spectrum of available investigations that sustain the successful implementation of digital technologies contributes to the development of competitiveness (James et al., 2004; Lau et al., 2006; Chow et al., 2007).

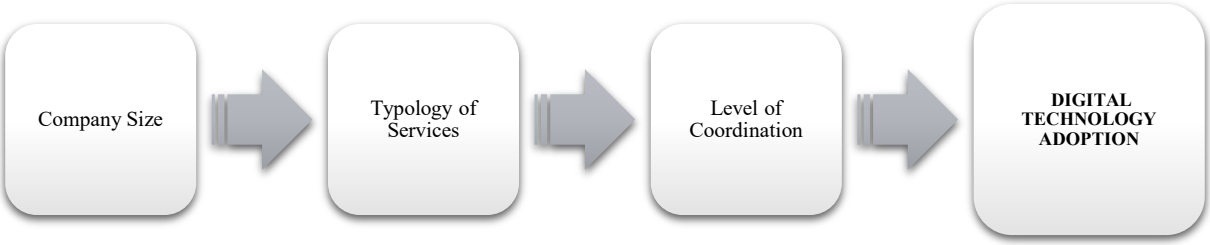
2.2.2.2 Digital technologies dissemination

In order to examine which are the principal digital solutions that transport logistics corporations tend to adopt in their business models, it is advisable to investigate and grasp the level of usage of these technologies. Overall, this degree appears to be below its potential, and it is more oriented to well-established and traditional systems (i.e. Internet, EDI, smartphone, laptop…). Additionally, the literature confirms a great variety of gaps and relevant limitations in the

correct application of sophisticated and innovative solutions (Evangelista and Sweeney, 2006; Marchet et al., 2009; Perego et al., 2010). The situation on the Italian scenario does not seem to be different, in fact even in Italy it is possible to detect, according to different studies, a poor level of adoption linked to advanced and state-of-the-art digital solutions in the corporate models of business (Merlino and Testa, 1998; Minguzzi and Morvillo, 1999; Freight Leaders Club, 2003). However, although there is a limited rate of success, as attested by research promoted by Zeimpekis and Giaglis (2006), worldwide organisations are highly aware of the relevance and the opportunities that the proper and the professional application of the constantly updated digital technologies can provide, not just to the growth of the single company but also to the development of the entire transport and logistics sector.

Specifically, which factors impact this degree of deployment? The relevant documentation suggests the major influences arise from the corporate size, the nature of the service on offer and, lastly, the level of corporate coordination (***Figure 6***).

Figure 6. Digitalization conditioning factors



Source: Personal elaboration

Company size appears to be a key variable that can support businesses in the successful implementation of smart digital technologies (Pokharel, 2005). As reported in the empirical analysis directed by Evangelista and Sweeney, (2006) it is possible to observe a high heterogeneity in the adoption of digital solutions when comparing companies characterized by huge differences in size. In support of this idea, several studies affirm the presence of a positive relationship between large companies and high adoption levels of innovative and sophisticated digital technologies (Davies et al., 2007). In other words, what emerges is that corporations characterized by small business sizes are used to implement and developed simple and traditional digital solutions. This differentiation between small and large companies is a direct consequence of the fact that, on one hand, larger company sizes lead to a business development mentality based on a long-term perspective, thanks to the huge presence of tangible, intangible assets and economic resources able to support a complete digitalization process, while, on the other hand, small company sizes mean limited resources, technological skills, infrastructures

and adversities to changes; all factors that make it difficult and rare to invest heavily in innovative digital solutions. Regarding this issue Evangelista and Sweeney (2006) suggested an in-depth analysis of the factors that inhibit the adoption of digital technologies by small third-party logistics service providers. The authors, in addition to confirming what was mentioned earlier, concluded small companies are used to limiting the application of digital solutions on their business models for strictly financial reasons. Specifically, the boundaries derive mainly from the huge size of investments, implementation costs and the maintenance/upgrading costs digital solutions require to be efficiently implemented. Another major limitation is related to the constant and costly training activities implemented for the development of specific employee skills. The adversity to technological progress, typical of small businesses, however, does not play in their favour. In fact, the continuous underestimation of the digital solutions potentials could force them to forcefully drop the increasingly competitive market (Evangelista and Sweeney, 2006). It is very important to consider small enterprises when discussing transport logistics corporations since, in this sector, most players located in EU countries are catalogued in this dimension[10].

Additionally, the *type of service* offered together with the *dimensions of the fleet* used seem to be two important factors in the degree and in the ability to adopt sophisticated digital technologies. In fact, the study conducted by Golob and Regan (2002b) argues the larger the fleet and the more developed the service offered meant the greater the demand for advance digital solutions. In other words, what the authors confirm is a positive relationship that links firms able to offer a wide range of services, through a large and effective fleet, to always having updated and innovative digital technologies developed.

Finally, also the *level of coordination* between the wide variety of players involved in the operating processes is crucial. In this regard, coordination is seen as a fundamental variable that supports a correct adoption of digital solutions useful for an efficient implementation of strategic and operational processes (Perego et al., 2010). Therefore, businesses are called to a progressive movement towards an increasingly integrated approach that supports and upsurges the alignment of digital technologies adoption with the overall corporate strategy (Chapman and Soosay, 2003).

[10] See Eurostat (2003), Panorama of Transport. Statistical overview of transport sector in the European Union

2.2.2.3. Digital technologies applications

Despite the confirmed limitation in the adoption level of Information and Communication Technologies (ICT) in the field of transport logistics, in recent years literary interest in this current and innovative topic has grown exponentially (Perego et al., 2010). In fact, despite not being leaders in the digitalization process (Tilanus, 1997), transport enterprises have shown important steps towards more innovative business models based on the employment of digital technologies (Lynagh et al., 2001). This shift is probably driven by the growing awareness the capability of offering services fully-integrated with digital solutions is, in the costumers' perspective, an important element of differentiation and added-value (Karkkainen, 2004). Most of the available empirical research is mainly focused on the classification of digital solutions developed in the field of public transport (Wotton et al., 1995; Giannopoulos, 2004; Panou and Bekiaris, 2004). Scientific resources based on the implementation and the adoption of digital technologies in the field of freight transport enterprises are therefore still few (Marchet et al., 2009). Because of the magnitude of the argument presented, this section mainly investigates and examines the most common and attractive, for the academic world, digital technologies. In this respect and in order to overcome the above-mentioned literature gap, the authors Marchet et al. (2009) have deeply analysed the Information and Communication Technologies (ICT) applications in the Italian transport industry. The authors' aim was to derive a complete classification of digital solutions applications in their wide variety. Specifically, following the researches' idea, ICT linked to the transport logistics world can be ranked in four main different categories in which a great variety of dissimilar technologies could be ascribed. More in detail, these classes include the transportation management (TM), the supply chain execution (SCE), the field force automation (FFA) and, finally, the freight and fleet management (FFM) applications (***Table 6***).

Transportation management applications (TM), tools to assist and sustain the planning of transportation and the efficient and effective execution of the delivery process, are the digital solutions that composed the first area (Mason et al., 2003). In this division it is possible to detect applications for routing and scheduling, tracking & tracing and freight payment as well as systems such as auditing and enterprise resource planning (ERP) (Gilmore and Tompkins, 2000; Tyan et al., 2003). Specifically, enterprise resource planning (EPR) is a «…tool for comprehensive planning, coordination and management of companywide tasks» (Hompel et al., 2015). The correct implementation of these solutions can lead to a wide range of benefits in the business models. By supporting the choice of transport, the load management and the coordination of the entire operational process, they make it possible to achieve, on one hand,

high improvements in terms of productivity, efficiency and performance while, on the other hand, drastic reductions in operational costs, pressures and lead-time variability (Button et al., 2001; Mason et al., 2003).

Table 6. Digital technology applications in Italian freight industry

DIGITAL TECHNOLOGY	*FUNCTIONS*	*EXAMPLES*
Transportation Management	Supportive tools for an efficient and reliable transportation process	▪ Routing and Scheduling ▪ Tracking & Tracing ▪ Freight payment ▪ Auditing ▪ Enterprise Resource Planning
Supply Chain Execution	Systems able to sustain, monitor and automatize the physical flow of cargo along the entire shipment process	▪ Order management ▪ Warehouse Management System ▪ Proof of delivery ▪ Electronic Data Interchange
Field Force Automation	Technologies based on mobile devices that provide a bidirectional flow of communications integrating remote workforce and enterprise business processes	▪ Workflow processing ▪ Data storage ▪ Data transfer ▪ Global System of Mobile ▪ Dedicated Short Range Communication
Freight and Fleet Management	Reporting tools or onboard sensors capable of providing real-time information about the vehicle and the load unit	▪ Global Positioning System ▪ Radio Frequency Identification ▪ Wireless Sensor Network

Source: Personal elaboration

The second area includes *supply chain execution* (SCE) applications. These are complex and innovative solutions capable of supporting, monitoring and automating the physical flow of goods along the entire shipment path (Lambert et al., 1998; Giaglis et al., 2004). Such systems can be, for instance, the orders processing, the warehouse management system (WMS), the proof of delivery and the electronic data interchange (EDI) (Marchet et al., 2009). In detail, warehouse management system (WMS) is a computer software aimed at managing, monitoring and optimizing all the activities related to the warehousing and the distribution of freights (Hompel et al., 2015), while electronic data interchange (EDI) is «…the computer-to-computer exchange of business information electronically, in a structured format, between business trading partners » (Ferguson et al., 1990). Thanks to their support and the opportunities they bring to businesses that efficiently develop them, in addition to enhance the proficiency and quality of the service offered, they are, at the same time, capable of reducing the errors that could arise from data entrance, by making the communication of information and data between

the actors involved in the process more fluid, flexible and reliable (Pokharel, 2005; Patterson et al., 2003).

The third macro area is composed of *field force automation* (FFA) applications such as workflow systems, collection of large amounts of data in mobile devices, network-based data transfer and synchronization of relevant information with corporate software (Alahuhta et al., 2005). In addition to the above-mentioned ones it is possible to find the most known systems such as the global system of mobile (GSM) and the dedicated short range communication (DSRC). In detail, global system of mobile (GSM) is a digital transmission technology that provide to enterprises the opportunity and the ability to transfer relevant and crucial data from the corporate business to the vectors and vice versa (Giannopoulos, 2009), while dedicated short range communication (DSRC) is a transmission technology capable of transferring, through radiofrequency, relevant data to control authority (Liu and Gong, 2014). These applications are capable of offering high levels of integration, interactivity and customer satisfaction as well as cost reduction and savings (Rodina et al., 2003; Barnes et al., 2006).

The fourth and the final category embraces *freight and fleet management* (FFM) applications. These solutions generally consist of instruments and/or sensors that, when efficiently located, are able to transmit real-time information to the corporate enterprise. The data transmitted vary from information relating to the exact location of the vehicle and therefore the cargo, to the temperature and the safety to which the most delicate and valuable loads are exposed (Zeimpekis and Giaglis, 2006; Marchet et al., 2009). In this area the digital solutions of global positioning system (GPS), radio frequency identification (RFiD) and wireless sensor network (WSN) can be catalogued. Global positioning system (GPS) is a technology that enable vehicles to be traced, in real time, by the corporate business. Thanks to this digital solutions corporations have the opportunity to receive, through satellite signals, the exact location of the cargo (Radivojevic et al., 2017). It is widely used in transport and logistics sectors because its efficient application led to the enhancement in the quality of services offered and the reduction in the management of fleet costs (Giannopoulos, 2009). Radio frequency identification (RFiD) is an innovative and complex digital solution capable of identifying, by means of radio frequency electromagnetic fields, the cargo (Evangelista and Sweeney, 2006). Tags RFid are located on the freight and they contain a huge amount of data useful to immediately recognize and collect relevant information about load unit (Radivojevic et al., 2017). Wireless sensor network (WSN) is another type of identification technology through which businesses can collect data about both the position and the physical attributes of cargo (Radivojevic et al., 2017). In particular, they are composed of a large number of sensor-nodes that, by means of wireless, are able to

transmit data efficiently (Brandolese and Rucco, 2012). The benefits provided by these digital systems and solutions, capable of providing immediate relevant information, are many. These, in fact, are able to reduce management costs, errors, and the use of personnel as well as the waste of paper documents, increasing, at the same time, the control, the efficiency, the performance of the overall operations and the service itself (Loebbecke and Powell, 1998; Kia et al., 2000).

More recent empirical studies have founded supplementary digital solutions that are frequently employed in the transport and logistics sectors as the customer relationship management (CRM), the cloud system (Lim, 2019; Truong, 2020) and the blockchain (Pournader et al., 2020).

Customer relationship management (CRM) is an innovative and current marketing strategy aimed at building a stable and long-lasting relationships with the companies' final customers. In other words, it is an «…organizational capability to enhance competitive advantage» (Plakoyiannaki and Tzokas, 2002) which the final objective is to create customer loyalty through advanced and innovative digital infrastructures (Zikmund, 2003). Customer relationship management (CRM) system plays a crucial role in the highly competitive environment in which freight forwarding companies every day operate. In fact, in order to survive such a surrounding background, it is recommended to adopt the most effective nurturance and maintenance of the end-user connections (Wong and Sohal, 2003). In particular, the authors Shang and Lu (2012) conducted a deep analysis on the application of CRM in forwarding corporations. They confirmed the relevance of this system and they, additionally, argue the most important benefits could be accomplished by putting all effort into the improvement of communications processes. This means companies are ever more called to enhance their capability of carefully listening and reactively responding to customers' complaints and needs. Summing up, the implementation and the efficient exploitation of this tool gives the logistics and transport sector the possibility to provide its customers with faster, more accurate and reliable services; thus, increasing both the overall business performance and the competitive advantage within the market. This is achieved thanks to the system capability to store, in the immediate future, the most relevant information concerning the requirements and the wishes of the target customers (Shang and Lu, 2012).

The deployment of *cloud system* is increasingly gaining ground within the industry as its efficiency and interconnection with the complex world of international transport processes is rising very fast (Lim, 2019). More in detail, this tool provides the corporations both the

opportunity to optimize their processes and the capability of building digital platforms capable of making international transportation processes progressively fluid, fast, traceable and immediate (Soebhaash et al., 2013). The benefits resulting from the adoption of the above systems are manifold. In the opinion of Arnold et al. (2013) such advantages can be link to the progress achieved in the cooperation and collaborative relationships among several enterprises. Moreover, according to Vinit (2019), the greatest relevant benefits cloud system implementation might offer to organizations are: the scalability and the adaptability; the evolution of IT costs from capital to operating expenses; the decline of generic and ICT costs; the quicker time-to-market for companies and their related offer; the enhancements in the management and in the performances and, finally, the superior availability and disaster recovery alternatives. Several empirical investigations have also shown an incremental use of cloud systems in the field of logistics and transport. This trend towards novel solutions has been almost driven by the accelerating digitalization of workflows (Arnold et al., 2013).

Finally, *blockchain* is a very recent solution which began its dissemination in 2008, year in which Satoshi Nakamoto has invented the bitcoin cryptocurrency (Nakamoto, 2008). In detail, blockchain is a «…ledger that record transactions in a trust less environment and is protected by the science of cryptography» (Pournader et al., 2020). In other words, it is a digital register in which every transaction that could take place is located in different blocks and the security of these movement is guaranteed by both the digital signatures and cryptographic. Blockchain provides a great variety of advantages to corporations that efficiently apply it in their *modus operandi*. On one hand, Carter and Koh (2018) together with Casey and Wong (2017) argue it allows a more efficient traceability of the cargo, transparency in the overall supply chain operations, the carrier onboarding and the mobility as a service. On the other hand, Pournader et al. (2020) registered different benefits such as the improvements in the speed of data and financial transactions, the enhancements in safety of shared data and digitalized assets and the reductions in the number of intermediaries involved. The diffusion of this digital solution has heavily influenced the way of doing business in a wide range of sectors including the transport logistics field. Indeed, many authors have recorded an increasing interest in the usage of the blockchain (Pawczuck et al., 2018; Carter and Koh, 2018). Regrettably, still in this regard, the documentation reviewing the incidence and the trends in the deployment of this solution, in the distribution logistics sector, is limited (Pournader et al., 2020) but Moore (2018) stated the most promising prospects for the future of the blockchain in this environment. It is motivating to report many scientists claim by 2023, the ever-increasing utilization of the blockchain and the most innovative technologies, such as those related to the internet of things (IoT) and artificial

intelligence (AI), will be able to radically change the entire supply chain functions, operations and processes. (Maguire et al., 2018; Xu et al., 2018; Gunasekaran et al., 2018; Winkelhaus and Grosse, 2019).

This brief investigation into the literature available reveals in the field of transport logistics the path towards the digitalization of processes is a constant common denominator that has been characterising most of the corporations of this sector over the years. Even the complexity of this path, the advantages it is able to bring, in the long-term, are multiple and relevant since they are capable of providing to enterprises the opportunity and the challenges to improve their competitiveness and their overall performance. Specifically, this section emphasizes firstly, the relevant drivers of digitalization, secondly, the digital dissemination and the factors inhibiting it and, finally, the great variety of digital solutions transport logistics sector can count on. The available digital technologies are multiple, and they are able to give support and innovation to whichever type of required operations, processes and activities. ***Table 7*** was created with the principal purpose to summarize, making more clarity, the main digital solutions adopted over the years in the logistics and transport sector.

Table 7. Digital technologies definitions

DIGITAL TECHNOLOGY	*DEFINITION*
Transportation Management System (TMS)	TMS is a supportive tool for an efficient and reliable transportation process (Mason et al., 2003).
Enterprise Resource Planning (ERP)	ERP is a «…tool for comprehensive planning, coordination and management of companywide tasks» (Hompel et al., 2015)
Warehouse Management System (WMS)	WMS is a computer software aimed at managing, monitoring and optimizing all the activities related to the warehousing and the distribution of freights (Hompel et al., 2015).
Electronic Data Interchange (EDI)	EDI is «…the computer-to-computer exchange of business information electronically, in a structured format, between business trading partners » (Ferguson et al., 1990).
Global System of Mobile (GSM)	GSM is a digital transmission technology that provide to enterprises the opportunity and the ability to transfer relevant and crucial data from the corporate business to the vectors and vice versa (Giannopoulos, 2009).
Dedicated Short Range Communications (DSRC)	DSRC is a transmission technology capable of transferring, trough radiofrequency, relevant data to control authority (Liu and Gong, 2014)
Global Positioning System (GPS)	GPS is a technology that enable vehicle to be traced, in real time, by the corporate business. Thanks to this digital solutions enterprise have the opportunity to receive, through satellite signals, the exact location of the cargo (Radivojevic et al., 2017). It is widely used in transport and logistics sectors because its efficient application led to the enhancement in the quality of services offered and the reduction in the management of fleet costs (Giannopoulos, 2009).
Radio Frequency Identification (RFiD)	RFiD is an innovative and complex digital solution capable of identifying, by means of radio frequency electromagnetic fields, the cargo (Evangelista and Sweeney, 2006). Tags RFid are located on the freight and they contain a huge amount of data useful to immediately recognize and collect relevant information about load unit (Radivojevic et al., 2017).
Wireless Sensor Network (WSN)	WSN is another type of identification technology through which the businesses can collect data about both the position and the physical attributes of cargo (Radivojevic et al., 2017). In particular, they are composed of a large number of sensor-nodes that, by means of wireless, are able to transmit data efficiently (Brandolese and Rucco, 2012).
Customer Relationship Management (CRM)	CRM is an innovative and recent marketing strategy aimed at establishing a long-term and solid fiduciary relationship with its clients, in order to generate loyalty through IT infrastructures (Zikmund, 2003).
Cloud System	Cloud systems can be viewed as a sort of digital infrastructure enabling the development of digital collaboration platforms, which make international shipments more and more fluid, traceable and straightforward (Soebhaash et al., 2013).
Blockchain	Blockchain is a «ledger that record transactions in a trust less environment and is protected by the science of cryptography» (Pournader et al. 2020).

Source: Personal elaboration

2.3. Challenges and resilience in times of crisis

This section has as its main analysis objective the study of the impacts and the managerial challenges corporations, mainly those related to logistics and transport field, have suffered over the years due to the different and multiple economic, social and health crises that have occurred. Moreover, ample space is left to both the definition of the concept of resilience, understood as a key skill that businesses are called to develop when the environment around them becomes highly characterized by uncertainty and volatility and the fundamental role acquired by digital solutions in the midst of the current health emergency.

Given the extreme contemporaneity of Covid-19 phenomenon, scientific research on the subject is quite rare. The main objective of this section is to propose a brief review that takes into account the little empirical research and the many instant papers developed in the midst of the pandemic. In this regard, a total of 85 instant papers have been collected from March to August. These were catalogued in an excel file according to the title, publication date, authors, organizations, nature of the paper (position or primary data), keywords and main content (see ***Appendix A***, instant papers review). After the classification process the instant papers were selected in terms of relevance and representativeness of the topic in question. This mechanism allowed a thoughtful review of the information developed during the health emergency.

In details, the first section analyses the impacts past crises, such as the financial crisis of 2008, and the present crisis, Coronavirus, have had on distribution logistics corporations. The second section investigates the managerial and the operational challenges corporations have had to face at the advent of Covid-19 crisis. The third section proposes a definition of the concept of resilience analysing the elements that nourish it. And, finally, the fourth section researches the change of role in the use of digital technologies as a fundamental tool to survive efficiently to the socio-economics crisis.

2.3.1. The impacts of previous and current disruptions in transport logistics

The investigation of the incidence and the ways of reaction through which companies, especially freight forwarding ones, have been used to deal with unexpected events that over the years have been aggressively unleashed in the whole world and in the international economy is of great interest for this research. The Covid-19 pandemic, which occurred in the first months of 2020, was an unexpected and a far-reaching event. This has constituted, and is still constituting, not only a worrying health emergency but, also, a drastic and a relevant economic-financial crisis for the entire globe. It has affected, as all sectors, also the logistics and transport

one. In this regard, it is considered appropriate to build a brief literature investigation to highlight the effects, the managerial choices and the vast challenges past crises and disasters have brought and encouraged to this specific sector.

The combination of different factors such as the evolution of phenomena like the globalization, the terrorism and the climate change together with the spread of unknown diseases and viruses has created a surrounding scenario, in which corporations are operating, ever more characterized by the element of variability (Berkoune et al., 2012). In other words, in this context, it is possible to make reference to a redefinition of the market painted by the VUCA model, which is nothing more than an ecosystem characterized by high levels of volatility, uncertainty, complexity and ambiguity (Bennett and Lemoine, 2014). Within this picture, the disruptions that have forcefully hit the economy and the activities that constitute the logistics and transport filed have been multiple and history is able to offer a wide variety of examples (Donadoni et al., 2018). Think, to name a few, the limitations in container volumes imposed by the increase in the Baltic Dry Index in 2003, the upward trend experienced by the oil price in 2008, the most damaging economic and financial crisis that occurred in the same year (Crum et al., 2011) and, again, the terrible earthquake in Japan few years later, in 2011 (Donadoni et al., 2018). Unfortunately, the literary interest in in-depth research aimed at identifying the incidences, the threats, the reactions and the challenges that the world of logistics and transport has been called to face during past crises is quite scarce (Folinas and Aidonis, 2012).

However, the recent study conducted by the authors Folinas et al. (2018) provides interesting information. More in specific, the analysis mentioned focused the attention on investigating the empirical researches that, over the years, have set the goal of examining and understanding the impacts and the consequences the global financial crisis has brought in the logistics and transport sector. This in order to extrapolate common trends in the effects, brought by the emergency, and in the reactions developed, to survive, by the companies under analysis. The financial crisis, which began in Europe in 2008, had significant and negative repercussions on this sector (De Leeuw and Wiers, 2015; Hofmann et al., 2018; Rothengatter et al., 2011). Providing some numbers, the World Trade Organization (WTO) has recorded a significant decline in the world of global trade and shipping equal to 10% (World Trade Organization, 2009). The negativity and the violence of the impacts are to be found, fundamentally, in the forced claim to rethink the old structural paradigms that had constituted the international model of the industry for many years (Miyashita, 2009), in the huge decrease experienced in the logistics flows in terms of reductions in both the orders and in the transportation volumes, in the dissolution of major transport contracts and in the increase of oligopoly strategies as well

as in the promotion of more efficient but less expensive means of transport (Mazzarino, 2012; Folinas et al., 2018). In this highly unstable context, the decision makers of the sector have shown a relevant capacity to adapt to the new paradigms (Bentley, 2011). This characteristic, also known as structural flexibility (Beamon, 1998), is fundamental because «...in economically difficult times, if organizations align their strategies with the changes of such an environment, their performance is likely to be optimised» (Zajac et al., 2000). In addition to this capacity, many other response mechanisms have been implemented by enterprises to efficiently cope with the pressure brought by the massive spread of the economic crisis. Among the typical reactions it is possible to detect, on one side, important upsurges in cooperation, innovation, development of new learning techniques and digital solutions that allow for greater effectiveness and efficiency and, on the other side, relevant reductions in terms of operational activities and human capital employed (Piranfar, 2009; Bentley, 2011). A common trend in response to periods of economic downturns is provided and studied by a previous research promoted by Yu et al. (2016). The authors state that, in most cases, this field, in order to remain active in the market, even though it is introduced in an extremely complex and volatile environment, is used to capitalise in sustainable logistics rather than to focus on investments aimed at increasing the efficiency and the effectiveness of freight transport. In the framework of this brutal economic and financial crisis, in accordance with the theory conveyed by Lan and Zhong (2018), the challenges enterprises, in the logistics and transport sector, have been called to face are related both to greater investment in infrastructures, aimed at increasing the level of integration and coordination within the multifaceted system and to sophisticated emphasis on the world of digital technologies and their proper and efficient exploitation (Folinas et al., 2018).

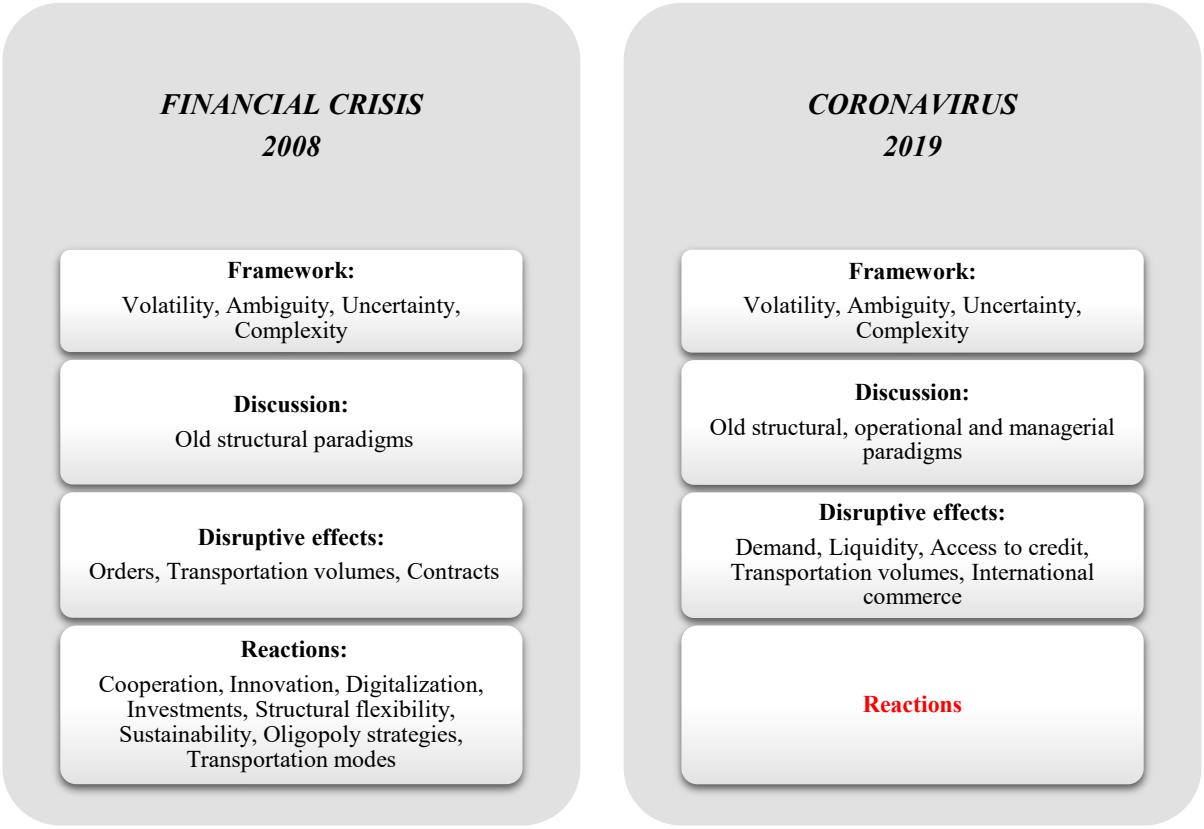
Having investigated the 2008 global financial crisis and its link with the transport and logistics sector, it is now important to move the emphasis on the most recent crisis, the Covid-19 health emergency, since it is still affecting the domestic population and the world economy as a whole. In this context, it is interesting to carefully analyse which have been the damages, the challenges and the opportunities faced by the sector under analysis and, specifically, which have been the reaction strategies implemented by corporations in order to ensure and to guarantee the continuity of their businesses within the new operational ecosystem. Coronavirus is an extremely recent crisis, which began its spread worldwide on December 31, 2019 when Beijing, for the first time, revealed several cases of a suspected and unknown form of pneumonia in

Wuhan[11]. Covid-19 is among the epidemic outbreaks that, in line with the thought expressed by the author Ivanov (2020a), are events that are initially limited to a restricted geographical area but that, in a very short time, spread like wildfire throughout the planet. This phenomenon can be traced back to the advent of three other epidemic disruptions such as SARS, *Severe Acute Respiratory Syndrome*, MERS, *Middle East Respiratory Syndrome*, and Ebola (Johanis, 2007; Calnan et al., 2018; Buyuktahtakın et al., 2018). In particular, these unforeseen events are characterized by three main attributes: long-term negative effects; large scale diffusion and a dissemination affecting, concurrently, the supply, the demand and the logistics infrastructures (Ivanov, 2020b). If analysed at the general enterprise level, the rapid diffusion of Covid-19 has caused an immediate contraction in demand which, in turn, has led to significant decreases in terms of liquidity and access to credit. This combination of factors has made it extremely difficult to manage and re-organize work activities already negatively impacted by the imposed rules on social distancing (Cascetta et al., 2020). Analysing deeply the logistics and transport sector this has recorded a highly significant negative impact (Zheng et al., 2020). In particular, the imposition of the lockdown of manufacturing corporations, forced by the D.L 25 March n. 19[12], has had disruptive effects on the flow of freight and logistics in general, as these demands are derived (Agostino et al., 2020). The greatest effects were recorded, on one hand, in terms of turnover, which dropped on average by 14 percentage points compared to the traditional levels experienced in the previous years (CERVED, 2020) and, on the other hand, in terms of transport volumes which contracted by 40% in the first months of 2020 (CONFETRA, 2020). Some interesting numbers are reported from an analysis conducted by *Fedespedi*, which investigates the main repercussions Covid-19 has brought on transport and logistic field (Fedespedi, 2020). From January to May 2020, the researches have recorded significant drops both in the international commerce and in the container, maritime and air traffic. In detail, the exports reduced by 16,8%, the import by 19,2% while container, maritime and air circulation respectively by 11,4%, 8,2% and 26,7%. These figures clearly demonstrate the brutality and the violence of the impact the health emergency has had on this sector. However, the president of *Fedespedi*, Silvia Moretto, declared despite the considerable damage suffered there are positive signs that give courage for a gradual and positive recovery in this specific field (Fedespedi, 2020).

[11] A densely populated city and main hub for international trade located in Central China, more precisely the capital of Hubei Province.
[12] Gazzetta Ufficiale, *D.L 25 Marzo 2020 n.19*

Figure 7 is reported in order to summarize the brief comparison between the global financial crisis, 2008, and the Coronavirus, 2019 underlying the not jet investigated reactions of freight forwarding companies to the current socio-economic crisis.

Figure 7. Financial crisis vs Covid-19



Source: Personal elaboration

Now it seems stimulating to study which are the major and immediate challenges organizations, at operational, managerial and organizational level, have been called to face. In other words, how the business model has changed during the pandemic dissemination? And, in which way have the companies reacted?

2.3.2. Among challenges and opportunities of Covid-19

Before starting to in-depth discuss the main challenges brought by Coronavirus to the industry world it is important to recognize which is the main obstacle leaders, especially in the Italian nation, has met. The research carried out by Pisano et al. (2020) argue the main inability of managers is to be traced in the lack of ability to recognize the extent of the threat posed by Covid-19, to organize a systematic response to it and to learn the first successes in implementation and, above all, the failures. In other words, what has emerged is the inability to respond quickly and effectively to the trials posed by the emergency. Also, according to the

researchers Agostino et al. (2020), the most important weaknesses the leaders of transport logistics company has demonstrated is to be sought in the inability to react, that is the incapability to adapt rapidly and immediately to the changes of the surrounding environment. In this context, the figure of the company leader, understood as the individual in charge of guiding the business into a new equilibrium, becomes fundamental. In other words, he is called to trust in thought and reason, leaving aside everything that is personal and other people's experiences and opinions. The key principle of the *"fight"* against the Coronavirus is «Adapt and Change*»* (Viani, 2020). More specifically, the task of the leader is to instil confidence in uncertainty and to implement business strategies that may be countertrending but fundamental to protect businesses against a catastrophic impact. Therefore, it becomes mandatory, to survive and to efficiently reach the next normal, to implement an action plan designed, characterized by steps and continuous updates, always keeping in mind the future will be completely different from the pre-emergence health times. Being this, a sector of fundamental importance, capable of guaranteeing the continuity of supplies of essential and primary goods (Choi, 2020), companies were called to transform, in an effective and efficient way, a health emergency into a real opportunity to be seized through new, or already established, action plans.

The challenges Covid-19 has provided to transport and logistics corporations can be consider common to the ones experienced by all other industries. Indeed, these are mainly related to the drastic drop in turnover, the protection of employees and organizational adjustments, the impositions and the limitations in the applicability of smart working, the collapse of the old supply chain paradigm and the new risk management mode.

2.3.2.1. The drastic drop in turnover

The first reflection that comes to mind when hearing about the economic shutdown is certainly the drastic and sudden drop experienced by turnover. Businesses have been called upon to manage, on the front line, the effects of the emergency on the financial situation through their own internal resources. In this context enterprises have requested assistance in terms of liquid assets in order to, at least, guarantee the survival to their activities. This request led the government to establish several decrees of law to support corporations and the general economy. It seems important to remember the main ones: D.L Cura Italia, D.L Liquidità and D.L Rilancio. Specifically, the D.L Cura Italia[13], D.L 17 March 2020, n. 18, provided the first measures to support liquidity through the introduction of the redundancy fund and the moratorium on loans and mortgages payments. Through the D.L. Liquidità[14], D.L 8 April 2020

[13] Gazzetta Ufficiale, *D.L 17 Marzo 2020 n.18*
[14] Gazzetta Ufficiale, *D.L 8 Aprile 2020 n.23*

n.23, a plan has been set up with a total amount of more than 750 billion euro in order to ensure the liquidity needed to meet the financial maturities with the aim of limiting and/or avoiding the dangerous dominoes that could occur in case of lack of payments. Finally, thanks to the D.L. Rilancio[15], D.L. 19 May 2020, n. 34, more than 16 billion has been allocated, the possibility of using the redundancy fund has been extended, interventions in the fiscal field have been expanded and non-refundable grants have been paid out. What can be easily derived is the complexity and the large number of actions that have been requested to economic realities in order to obtain an effective and efficient financial management. Therefore, it was necessary to rethink and discuss every element from budget forecasts to present and available cash flow. With the strong awareness that the transformation of the business model will be radical, it was necessary to understand how to re-orient operations, investment choices and cash options (Porcu, 2020a).

2.3.2.2. The safeguarding of collaborators and organizational adjustments

After the need for liquidity, the engine of every economic activities, the second most important asset of corporations is the personnel. Without employees, companies do not have the necessary skills and resources to keep their value chain alive. In the light of this, a major priority enterprises had to consider, as soon as the virus began to spread, was the protection of their workers (Jullens, 2020). On one hand, employees were called upon to collaborate and manage themselves autonomously in order to guarantee the continuity of their work; on the other hand, corporations were faced with a series of great and enormous managerial complications to be overcome immediately in order to guarantee the continuity of the entire company business in total security. The Circular of the Ministry of Health n. 3190 of March 2, 2020[16] stressed the responsibility for the protection of biological risk is in the hands of the employer who makes use of the collaboration of the competent physician, the Head of the Prevention Protection Service and the Workers' Representative, for the purposes of risk assessment pursuant to Legislative Decree 81/2008 without prejudice to the obligation to communicate information to all employees, starting with the hygienic-sanitary measures to be taken in the workplace to minimize the risk of contagion (Rendina, 2020). The CEOs of economic realities, in fact, had to move on several fronts, at the same time, in total compliance with the shared Protocol for the regulation of measures to struggle and contain the spread of Covid-19 virus in the workplace, issued on March 14, 2020 and subsequently integrated on April 24, 2020[17]. Within this protocol,

[15] Gazzetta Ufficiale*, D.L 17 Maggio 2020 n.34*
[16] Ministero della salute, *Circolare del Ministero della Salute n.3190 2 Marzo 2020*
[17] Ministero del Lavoro, *Protocollo condiviso misure di contrasto Covid-19 24 Aprile 2020*

indeed, there are described all the security measures to which corporations had to adapt in order to be able to continue their economic activities during the period of health emergency ensuring maximum security to their collaborators. Specifically, the actions to be taken mainly concern the obligation for managers to:

- inform through the most suitable and effective ways all workers and anyone entering the company about the provisions of the Authorities, delivering and/or posting at the entrance and in the most visible places special information leaflets;
- review the methods of access to the firm through the control of body temperature or the execution of the swab;
- rethink the ways in which external suppliers enter the company, for example by imposing entry, transit and exit procedures and prohibiting access to offices;
- ensure the daily cleaning and periodic sanitization of premises, environments, workstations and common leisure areas;
- take all hygienic precautions, in particular for the hands, by providing within the company detergents accessible to all employees;
- manage the common areas with the provision of continuous ventilation of the premises;
- organize the company through work shifts, transfers, smart working and the remodulation of production levels;
- manage the entry and exit of employees;
- organize internal transfers, meetings, internal events and training activities.

Therefore, it is possible to grasp the managerial and organizational difficulties to which employers had to adapt in the shortest possible time in order to remain active in the market. In addition to organizational adjustments, corporations have had to implement the use of digital tools for the prevention of contagion. In this regard, Viani (2020), business leader of appFORGOOD, discuss, in an article published for digital4executive, about the launch of the latter and its capability of signalling, through an alarm, the exact moment when the distance between employees falls below the meter.

2.3.2.3. Constraints and limitations in the applicability of smart working

One of the direct consequences of Covid-19 was the imposition of social distancing which upset, on one side, the lives of citizens around the world, who found themselves locked up at home, and, on the other side, the working habits of many employees, who had to adapt to the practise of smart working. Indeed, businesses were called, following the Prime Ministerial

Decree of March 11, 2020[18], to make the maximum use of agile work for activities that could be carried out at home or remotely. A survey promoted by Cgil and the Di Vittorio Foundation (Il Sole 24 Ore, 2020) declared that, in Italy, during the lockdown of manufacturing companies, about 8 million Italians employees worked in telework conditions. The number, again according to this study, seems to have increased drastically from only 500 thousand people who used to work in this mode before the pandemic. But which were the main constraints and limitations that arose from the implementation of such work approach? And, what are the forecasts for its sustainability in the next normal? The imposition of smart working has resulted as a radical change in the working paradigm, thus triggering a series of difficulties and boundaries in the applicability with which most economic realities have had to deal with. The application of the job from remote appears in fact very limited; ***Table 8*** reported some practical examples.

Table 8. Limitations in smart working applicability

ACTIVITIES	*LIMITATIONS*
Negotiation	The practice of negotiation is based on deep mutual trust and interpretation of non-verbal communication.
Relationship building	Human contact and physical interaction play an important subconscious role in building relationships.
Personnel training	Collaboration and interaction with a supervisor are essential for reactive and functional learning.
Decision making meetings	Implicit signals such as emotional expressions are fundamental in making consensual decisions that remotely become difficult to understand.

Source: Personal elaboration from (Mckinsey & Company, 2020)

What it is possible to detect is that many business functions require human contact by their very nature. During the imposition of production firms' lockdown, a great variety of economic realities were faced with the need to adapt these activities and, in the worst case, to suspend them until the end of the crisis. Therefore, it is spoken of limits tied to the impossibility to realize an informal human comparison, necessary for the effective performance of fundamental business functions. In addition to the scarce applicability of smart working on the complex organizational structure of corporations, there is another challenge, perhaps the most complicated, that these realities have had to face to ensure the effective use of smart working by all employees. Never as in this period the digital preparedness of companies has become a determining factor in ensuring business continuity by adapting reactively to the changes in the

[18] Gazzetta Ufficiale, *Decreto del Presidente del consiglio dei ministri 11 Marzo 2020*

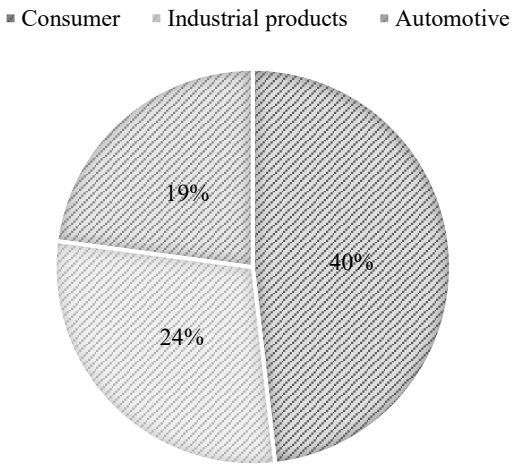
working model. A survey promoted by Hermes Consulting in the month of April 2020 declared that from the point of view of personal equipment, out of a sample of 500 Italian managers, 60% of them already had a work area in their homes while 39% had to act immediately with emergency plans at the advent of Covid-19 and in 77% of cases the devices that were used were provided by the company and connected to a Virtual Private Network (Scaglioni, 2020). The reactivity in the implementation of quick and dirty solutions was fundamental to overcome this challenge as well. Certainly, the acceleration of the use of agile work brought by the advent of Coronavirus has not only had a negative impact on businesses. This paradigm shift, is confirmed by a study published on June 1, 2020 by Mckinsey & Company (Mckinsey & Company, 2020), first of all, has increased the resilience of companies that have been able to react to the challenges in a more flexible and efficient way; has improved the cost position by reducing the demand for large real estate spaces and corporate travel and has increased employee satisfaction by offering them greater flexibility and work autonomy. But, the most important improvement, reported by the results of an internal survey conducted by Digital360 S.p.A, a company listed on the AIM Italia market, concerns the increase in work effectiveness occurred during the weeks of *"forced"* smart working. The latter showed signs of clear enhancement. In fact, 88% of employees believe their work efficiency has improved thanks to the use of remote working (Maci, 2020). In light of these positive aspects and despite the difficulties encountered in implementing and preparing for the effective use of smart working, many workers emphasized their will to continue this experience even once the health emergency will be over (Il Sole 24 Ore, 2020). The survey conducted by Bdo, directed to 244 senior managers from eight different European countries (Belgium, Netherlands, France, Germany, Italy, Spain and Great Britain), confirms the smart working sustainability in the next normal. Indeed, according to the result recorded in the Italian country, the 42% of the respondent declared the willingness to continue the activities through a massive use of remote work (Redazione Romana, 2020).

2.3.2.4. The collapse of the traditional supply chains and old risk management modes

The global economy, in which the Coronavirus has become the central character, has been for years characterized by a strong level of connection that has led to the inevitable enlargement of the effects of the virus both in terms of health, in numbers of contagion, and in economic terms, immediate and large-scale. The super lean operating model, that for ages has increased ROI, during the health emergency seems a potential responsibility (Jullens, 2020). In this regard, the results of a study reported by Deloitte are described. It stated that 75% of companies suffered a negative impact on their supply chain due to the logistical restrictions imposed by the Covid-19 pandemic (Mazzucco, 2020). Specifically, 62% recorded delays and lengthening of delivery

times for components from Chinese suppliers[19]. These problems arose from the fundamental role that China plays as the *"world factory"*, the world's leading supplier (Kilpatrick, 2020). In order to provide a view by industry, ***Figure 8*** is constructed and reported as an example of the phenomenon.

Figure 8. The industry effects of supply chain blockage



Source: Personal elaboration from (Mazzucco, 2020)

Thanks to this representation, it is possible to note the impacts the slowdown and partial blockage of the supply chain, started in China at the advent of the health emergency, have brought to the Consumer (40%), Industrial products (24%) and Automotive (19%) sectors[20]. For the future 2020 an important trade contraction of 15.3% has been estimated. Moreover, many businesses, found themselves to face the blockage of supply chains and the *safety shock effect* (Bellini, 2020). The latter has led to the management of large stock components to deal with unforeseen events. The CEOs of corporations were called upon, firstly, to question everything that was part of the old normality based on strategies of extreme internationalization and overexposure and, secondly, to rethink a more decentralized business model able to react more effectively to exogenous phenomena of similar or broader scope. In other words, companies have had to define the magnitude of the exposure of their logistic chain to the uncertainties and how much such exposure would have lasted, including suppliers of band 1,2,3 and considering the levels of stocks in possession (Licata, 2020a). A research conducted by Foster (2020) highlighted the importance, in times when supply chain is under huge pressures, of finding a balance between protecting inventory to meet fluctuating and intermittent demand and the flexibility that cash flow and business model revision needs can determine at any time. Following Agostino et al. (2020) what is required is a radical rethinking of the old operational

[19] For more details see: *Instituteforsupplymanagement.org*
[20] For more details see: *Statista.com*

paradigms and an immediate movement towards to both short and redundant supply chains and to *make to stock* strategies. Specifically, economies realities are called to respond efficiently to these relevant disruptions through both reallocation and diversification strategies and technologies capable of predicting emergency or risk exposure (Sharma, 2020; Perona, 2020). In other words, it is important to redesign a supply chain capable of looking at territoriality (Di Rosa, 2020). In this context, it was essential also to review the risk management methods that companies typically use in the old normality. Indeed, standard risk management was another important weakness corporation have shown to possess during the socio-economic crisis period. This unpreparedness limited the awareness of the vulnerability of the super-lean model applied to the supply chain and brought important organizational problems (Alicke et al., 2020). This idea is confirmed by the survey promoted by the RISE Laboratory of the University of Brescia and ASAP Service Management Forum, an important Italian community that has been dedicated to service and service-related issues for many years. These realities, on March and April, have created a questionnaire involving 180 companies in order to analyse the impact of the Covid-19 on the supply chain of products and services. The results shown that almost 50% of the sample classifies the impact of the emergency on the internal supply chain as "high" or, in some cases, "very high" (Adrodegari et al., 2020). This percentage underscores the immediate need for economic organizations to reconcile all their strengths, experiences and resources to develop fundamental risk management capabilities to, in turn, support a resilient future strategy capable of responding to possible future shocks of similar magnitude. Specifically, they have been called upon to go beyond enterprise risk management (ERM) processes as unable to recognize highly complex, low probability but high-impact solutions. The implementation and testing of simulations would be highly effective in predicting the impact of large-scale catastrophic events and the actions to be taken to mitigate their effects.

It is interesting, at this point, to underline that unexpected events can be as negative as positive. In fact, according to the thought expressed by Schumpeter (1952) every disaster is followed by a process of creative disruption. This phase is capable of offering businesses important threats and challenges that, in turn, allow a shift towards innovation processes and technological changes, which in the steadiness of routines would remain hidden and not efficiently grasped. In other words, economic crises together with any kind of unpredicted but far-reaching disasters encourage and motivate companies, both in general and specifically those which are part of the logistics and transport sector, to undertake new and unexplored practices in order to develop the right resources, skills and infrastructures that provide them the possibility and the opportunity to survive and remain active in a completely new market. This thought is confirmed

also in the context of Covid-19; in fact, the advent of this socio-economic crisis is seen as a disruptive force capable of generating both negative and positive incidences. It is seen as an «…enormous business opportunity» (Porcu, 2020b). In light of this, it is now stimulating and essential to analyse the most important ability corporations, in the extraordinariness of the period, are called to develop in order to accept and win all the challenges imposed by Covid-19.

2.3.3. Resilience in uncertainty and volatility

The sum and the combination of all the natural, social and economic-financial calamities that have occurred over the years result, as introduced in the previous paragraph, in an operating environment characterized by high levels of variability and vulnerability. Disruptions are the greatest architects of organizational upheaval. In fact, these are seen as significant threats to companies that find, at their occurrence, the survival of their main activities completely undermined (Bhamra et al., 2011). Due to the restrictions in expertise, awareness and familiarity, corporations face relevant complications in forecasting all potential incidences may come about (Hanen and Huhtinen, 2011). Definitely the large majority of organizations, in an effort to safeguard as much as possible the integrity of their business from unforeseen eventualities, develop emergency or disaster recovery plans (Cerullo and Cerullo, 2004). Sometimes, however, these do not seem to be as efficient as they might be to ensure certain survival (Seville et al., 2006). It is exactly in this framework that the movement of corporations towards the development of the concept of resilience is increasingly taking place. This constitute one of the most important skill and ability that a company is invited to improve in the long-term to survive the new paradigms that constitute the surrounding background (Christopher and Peck 2004; Rice and Caniato, 2003). This idea finds confirmation also in the context in which Covid-19 has forced economic realities to operate. In fact, in an article published by McKinsey & Company, it is possible to detect the definition of resilience as a «vital necessity» to endure the completely changed nearby scenario (Sneader and Singhal, 2020a). Thus, this ability is the key that enables companies to both overcome the challenges imposed by the health emergency (Redazione Romana, 2020; Sneader and Singhal, 2020b) and proactively face the uncertainty and the typical volatility of the new context (Danoesastro et al., 2020). Resilience is seen, in this operational framework, an active capability which allows corporations to interpret the context, anticipate the changes and reconsider both the processes and the interal resources (Dekra, 2020)

Resilience has a very wide range of applications since it is a multidisciplinary and multifaceted concept (Bhamra et al., 2011). Fort this reason, it is commonly applied in different fields of analysis such as ecology (Walker et al., 2002), metallurgy (Callister, 2003), psychological sciences (Barnett and Pratt, 2000), supply chain management (Sheffy, 2005), strategic management (Hamel and Valikangas, 2003) and, finally, engineering (Hollnagel and Woods, 2006). Even if its extensive applicability the definition of the term is always linked to the ability to «…withstand systematic discontinuities as well as the capability to adapt to new risk environments» (Starr et al., 2003). More in specific, resilience is «…the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from disturbances of the deliberate attack types, accidents, or naturally occurring threats or incidents. System resilience for a particular function can be measured based on the persistence under uncertainty of a corresponding system's performance in the face of disturbances» (Ayyub, 2013). In other words, it is nothing more than the capability of adapting rapidly to the change an unforeseen and far-reaching event could bring while keeping as far as possible the conventional productive and capacity levels. It is the combination of factors such as the readiness and the preparedness, the response and the adoption, and, finally, the recovery and the adjustments to the new environment (Ponomarov and Holcomb, 2009). This, it is intuitive to recognize, is a complex ability that most of the time turns out to be concealed and businesses acknowledge they own it only once a shock arises (Juntunen, 2014). Additionally, it can be defined as a strategic element that provide to corporations the opportunity to be both efficient and safer in the long run (Hollnagel et al., 2010) and competitive as clever in risk mitigation and recovery (Leviakangas and Aapaoja, 2015). In summary, a system can be defined resilient only once it proves to be based on a mindset capable of tolerating the unpredicted, maintaining the traditional operational capabilities and recovering quickly from the adversity brought by the disruptions. It is important to emphasize that this skill is not linked with the capability of surviving but of reacting, adapting and recovering (Bhamra et al., 2011).

To go deeper into the concept, the available literature proposed a great variety of researches focused on the investigations of the main elements that might composed the capability of resilience. For instance, a previous study conducted by Fiskel (2003) proposed an analysis of the concept linking it directly to four main characteristics: diversity, efficiency, adaptability and cohesion. Under the author's perspective these are the main attributes that contributes to the nurture of the resilience ability. In details, a system could be considered as resilient once it is characterized by multiple forms and behaviours, it is able to efficiently developed high level of

performance without huge resources consumption, it is flexible to change in response to new pressures and, finally, it is capable of sustaining a great variety of linkages. On another viewpoint, the researches Walker et al. (2002), in a study led in order to catalogue the element composing resilience, suggested a definition of the concept connecting it to the element of vulnerability. Specifically, resilience is described as the exact reverse function of vulnerability (***Equation 1***). Thus, it represents a function of exposure, susceptibility, and coping capacity (White et al., 2005; Molarius et al., 2014).

Equation 1. Resilience equation

$$Resilience = \frac{Coping\ Capacity}{Susceptibilty\ \times Exposure}$$

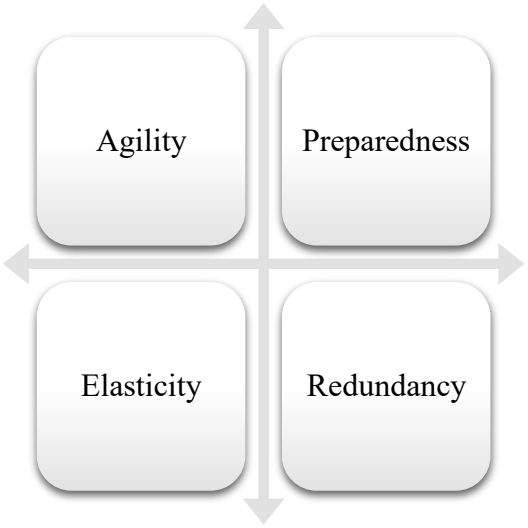
Source: Leviakangas and Aapaoja (2015)

Coping capacity is the capability of a system of operating, in times of crisis, through its available assets, resources and infrastructures; *susceptibility* is the ability to be reactive in absorb and accept an unforeseen event and, finally, *exposure* is a state in which systems can be found, often characterized by complexity and threats (Leviakangas and Aapaoja, 2015). Despite the wide variety of authors voicing their interest in this subject, the eleborate wants to pay particular attention to a very recent study conducted by the authors Rapaccini et al. (2020). This investigation has been conducted in the midst of Covid-19 heatlh emergency with the principal aim of studying the impact of the current epidemic outbreak on Italian manufacturing corporations. In particular it provided an exhaustive definition of the factors that shape the notion of resilience. Following the researches' perspective resilience is the perfect mixture of four main elements: agility, entrepreneurial preparedness, elasticity and redundancy (***Figure 9***).

Going through the elements description, *agility* is the capability of a system of adjusting and reacting immediately to an uncertain and volatile environment (Mason-Jones et al., 2000); *entrepreneurial preparedness* is a *"cumulative learning process"* (Cope, 2005) that allows entrepreneurs to develop an ability, firstly, to recognize the needs of their businesses in times of crisis and, secondly, to act in order to remain competitive in the market (Munoz et al., 2019); *elasticity* is «…the means of managing today's and tomorrow's increasingly connected and heterogeneous systems consisting of people, computing processes, and things» (Moldovan et al., 2018); and, finally, *redundancy* is the ability to both used resources in reserve and to introduce quickly other assets, skills and infrastructures helpful to successfully face the occurrence of unexpected event (Sheffy and Rice, 2005). Thus, systems which develop and

nurture carefully all these elements are more capable of quickly adapting, responding and recovering from turbolence and discontinues that might occur anytime.

Figure 9. Elements of resilience



Source: Personal elaboration from Rapaccini et al. (2020)

2.3.4. The development of digital resilience during Covid-19

The review of the resilience concept emphasized the advantages the development of this particular skill can provide to corporations in times of economic downturns and shocks (Currie et al., 2020; Dolgui et al., 2020). Due to the rapid and massive diffusion of Covid-19 emergency, enterprises, have found themselves *"jailed"* in a completely new framework based on unknown and unexplored paradigms. During the pandemic many players have developed few investigations in the form of instant papers aimed at discovering the role played by the digital technologies in Coronavirus survival. The explanation that has enhanced this particular interest derives from the fact that many investigators and experts, during the health crisis, have examined the phenomenon of Covid-19 in its widest scope, linking it directly to the acceleration towards the digitalization of processes (Basu, 2020). In this regard, Andrew Keen, one of the most influential commentators of the digital revolution, during an interview has reported «…we are surviving this pandemic thanks to technology» (Cancellato, 2020) and, additionally, an article published in the Logistica Efficiente website, argued «… the future is digital» (Logistica Efficiente, 2020). In fact, according to Capozuca (2020) a new Darwinian model will become established, according to which only realities predisposed to change and to digital transformation will be able to survive the challenges imposed by the crisis and effectively achieve what will be the next normal. Reporting some confirmative numbers and according to the DMEXCO Trend Survey about 70 % of executives from Austria, Germany, and Switzerland

(DACH regions) have expressed their agreement regarding the positive impact of the crisis on the company's digitalization process (Malev, 2020). Additionally, another questionnaire, promoted by the team Capterra, directed to 3.144 respondents from eight different countries (Australia, Brazil, France, Germany, Great Britain, Spain, Italy and Netherlands) on May, 2020, found a percentage of 39% of decision maker who emphasize the necessity of digital solutions to overcome efficiently the change underway (Manager Italia, 2020). This means that what experts have explored is the speeding up of the corporation's business models, including those in the transport and logistics sector, in the direction of a next normal, where «...digitalization is nearly omnipresent, automation is ingrained, and logistics has adapted to slower trade as the economic windfalls of globalization fade further» (Szakonyi, 2020). In other words, researches emphasized the even more important role technologies will play, from now on, on the overall industry world (Hernaes, 2020). In this regard, Carly West, direct analyst of Gartner Supply Chain Practices, affirmed digitalization will help economics realities to be leaner and more proactive in the future (Licata, 2020b). Certainly, it should be pointed out, it would be erroneous to declare the diffusion of Covid-19 is the primary cause of a digital transformation of processes and activities. In fact, it should be understood the advent of such a health emergency is an energetic push towards the increasing implementation of new digital technologies, path that many companies over the years have neglected and left in the *"to do list"* (Lars, 2020; Jorgensen, 2020; D'Auria et al., 2020; Casali, 2020; Veicoli, 2020; Antonucci, 2020; Scotti, 2020; Pesce, 2020). This thought is perfectly taken up and confirmed by Principal Consultant at Dept in the UK, Johathan Whiteside. He claimed «…the digitalization of operational processes has been on the radar for companies of all sizes for a while, but has usually landed in the "we'll get to it eventually" column. Businesses would talk about live chat or automating end-to-end operational processes but, ultimately, would decide not to go ahead, since they couldn't justify the internal change impact to support it. But now, new processes are being implemented overnight; businesses have already adapted, and rely on the technology to facilitate the changes» (Whiteside, 2020). In other words, organisations of every sector have been called to be reactive and proficient in the development of a digital transformation, that typically required from one to five years, in a matter of days or weeks (Baig et al., 2020; Blackburn et al., 2020). According to the senior executive at Gartner, Sandy Shen «...this is a wake-up call for organizations that have placed too much focus on daily operational needs at the expense of investing in digital business and long-term resilience» (Dean, 2020). In this context, what before Covid-19 was only an optional and a strategy that a business might implement to increase its market position and competitiveness, from now on it become a real necessity (Saenz, 2020; Campisa, 2020; Lesser and Reeves, 2020). Therefore, the diffusion of

Coronavirus worldwide has stressed a new attitude, developed by companies, towards the use of digital technologies; a phenomenon that has been recorded in all sectors, including the logistics and transport one. The economic actors, during the emergency, have rethought to digitalization and the benefits it is capable of providing. More in detail, technologies are now seeming as a *"glue"* able to sustain and guarantee the continuity of the operational activities in times of uncertainty and volatility (Whiteside, 2020). This means they are becoming fundamental tools that, if efficiently exploited, offer to corporations the capacity to remain competitive in the market by adapting to the new variable surrounding environment (Basu, 2020). What can be deduced is the implementation of digital solutions is no longer closely linked to advantages in terms of efficiency, effectiveness and competitiveness which, in turn, can offer transformations and innovations in the business models (Andal-Ancion et al., 2012; Colbert et al., 2016; Chesbrough, 2010; Fitzgerald et al., 2014; Osterwalder et al., 2005), but it has been positively linked to the above-mentioned concept of resilience (Lillie et al., 2020; Gastaldi et al., 2020; Close et al., 2020). Indeed, companies have realized digital investments are capable of offering them the right resources, skills, knowledges and infrastructures they need to adapt immediately and respond reactively to the challenges brought by the external environment shocks (Ferrajoli and Furfaro, 2020). In support of this statement is reported the thought expressed in an article wrote by Greg Karr, Capgemini Invent NA Service Delivery Manager. He argued the onset of the crisis could have been predicted by organizations as early as January 2020 if only they had invested time and money in right technology, analytics, and metrics. The unpreparedness to react is a clear sign of poor use of digital technologies (Karr, 2020). Thus, organizations able to invest in digital solutions have the opportunity to develop internal resilience extremely helpful to survive in hard times of crisis. It is important to remember that this thought does not seem to be entirely new because, a perhaps lower awareness of the support digital technology is able to offer to corporations, had already been widely debated in the last 90's and early 20th century by different researchers (Bowersox and Closs, 1996; Closs et al., 1997; Bharadwaj, 2000; Spanos et al., 2002; Golob and Regan, 2002a; Giannopoulos, 2004). A validation of the support and the assistance the application of innovative and sophisticated digital solutions are able to provide to companies dealing with logistics and transport is confirmed by the another thought expressed by the authors Cascetta et al. (2020) which argued «…only the financially sound businesses, less exposed to debts and able to govern a transition from transport to a more persuasive use of technology can survive with reasonable certainty; the others, in contrast, are more likely to be exposed to the probability of bankruptcy or to the risk of being absorbed by larger players». For this reason, the leadership is explicitly called upon to accelerate the deployment and exploitation of the most innovative

digital technologies and solutions to become more resilient and benefit from the new working paradigm (BCG, 2020). According to Campisa (2020) and Kilpatrick (2020), the digital resilience can be effectively powered by innovative technologies such as internet of things (IoT), blockchain, artifical intelligence (AI), 5G and robotics which allow transport and logistics realities to be anywhere at anytime (Desai, 2020).

Concluding, what emerges is on one side, the new role played by technologies as an essential partner for the survival and the efficient management of threats and challenges that Covid-19 crisis has brought and will continue to bring (Garcia, 2020) and, on the other side, the opportunity the crisis offer to the transport logistics sector to «…reason better about innovations by planning investments in digitalization and new ways of doing logistics» (Stifano, 2020).

3. Methodology

The advent of Coronavirus, as learned in the previous section, has violently upset the social and the economic paradigm in which forwarding companies have found themselves operating. After having analysed and understood the phenomenon in its scope and entirety, was born the interest in developing a study, capable of evaluating the impacts, the health emergency Covid-19, has had in the business models of logistics and transport corporations.

Given the rare empirical investigation currently available, this research has set itself the objective of understanding the ways in which the stringent government regulations and the lockdown of manufacturing enterprises have distorted: the mechanisms of profit, in terms of price structure, costs and revenue models (*value capture*); the offer of services and the value promise (*value proposition*); the sales channels and customers buying behaviour (*value delivery*); and the activities, skills and internal business processes (*value creation*). In addition, driven by the strong awareness of the pressure that is stifling global supply chains firmly connected and based on super lean systems, the incidence the pandemic has had on supply chains were also analysed. Finally, the study wanted to focus particular attention on the managerial challenges forced by the advent of the crisis, in order to capture the nuances in the way different economic realities reacted. Specifically, it was intended to analyse the degree of resilience demonstrated by enterprises and the connection between this ability and three other elements: the digitalization, the restructuring supply chain plans and the diversification strategies, to discover the role these could have in the present, to efficiently face challenges and in the future, to increase the corporation's capability of being resilient.

This investigation has developed in two distinct but highly connected phases. In a first stage of analysis and in accordance with a qualitative approach to research as unique in its ability to address issues of description, interpretation and explanation (Bluhm et al., 2011), it was promoted a qualitative exploratory analysis from March to June 2020. This was aimed at discovering, firstly, the incidence, the managerial challenges and the way of reactions corporations faced and implemented in the midst of the emergency and, secondly, the elements of resilience which corporations have been called to develop. Given the interesting results achieved, this qualitative analysis was complemented by a quantitative analysis. This second stage of analysis, developed from July to October 2020, was focused on the study of the role played by the digital transformation and by other elements capable of boosting corporations' resilience in the post Covid-19 era.

3.1. Qualitative analysis

The choice of a qualitative analysis has made possible an evaluation, simplification and subsequent restructuring of the initial data into broad themes and general categories that, as a result, have provided a greater understanding and explanation of the phenomenon; more complete reasoned than the conclusions that would result from the mere evaluation of the original initial data (Lee, 1999). This type of approach is appropriate when research theory and literature on a phenomenon appears restricted (Hsieh and Shannon, 2005). The benefit is given by the possibility to limit the use of preconceived categories (Kondracki and Wellman, 2002) by deriving the names of the final categories directly from the data; approach also described as inductive category development (Mayring, 2000). The desire to analyse a multiplicity of different case studies stems from the awareness that qualitative investigations based on a single case can lead to potential problems of generalization and misinterpretation of available data (Leonard-Barton, 1990). The selection of the companies was conducted on the basis of different criteria: these had to be freight forwarding organizations in international trade, located in the north of Italy, willing to participate with interest in the research project and capable of providing an adequate level of information and/or knowledge. Accordingly, cases were selected on the basis of their relevance for the investigation questions, their convenient accessibility and proximity to the researcher (Mason, 2002). Case studies have been broadly applied in discovering and investigating the world of third-party logistics service providers (Mortensen and Lemoine, 2008; Stefansson, 2006).

With the principal aim of analysing and evaluating the impact of Covid-19 pandemic on business models and how companies reacted to it, an interview protocol was built in April-May 2020; in the midst of the emergency. It is a fundamental tool as the reliability and validity of the data collected improves if based on a well-designed research protocol (Yin, 1994). The characteristic of this protocol is the high level of flexibility, a key aspect that, in accordance with Gioia et al. (2013) allows to avoid the imposition of academic terminology and to limit the loss of fundamental concepts deriving from the interview. The protocol used to collect the data was built in Italian language for communicative simplicity towards the participating organizations. Regarding the structure utilized at the time of the interviews (see ***Appendix B***, interview protocol) the protocol was divided into four main sections and followed the elements characterizing a dynamic business model. In the first section, the respondent was asked to briefly describe the role he plays within the company and some business features considered essential for the study, such as the technological equipment at the time of the crisis and an assessment of digital readiness. In the second section, specific information was requested about

the negativity of the impact, the problems, the unpreparedness and the influence of digital technologies at the time of the lockdown of manufacturing corporations. In the third section, on the other hand, reference was made to the business situation at the reopening with the ultimate aim of grasping the methods, actions and level of operations with which the companies were about to face the settlement/restart phase. Lastly, in the final section, the focus was on the situation after the crisis, the new normal phase. In this context, the interviewees were asked to forecast expected scenarios for the transformation that their business was called to undertake in order to effectively achieve the so-called next normal.

The data were collected, given the extraordinary impossibility of the moment to undertake vis-à-vis interviews, through deep structured telephone interviews and/or through digital platforms that allowed a good level of interaction thanks to the use of a webcam (i.e. Zoom). In order to meet, in the best possible way, the needs of the interviewees, two further modes of collection were provided: the recording of a voice and/or video message or the writing of a text containing the answers. In these cases, it was requested to send the documents via social, cloud or email to the researcher in charge of the interview. The protocol was sent few days before to the interviewees in order to allow a good preparation and a more effective success of the interview. The sending was directed to specific company positions such as Sales managers, Chief Executive Officers, Chief Marketing Managers, Chief Information Officers, Service managers and General managers. Each interview was conducted in the presence of only one business component and the total interview hours amounted to about four and a half hours. ***Table 9***, in addition to detailing the roles of the interviewees and the total duration of the interviews, describes precisely the sample taken into consideration. The total number of corporations interviewed was six. The amount of examined cases turns out to be coherent with the sample size, within 6 to 10 cases, recommended by Rowley (2002) and used in other qualitative exploratory research conducted in transport and logistics context (Prange et al., 2018: 1 cases; Wagner and Sutter, 2012: 4 cases). The entire sample offers some similarities and differences that need to be highlighted in order to have a clear framework to support the following sections. A first common feature is the presence of only pure-service players whose value proposition are based exclusively on logistics, warehousing and distribution activities. Also, with regard to the position within the supply chain, the companies interviewed are exclusively third-party logistics service providers (3PL) or integrated logistics service providers. A first difference refers to the company size. It is possible to note that, according to the numbers of collaborators employed, there was one very small firm (with less than 20 employees), the company number 1; two small to-medium- sized enterprises (from 10 to 250 employees), the corporations number

2 and 3, and three multinational companies, leaders in the logistics and transport sector: businesses numbers 4, 5 and 6 (with above 250 employees). These are respectively, according to the AandA's Top 25 Global Freight Forwarders List[21], the third, the octave and the first global freight forwarder corporations.

Table 9. Empirical cases: outline of firms' characteristics

FIRM	*REVENUES Mio (2018)*	*EMPLOYEES (2018)*	*SUPPLY CHAIN POSITION*	*ATECO CODE*	*LOCK-DOWN TYPOLOGY*	*DIGITAL READINESS*	*INTERVIEWS, ROLES, DURATION*
1	8	19	3PL	Protected	Winner	Low	1, CEO, 20m
2	23	44	3PL	Protected	Winner	Medium	1, CTCM, 1h, 5m
3	160	210	3PL	Protected	Winner	High	1, BM, 33m, 30s
4	1,063	60,000	3PL	Protected	Winner	High	1, BM, 23m
5	6,393	481,000	3PL	Protected	Winner	High	1, PM, 35m
6	23,282	83,000	3PL	Protected	Winner	High	1, SM, 1h, 20m

Note: the assessment of "digital readiness" is conducted by means of an inductive analysis derived from the responses and the attitudes exhibited by enterprises during the interviews

Source: Personal elaboration

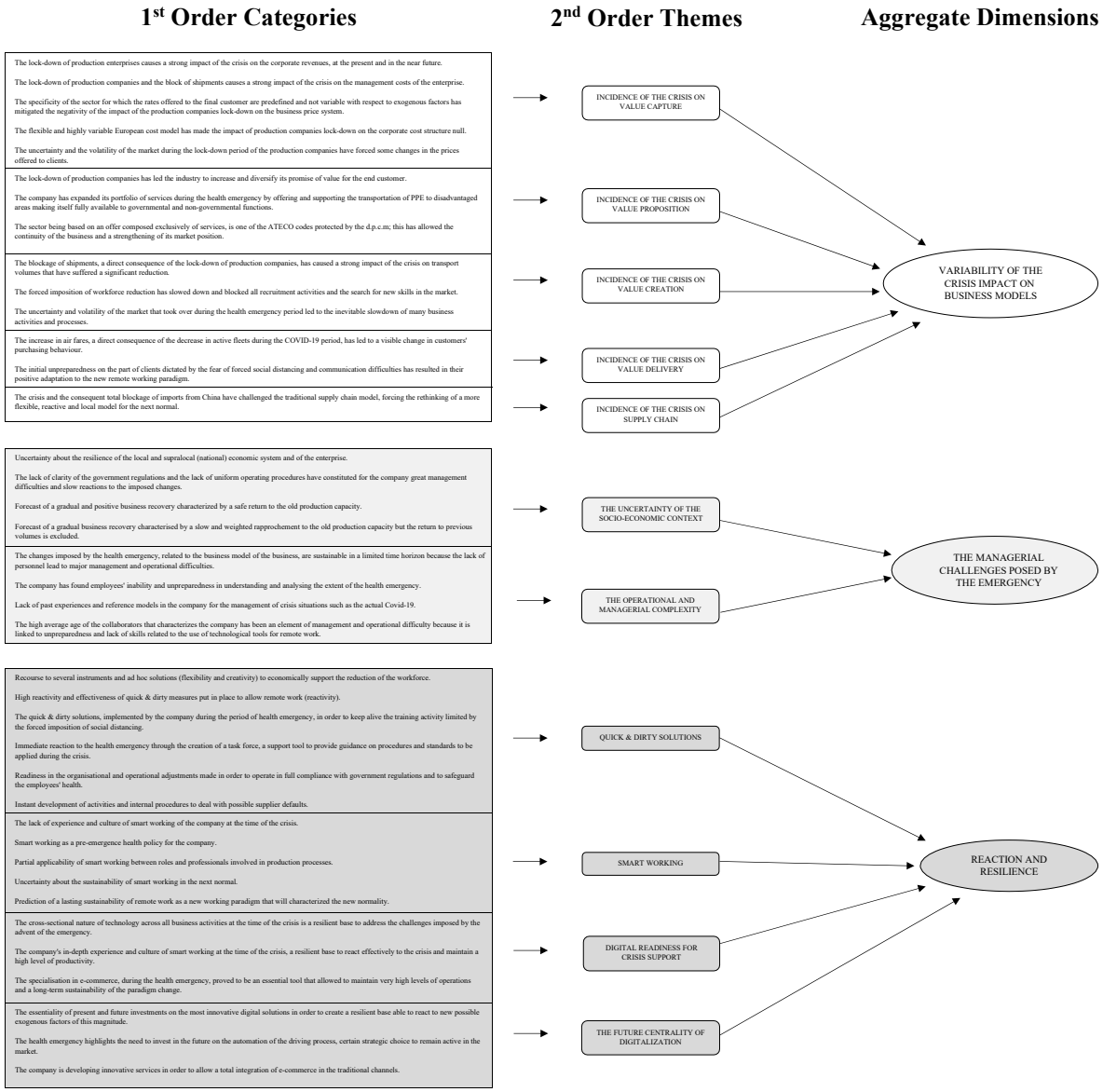
Contextualizing the sample to the research project, it is interesting to focus the attention on several issues. First of all, the economic realities considered, being based on an offer of services considered essential by D.L. 25 March 2020 n. 19[22], have been exempted from the block of activities occurred in the middle of the health emergency. In fact, the table confirms all the businesses in the sample are marked with protected ATECO codes; it is in these terms that they can be considered *"winners"* in the face of the forced imposition of lockdown. Another important difference was recorded in the degree of digital preparedness, competence of the companies at the time of the outbreak of the crisis. In this context what it is possible to detect is, on one hand, a consolidated digital readiness in the most mature and largest companies, in terms of company size, and experts in terms of internationalization, such as companies 3, 4, 5 and 6. On the other hand, in the enterprise number 1, there is a low level of digitalization deriving from the awareness that such investments require stable and well-founded justifications that, unfortunately, the smallest economic realities are not able to afford; and, in

[21] See for more information: *AandA's Top 25 Global Freight Forwarders List*
[22] Gazzetta Ufficiale, *D.L 25 Marzo 2020 n.19*

corporation number 2, it was possible to record a medium level of digital technologies exploitation based principally on the most traditional and common digital solutions.

The collection and the subsequent reduction of data followed a specific methodology. All interviews were recorded and subsequently transcribed. The transcription followed the model defined by Mayring (2014) *pure verbatim protocol*; it is developed word for word taking into account all dialectal formulations, fillers and articulations that may emerge during a dialogue. Once the transcriptions were completed, the coding process suggested by the *methodology of grounded theory* was implemented (Strauss and Corbin, 1990). Krippendorf writes «…the way categories are defined... is an art. Little is written about it» (Krippendorf, 1980). But it is important to remember that the system of categories is the central tool of analysis, contributing to the intersubjectivity of the procedure and allowing third parties to reconstruct or repeat the analysis (Mayring, 2014). Specifically, the scheme used assumes three different but interconnected steps that make it possible to categorize and codify information in order to capture the similarities and differences within the heterogeneity of the sample (see ***Appendix C***, representative quotations). Specifically, the first step is called *open coding*, at this stage, highlighting the exact words that seem to capture key thoughts (Hsieh and Shannon, 2005), the identification of the main concepts, their properties and dimensions and the grouping of data into sub-categories and categories called 1st Order Concepts begins. Conceptual coding can use in-vivo codes (Strauss and Corbin, 1990) or first orders (Van Maanen, 1979) whenever possible, or a simple descriptive phrase when in-vivo code is not available (Corley and Gioia, 2004). After facing open coding, the second step is characterized by *axial coding*: the grouping of categories dictated by the relationships that can be established between them. The results of this operation are the 2nd Order Themes. Once the second order themes have been identified it was possible to conclude the coding scheme through the last step: the *selective coding*. This allows one to reach the Aggregate Dimensions thanks to the selection of main categories of high level that collect in conceptually common strategic fields the 2nd Order Themes. ***Figure 10***, data structure, shows the result of this coding process implemented in the reference research project.

Figure 10. Data Structure



3.2. Quantitative analysis

After conducting the qualitative research which has led to some interesting results, it was agreed to carry on this investigation through the development of a quantitative analysis to gather further and more detail information (Voss et al., 2002). This choice arose from the awareness quantitative investigations «… are more helpful when conducting research on a broader scale or studying a large number of people, cases, and situations since they are cost-effective and statistical data can provide a succinct and parsimonious summary of major patterns» (Patton, 2002). The benefits are given by the possibility, provided by this method, to pose questions to a large and selected representative sample while allowing an easy and immediate comparison and statistical aggregation of data collected through the employment of a pre-constructed instrument or pre-determined categories (Yilmaz, 2013).

With the principal purpose to examine the factors constituting resilience in transport and logistics sector in the post Covid-19 era a questionnaire was developed, since it is one of the most used quantitative procedures (Queiros et al., 2017). Specifically, it has been elaborated following different phases which are now list in a summary way in order to facilitate a quicker and clearer understanding of the whole process. First of all, the main objectives were identified and a starting draft was developed. It is relevant to highlights that, as in the qualitative analysis, the survey was developed in Italian in order to facilitate clarity. After this stage, the questionnaire was tested in order to obtain useful feedback in terms of intelligibility, understanding and competence (Evangelista and Sweeney, 2006). This step is actual relevant since once the applicant is in front of the questionnaire, he or she does not have the opportunity to ask for clarification regarding the meaning of the questions. For this reason, it is advisable to create comprehensible and easy to understand questions placing them in a straightforward yet appealing format (Kumar, 2011). In particular, it was tested by three different experts in the field. After receiving the appropriate feedback, the survey was modified and the final protocol was obtained (see ***Appendix D***, questionnaire). In particular, this was composed of 23 questions and developed over 3 main sections. The first one, titled "*Registry*" had as main objective the collection of basic information about companies and the level of digital preparedness they were capable of developing over the years (9 questions); the second one, titled "*The role of digital technologies during the Covid-19 pandemic*" had the aim of analysing the role digital solutions have acquired during the advent of the Covid-19 health emergency (9 questions); and, finally, the third, entitled "*Beyond digital resilience*" was designed to understand which other elements, in addition to digital transformation, might constitute relevant drivers towards the creation of a business resilience to support efficiently and effectively the next normal (5 questions). To

develop the survey topic, it was taking as a reference, on one hand, empirical research on digital evolution of the sector and, on the other hand, the instant papers developed in the midst of the Covid-19 emergency related to the impulse of the latter towards digitalization, the major future element of corporate resilience. These reviews allowed to find a not yet explored, in an empirical way, field in which it was stimulating and motivating to investigate on. Analysing more in specific the survey structure, it was constituted by 18 closed-ended questions, from which respondent is called to choose among different alternatives (Brace, 2008) and only 5 open-ended questions. To develop the closed-ended questions it was implemented both the semantic differential scale, also called bipolar rating scale (Brace, 2008) and the Likert scale to «…allow respondent to express both the direction and the strength of their opinion about the topic» (Garland, 1991). For what concern the semantic differential scales, model developed by Osgood in 1957 (Osgood et al., 1957), they were developed setting two opposite statements at the extreme of the scale allowing the respondent to mark the dimensions they prefer, adding a cross along the numbered scale from 1 to 5 (Oppenheim, 1992). While, it was chosen the Liker scale, also known summated rating scale (Kumar, 2011), among the Thurstone and the Guttman one (Cohen et al., 2013) because of its wide applicability, for instance in communication, marketing, political and psychometric researches (Ryan, 1980; Garland, 1991; Raaijmakers et al., 2000; Kulas and Stachowski, 2013), and its ease in construction. For this reason the Likert scale is the most common used in quantitative investigations (Chyung et al., 2017). Regarding the number of anchors settled it was decided to used a five point scale with a neutral midpoint. These choices derive from different considerations. First of all, the original scale Likert formerly employed in early research was built in this style (Likert, 1932). Additionally, scales consisting of five points are the easiest to use, require less reactivity time and cognitive effort on the part of the respondent and allow him to express his or her thoughts (Chen et al., 2015; Chyung et al., 2017; Barua, 2013). And finally, the presence of the neutral point reduces the likelihood the respondent will provide an extreme response to the question (Weijters et al., 2010). Once the final questionnaire was completed the sample population was defined. In particular, to well outline it, it was used the database of Italian companies AIDA (Informalized Analysis of Italian Companies)[23]. Thanks to the access to this portal it was possible to export the complete list of all freight forwarding corporations operating in the Italian territory. Of these AIDA offers the financial, personal and commercial figures. To select them, it was necessary to enter the ATECO code 52.29 (Other support activities related to transport)[24]. More in specific it includes the 52.29.10, freight forwarders and agencies of customs operations, the

[23] For more information see: *www.aida.com*
[24] For more information see: *www.codiceateco.it*

52.29.21, transport intermediaries, and finally, the 52.29.22, logistic services related to the distribution of goods. The starting sample was composed of 10,801 economic realities. This has been subsequently filtered out by selecting only those organisations placed in northern Italy with a balance sheet for year 2018 or 2019, a positive revenue and a last year's number of employees greater than zero. Thus, it was reached a purified sample of 2,397 corporations. A greater amount of screening has been carried out on this sample. In accordance with the classification proposed by the European Union, only small (revenues ≤ 10 Mio and employee < 50), medium (revenues ≤ 50 Mio and employee < 250) and large (revenues > 50 Mio or employee ≥ 250) enterprises were taken into consideration. The choice to eliminate micro enterprises from the sample derived from the awareness, acquired both thanks to the literature review phase and to the qualitative analysis step, to the fact smallest realities are very far away from the innovative and updated implementation of digital solutions in their business models. This resulted in a final sample of 325 companies of which 211 were small, 59 were medium and 55 were large. ***Table 10*** is reported to clarify the selection criteria used and the final sample composition.

Table 10. Selection criteria and sample composition

	REVENUES		*COLLABORATORS*	***SAMPLE COMPOSITION***
Small enterprises	≤ 10 Mio	*And*	< 50	211
Medium enterprises	≤ 50 Mio	*And*	< 250	59
Large enterprises	> 50 Mio	*Or*	≥ 250	55
FINAL SAMPLE				**325**

Source: Personal Elaboration

At this point, it was decided to administer the data collection by sending the questionnaire by email. Such, in accordance with the thought expressed by (Kumar, 2011), seems to be the most common approach used even if it is characterized by a response rate, sometimes, very low. Consequently, the mailing list and the covering letter were created. The mail of the survey presentation is mandatory for the mailed questionnare (Kumar, 2011). Specifically, the mailing list was constructed in an excel file containing all the relevant information about both the corporations such as the name and the province of location and the respondent as the name, the professional role and the email address; while the covering letter has been developed through the email marketing platform *get response*. After these elaborate steps the questionnaire was launched. The companies addressed were a total of 325, of which 57 questionnaires were

received but, unfortunately, 7 questionnaires must be discarded because of their unusability for the research purposes. In specific, a response rate of 15,38 % was obtained, consistent with the expectations present in the literature that state a typically lower response rate of 20% for mailed questionnarie (Kumar, 2011).Thus, the total number of questionnaires on which the quantitative analysis was carried out is equal to 50 (***Table 11***).

Table 11. Numbers of questionnaire

	SAMPLE DEFINITION
Enterprises contacted	325
Survey received	57
Survey unusable	7
Total usable survey	**50**

Source: Personal Elaboration

4. Qualitative analysis: findings and discussion

4.1. Main findings

Before starting to explain and discuss the main relevant findings of the qualitative research carried out in the midst of the health emergency, it seemed interesting to report the respondents' opinion about the advent of Covid-19. On one hand, two out of six companies, realities 1 and 4, have declared to be very pessimistic about the highly negative impact the socio-economic crisis has brought to the forwarding corporation's business models. In particular, they have demarcated the health emergency as a real threat both at human level, in terms of health hazard, and, above all, at economic level, in terms of turnover disruption. On the other hand, realities 2, 3, 5 and 6, have declared to recognize the advent of Covid-19 crisis as a great opportunity at entrepreneurial and business level. In fact, the interviewees reported the emergency has posed itself as a relevant impulse that has helped and will continue to benefit companies in the sector in, for example, the rediscover of non-essential roles, thanks to the forced use of smart working, in the effective reorganisation of the corporate spaces, in the redesign of office policies, in the approach to e-commerce and in digital technologies investments.

4.1.1. The Covid-19 incidence on business models

The advancement of Covid-19 pandemic has resulted in dissimilar, variable and violent fluctuations economic realities have recorded in their business models. To make the explanation of these effects clearer, the different areas that compose the business model have been kept separate.

4.1.1.1. Impact on value capture

As far as the sphere of value monetization, *value capture*, six out of six realities have recorded, starting from the month of March, an average drop in turnover which then worsened considerably in the following month of April. In particular, company 4 stated «...we did from 50% to 70% less in April». Additionally, reality 1, verified a slightly lower decrease equal to 55%. One more important trouble emerged is related to the enterprise management costs, in fact, four companies on six have emphasized the block of shipments, direct consequence of the lockdown of the manufacturing enterprises, has increased exponentially the stockage of goods in warehouses. This forced realities to support and sustain enormous costs of management. The

branch manager of enterprise 4 has, indeed, declared: «...the warehouses are full, our warehouses are full because when there has been the general closing, we had goods that had to go in delivery and we have not succeeded to go there. Currently, we pick up and we receive the shipment mandates only after confirmation, of who gives us the mandate, the recipient is open and he can receive the goods». In this context, a multinational enterprise leader of the field, company 5, has endured the imposition of the health ministry that has forced the reality to the application of one surcharge on the shipment. This derived from the impossibility to maintain the workforce in the warehouses to the maximum operating capacity, «...we will endure what has been the imposition of the health ministry that is, beyond a certain weight of packages we must for force to place a surcharge, because in warehouse we cannot hold two employees near, the packages under a determined weight force to add a price on these». However, the negativity of the impact on the value capture has been mitigated from two transport and logistics sector peculiarities: the flexible and highly variable model of the European costs and the typical mechanisms of bargaining. Specifically, on one side, the economic reality 5 has declared the European and Italian flexible model, that previews the support of the costs only in presence of an effective movement of the goods, has rendered null and void the impact of the crisis on the structure of the business costs, «...in Europe there is a more flexible model above all in Italy that is variable...we substantially pay our distributors to package and if there are not the packages we do not suffer the cost». On the other side, company 2 has affirmed the model of the prices, through which the realities typically operate, has not suffered some transformations during the period of lockdown of the production firms, as it based on a system of bargaining to defined and fixed rates. «...Regarding the system of the prices... we have some global tenders tied to the transport, in the sense that year by year our contract managers bargain for the rail part, for the road part, for the sea part, so let's say those are and those are the rates for which is not that something has changed at the level of ... we already have the costs set container by container we say for months before so they have not changed» specified business 2. Such statement colludes with the increase of the prices occurred in reality 5 in terms of surcharge.

4.1.1.2. Impact on value proposition

The impact on the value promise, *value proposition*, of the companies contributing in the research project, has resulted in the expansion and diversification of the portfolio of services offered to end customers, for four out of six companies. In detail, company 4, in order to find, first of all, solutions to replace sea transport and, secondly, to compensate for the appalling increase in air fares, has developed rail services from China and partial charters, «...we are starting with new services to replace sea transport, because there was no more availability. Now

we are doing a rail service from China... as far as the airplane is concerned, the prices have skyrocketed so we have organized ourselves with partial charters»; company 5 has brought the services already implemented for many years in the United States to Europe; reality 3 has stated it has increased its offer of services expanding towards the new Turkish market, «...surely during the lockdown we opened to markets where we were not going, Turkey is one of them. During the lockdown we had available resources and we said, we had the opportunity to enter the Turkish market and we opened to this opportunity»; finally, business 6, in addition to providing a broader scenario of their offer by developing alternative services to the classic ones such as transport to and from the Far East by train instead of by sea, has deemed necessary to support the transport of personal protective equipment (PPE) in disadvantaged areas by making themselves fully available to governmental and non-governmental functions, «...so let's say the transport of masks we have made them and we are making them but given the volume of business of our company is not that the masks can make a difference...we have also participated in supporting NGOs at their own level...as well as transporting these products even in disadvantaged areas and therefore we have made ourselves available to non-governmental governmental functions to support these aspects». On the contrary, company 1, the smallest in terms of size of the sample interviewed, has registered a zero expansion in its offer and reality 2, said it has not changed the services offered to its end customers because it was not considered necessary by its worldwide distribution network. Also in this case, in the value proposition element of the business model, the impact has been strongly mitigated by the belonging of these realities to the ATECO codes protected by D.L. 25 March 2020 n.19[25]. This benefit is confirmed by six companies out of six. Company 5, to provide an example, declared that thanks to the zero interruption of service its sales of value has even strengthened in the middle of the health emergency, «...our sales of value on the final customer has even strengthened, because not having had much the impact of service failures, even in days when the drivers did not go out we were able to make up with direct employees for which we had no interruptions of service...it has positioned us even better this crisis than we had before».

4.1.1.3. Impact on value creation

In terms of *value creation*, the lockdown of the production companies and the consequent blockage of shipments has caused a strongly negative impact on the transport volumes that have suffered a significant reduction. In fact, three companies out of six have recorded a decrease between 50% and 60% in transport volumes. Reality 3 has declared «...on road we have had on April 50% less respect April of the last year, May minus 30% and June minus 20%», while

[25] Gazzetta Ufficiale, *D.L 25 Marzo 2020 n.19*

company 6 has stated «...the logistics we say on average will have been around 40%... for the transport via road also there we have had a period in which the decrease has been around 50%... the seafarer, in reality, has had a decrease around 30% more or less... the airplane has had a decrease of volumes of 50%». In addition to these reductions, the economic realities have recorded the unavoidable slowdown of many activities and business processes, reality 5 declared «...the projects are frozen, many things have gone into stand-by», and all the recruitment activities aimed at the search for new and innovative skills. «...It is logical that in this moment the whole has stopped but surely it will restart again here, then surely the hiring when it will be the moment it will reappears, new competences...perhaps for what was already, then in our way of working therefore the digital part already very evolved probably we would not have according to me incredible changes on the competences that we were already looking for in our resources» stated corporation 6.

4.1.1.4. Impact on value delivery

In the sphere of corporate *value delivery* two different and relevant impacts have been recorded. Firstly, two out of six companies stated they have witnessed an important change in the purchasing behaviour of services by customers. In detail, reality 4 declared the final customers were called to adapt, in the immediate future, to the change or, in the worst case, to the abandonment of their shipment, «...the first impact when you went to offer the rate, the customer said no if you were crazy to offer such a rate, coming back to you after maybe a couple of days because he felt a bit 'around as it was the situation, the situation was identical to ours, or worse, and so he came back. Many people gave up shipments or transformed them from airplane to sea, but those who were obliged to deliver the goods, perhaps within certain dates, had to pay much more than they were offered». Reality 3, on the other hand, claimed to have registered, on one side, customers who launched tenders, given the low volumes of transport and, on the other side, clients who thought about the central role played by intermodality during the crisis, «...they launched tenders during the crisis because they saw that the volumes were low so there was more, more offer on the market and have launched tenders...some customers have realized that intermodality, which is a sector that has not stopped, has been the key to give continuity to their own customers...they want to transfer as much as possible to alternative modes of transport to highways». Secondly, two out of six realities, the 5 and the 6, have observed the transformation of the sales and communication channels with the final customer and the initial unpreparedness of the same towards the new paradigm that, immediately afterwards turned into an efficient ability to adapt. In this regard, the project manager of company 5 quoted «...the customers in the first two weeks were absolutely unprepared for it, we already had Zoom and

all these digitalized platforms for which we were able to direct the customer...the customer would prefer to see us safely but would prefer to see us, but anyway platforms like Zoom or as others are adapted, it took a couple of weeks anyway».

4.1.1.5. Impact on supply chain

Another important consequence, the lockdown of manufacturing enterprises has brought, is related to the *supply chain*. In this highly volatile and uncertain context, four companies out of six, realities 1, 3, 5, 6, have declared the advent of Covid-19 pandemic and the consequent block down of shipments from one of the main global supplier, China, have alarmed the more verticalized realities, putting in complete discussion the old supply chain paradigm, «...what we have seen is that surely the impact has been transversal on all, it is logical that the major crisis is on companies that have been affected with the ATECO code not essential and that maybe were very verticalized». In other words, economic realities were forced to rethink the possible implementation of a more flexible and responsive supply chain as a new paradigm for the next normal. Questioned by the strong awareness of the high degree of dependence on China, company 1, through a simple statement, emphasized this grade of connection, «...we are stuck because there was the blockage but this comes back when they unblock and I can continue to import from China».

4.1.2. The managerial challenges imposed by the Coronavirus pandemic

When respondents were asked to describe and predict the shooting characteristics of the system, the relevant information was very varied. In particular, reality 4 has declared a deep uncertainty on the recovery capacities of the local and super-local (national) economic system and of the enterprise, «...so I hope that all goes well, I am convinced that we live in a region that has a great working impact for Italy and I am convinced that we should start again». Company 2 has foreseen a gradual and positive recovery that will bring the reality to the old production capacity through an initial ramp-up, «...it will be a ramp-up that will develop slowly and surely we will reach the levels of before». On the contrary, company 6 has hypothesized a slow and weighted rapprochement to the levels of traditional operations but has excluded the return to the old normality, «... May 3 if we want to represent a moment of restart from our part, we are say with the reins still pulled but ready to release them as soon as the business arrives, so this applies 360 degrees for all our activities ... we certainly expect an increase in volumes but here is not to return to 100%». These uncertainties, it has been stated by three companies out of six, 1, 2 and 3, were largely fuelled by the lack of clarity and poor government intervention through

government regulations issued during the health emergency. The latter in fact, according to respondents, have not been able to provide uniform operating procedures and have led the economic realities to sustain serious management difficulties and slowness in reacting to the changes imposed. Reality 1, for example, said «... not having a clear idea of what were the intentions and positions of the government did not help and especially then even now phase two a lack of what can be a uniform procedure even of the things that we must do within the company to be able to operate in peace». Business 3, in addition to emphasize the lack of clarity of the government regulations, highlighted another important aspect. This, in fact, declared the little financial support received by the government, «...this sector is a sector that has kept people alive...they had to be able to have the basic necessities for which it is a sector that has never stopped but which has had costs, therefore it has had to guarantee continuity but which has had smaller volumes and has had costs practically, apart from the supplementary funds, the costs have remained the same as when they were working at full capacity and here for sure there has not been the support that we would have expected, so the taxation on certain areas rather than the contribution...in short all things that for a sector like ours that has been vital for the country in a period of crisis we have not seen any support».

Economic reality 1 has found a high level of inability on the part of employees to understand and analyse the extent of Covid-19 crisis, «...it is not that they have demonstrated a particular ability to understand the problem, to analyse it». Company 4 has recorded a significant lack of past experience and business reference models for a correct and effective management of emergency situations such as today's, «...I believe there is no historicity about such a situation, while perhaps at the ups and downs of the stock market one could have got used to it well or badly knew how it was going to end». Business 5 has highlighted an important managerial and operational struggle related to the poor skills of older employees in the use of technological tools for remote work, «...it was complicated to teach the department of what could be the call centre or others to work from home here were missing some computer skills, say the average age of the company is not really low so there has been to teach them, the company has worked hard we found ourselves initially to cover some hard skills of some of our employees». Two companies out of six, realities 1 and 4, have reported these difficulties, all resulting from the variations imposed by the health emergency, could be sustainable in a limited time horizon of no more than a couple of months. In detail, reality 4 has declared «... certainly until the summer. It would be difficult to have 36 people in the office if something does not change».

4.1.3. Reactions and resilience

The advent of Coronavirus pandemic, radically changing the business models on which freight forwarding enterprises had been operating for many years, required an immediate and decisive reaction to new challenges.

The first of the various quick & dirty solutions that five out of six companies, realities 2, 3, 4, 5 and 6, declared to have adopted is related to the creation of a task force as a support tool to provide guidance on procedures and standards to be applied at corporate level. In detail, reality 5 stated «... it was set up both for reasons of personnel safety, clearly to inform us on how to make deliveries in red areas or otherwise at risk, and for the operative to move faders or airplanes in general». The only economic reality, in the sample considered as a whole, that has not established any crisis unit, to survive and face the challenges imposed by Covid-19 crisis, is the firm 1.

The second reaction that emerged is related to the organizational adjustments imposed by the Protocol shared measures Covid-19 issued on April 24, 2020[26]. In order to ensure the continuity of business activities, limiting the expansion of contagion, four out of six companies, realities 2, 3, 5 and 6, have declared reactivity and readjustment to all government regulations, taking into account the will to operate in full compliance with them. A complete example of such measures was outlined by reality 2. Specifically, it has implemented a series of measures at both organizational and communicative level. Outside the plants has been built a marquee in which each employee, upon entering the office, was subjected to the measurement of body temperature; it has been imposed the obligation to use all personal protective equipment (PPE); measures have been taken in order to maintain safety distances between employees in all areas of the business and, finally, have been included in the offices of the dispensers for hand sanitization, «...there are all a series of measures that have been taken with regard to the drafting of procedures for the hygiene part, a series of measures taken at the organizational level, and a series taken at the level of communications...outside the plant of...there is a marquee where the temperature is measured and the mask must be given, the regulations are strictly followed by us...canteen there is a spacing, then there is all the part related to hygiene measures, the dispenser part and then there are the workstations in the factory warehouses have been delimited and let's say the distance of at least one and a half meters, two meters, one from the other must always be respected».

[26] Ministero del Lavoro, *Protocollo condiviso misure di contrasto Covid-19 24 Aprile 2020*

The continuity of the activities has been made possible also thanks to some solutions enterprises have devised in order to allow the collaborators work from remote. In this context, four companies out of six, realities 3, 4, 5 and 6, have declared to have reacted in the immediate by equipping all the workers with any device useful to guarantee and support this new way of working remotely. Corporations 6, for example, faced with the need to bring smart working from day to night in an extreme mode, saw employees take home desktops and keyboards they typically used in the office and, additionally, had to check in a flash the stability of the connections of each employee. The sales manager of this company said «...we had for example, in the operational part, people who took home the desktop that was a smaller box than a laptop and they could start working from home with great ease, so this was an activity that we have set up immediately in a very fast time, this was certainly important in terms of infrastructure and software logically that has allowed us to support this new way of working…we had to bring it in an extreme mode five days out of five…before we did only one day out of five a week and we also had to tell the operators with desktops to work at home, take home the computer, take home a monitor, keyboard and everything you needed to check if they had a Wi-Fi connection in short, these things logically».

Moreover, driven by the strong awareness that one of the most important assets of companies is the staff, five out of six realities have implemented immediate solutions in order to keep alive the training activity limited by the forced imposition of social distancing. On one hand, company 4 has used digital platforms such as Skype, on the other hand, realities 2, 3, 5, and 6 have activated online training courses through webinars or meetings on the digital platform Zoom. Specifically, company 6 has proposed a course of remote selling with the main objective to develop certain capabilities in the collaborators that have found to use totally different means of communication at the moment of the negotiation with the final customers, «...we have activated different courses of formation with technologies we say of e-learning…therefore with remote trading through webinars, Zoom…we have been able to say to make a very elevated number of courses exploiting this period therefore improving also what is the part of skills set of our people now to the resumption, we have done courses for our people of remote selling then how to help them to a sale and a different communication than what they are normally used to handle other situations to better manage the way of being on the phone…then how to use the tools, Zoom, but also how to talk to people in a different way from what is face to face, then we have logically exploited to train our people on what are instead a whole series of our value-added systems of tools for which are made available to our customers». Only one reality, corporation 1, has opted for the complete suspension of these activities.

Additionally, the entire sample of corporations analysed said to have resorted to different tools and *ad hoc* solutions in order to economically support the forced reduction of the workforce, among these the redundancy fund and the disposal of vacations are the main used. The use of vacations has made it possible to leave the monthly salary of employees unchanged while reducing the physical presence of staff in the offices. Particularly, company 4 has implemented shifts that have allowed the use of the two-day redundancy fund for each employee, «...now we are taking turns doing two days of redundancy fund. We have four days of lay-off per week, I have divided the work groups in two so Monday and Tuesday makes one group and Thursday and Friday makes the second group». Firm 5, in contrast, required its employees to dispose of all the vacations accrued in the previous year in order to reduce operations without directly affecting salaries. Finally, the same reality together with the business 3, have declared to have put in place preventive measures in order to guarantee a certain coverage of the costs that could arise due to possible suppliers' defaults. This to make up for any shortcomings, «...one thing we say where we found ourselves ready was in managing the cash register so we had a block of payments by our customers…we had to manage the fact of not being paid and having to pay our suppliers anyway which is not a very simple thing...it's obvious that I have to manage...I receive 10 and I pay for 10 because if I start to receive for 10 and pay for 10 after a while I am in default so I have to manage...talk to the suppliers explain the situation say look you have invoices for 100 I send you a transfer for 80 meanwhile I give you something but try to understand that if I receive 10 and I pay 15 for two months after a while I am obviously short of liquidity».

4.1.3.1. The smart working

As far as the forced imposition of the work remotely, one company out of six, reality 4, stated during the interview that in its subsidiary this mode had never been implemented because it was not encouraged, «...we have always snubbed the smart working as a company, it was not almost incentivized, it was not written anywhere but it was said between the lines». On the other hand, companies 2 and 5, emphasized their extensive experience in this area. In fact, the employees of reality 2 used to work five days a month in smart working in the period before the health emergency, «...for us smart working was not a change because it is a policy, however company policy here in Italy had, until the pre-crisis Covid-19, 5 days a month of smart working, so we are already used to work in smart working». While, the employees of reality 5 had developed the knowledge and skills required by remote working since 2008. When interviewees were asked for an opinion about the sustainability of this way of working in the new and future working paradigm, the answers provided were very different and varied. One reality out of six,

company 1, was considered doubtful about the sustainability of this paradigm of work crisis ceased although having had a positive feedback both in terms of operational efficiency and staff collaboration, «...we have activated work from home, this was certainly as input from Coronavirus that otherwise we would never have updated it, I do not know if in the future will remain or not, for the moment the impact is positive». On the contrary, firm 5 has emphasized the desire not to return quickly to the old normality but rather to test the effectiveness, in the long run, of such a solution. In this context, the project manager of the reality in question has declared «...the intention is to say not to go back quickly so even for June we are seeing to maintain and only then to description of the various functions of manager see if some activity that actually had a critical management in smart working to bring it back to the office but we absolutely must not make all the people back to the office suddenly…those that we are using today that we have put in place will not disappear so the webinars, Zoom calls, staying close to the client and even internally the meetings that we are doing will hardly come back to reassemble all the people…the social part and then the relationship with the client and the human relationship a must…but inevitably will be managed and distributed in a different way». Factor common to the entire sample analysed are the records in terms of limits in the applicability of smart working between roles and professionals involved in production processes. Reality 4 declared a simple and immediate application of smart working with regard to billing activities or the mere data entry while, found constraints for all those activities and processes that require human contact by their nature. Company 6 has implemented this mode for all transport activities reaching the 95% of active employees from their homes for both the commercial and operational part; as far as the logistic part was concerned, there were some difficulties because the storage activities are bound to the presence of the staff on site, «...we have operated practically with the smart working mode spread as much as possible, we have come to have just under 500 people in smart working but we can say that we have put in smart working for all transport activities so that it is maritime transport, aerial or terrestrial I would say more than 95% of the people is the commercial part that the operating part, logically it has been different the relationship in the logistic part this because the people of warehouse must make the handling therefore must for force be present but also the administrative activities are a lot tied up to the activities of warehouse for the printing of the bubbles, for everything...the printing of invoices rather than other documents and therefore the part of smart working has been applied only on some functions of staff that could effectively work with this modality». These kinds of difficulties were also highlighted by other three realities of the sample, companies 2, 3 and 5. Business 3, to provide an example, has declared a use of smart working equal to 80% for the administrative part and only equal to 20% for the operating activities.

4.1.3.2. The digital technologies

The totality of the research sample painted digital technologies, already implemented at the time of the crisis and the previous skills of the collaborators, in the digital field, as fundamental support tools during the period of the health emergency. In fact, five out of six companies, realities 2, 3, 4, 5 and 6 declared to have a good corporate technology endowment. In particular, what was emphasized is the high degree of transversality digitalization has with respect to all business areas of the company. This characteristic has proved to be a resilient basis thanks to which economic realities have been supported in the address the challenges imposed by Covid-19. Company 3 stated «...we were thinking that with the technologies of a year ago we had to face a crisis of this kind here probably...I don't want to say that we wouldn't have passed it but we would have had great difficulties...in short, fortunately digitalization is one of our strong leaders and we were able to give people work, serve customers, provide a continuous infrastructure for all our operators». Business 1, on the contrary, has demonstrated a standard digital preparedness implemented in the operational, administrative and communication channels. Moreover, according to economic realities 5 and 6, the specialization in e-commerce has proved to be essential as it has allowed to maintain very high levels of operations and a long-term sustainability of the paradigm shift. «The fortune of being specialized in the e-commerce regarding also our competitors the percentage has been surely less...that is to work to 40% instead of 20% as others…surely has helped…we are going very well in this moment because the e-commerce is exploded» has cited the project manager of reality 5. Always such company has affirmed the maintenance of an eminent degree of efficiency has been made possible also from the deepened company culture in the smart working. In fact, it has made possible an immediate implementation of remote working based on consolidated competences and experiences, «...being already automated but for reasons more of company philosophy, of company structure, therefore already equipped with tools of smart working already the people knew for the greater part to usurp them and has maintained the productivity to not optimal levels because optimal would be if there was not the Coronavirus but absolutely acceptable».

In this context, in which the efficient implementation and use of digital solutions seems to be fundamental, five companies out of six, realities 3, 4, 5 and 6, have underlined the essentiality of present and future investments on the most innovative digital technologies in order to have the possibility to develop a resilient operating base able to react to new possible exogenous factors of the same or wider scope. In particular, on one hand, companies such as the realities 2, 3, 5 and 6, already strongly developed in this field, have declared the importance of these continuous investments. Investments that, for example, in the case of the reality 2 refer to the

digitalization of warehouses with the aim to improve the coordination of the various activities and the numerous processes, while, looking at the company 3 make reference to the digital transformation of the administrative processes, to the development of a platform of e-learning and to the use of advanced systems of TMS. The most promising technologies on which to invest more, in order to remain active in the market, that emerged from the search are multiple. On one hand, under the company 5 perspective, the technology of the future turns out to be the automation of the process of driving the fader from hub to hub, «...the autonomous driving... that will be the real revolution...but all that the fader then what is a truck that must go from hub to hub must not put a person on it anymore, that is the absolute revolution, the automation of that process will be decisive for those who want to stay in the market». On the other hand, according to reality 6, it is necessary to focus attention on those technologies capable of making possible the total integration of e-commerce with traditional channels. To this purpose the company is developing platforms, in supply chain field, in which the e-commerce can be fully integrated to the traditional modalities. Specifically, such solution turns out to be able to offer to the end customers a suite of multimodal services applicable to any activity that the company supplies, from the air transport to the marine one and from the terrestrial transport to the logistics field, «...we are developing more and more and giving more and more the possibility to put in feet of the platforms in supply chain arena where the part e-commerce can be absolutely integrated to the traditional modality therefore our suite of services absolutely covers this part of e-commerce…I would say a lot in the logistic part of warehouse then in the part of transport must understand the execution towards which markets goes but also there logically depends on the type of service then necessary if an express service, a service we say however that international but here on this we are working a lot just like platform». Contrary to these realities, company 4 has declared to have *"learned the lesson"* imposed by the health emergency Covid-19 and has underlined the importance of a greater attention towards the digitalization of its business model. Company 1, however, proved to be very uncertain about these investments as a very small reality not able to draw a positive relationship between costs and benefits. The CEO of this reality declared «...we are too small to justify this investment».

4.2. Discussion:

The purposes of the qualitative analysis conducted were manifold. First of all, the research would like to assess the impact of Covid-19 on the business model areas analysing the managerial challenges to which economic realities were subjected. Secondly, it seemed stimulating the assessment and the evaluation of the company's resilience and the elements that make it up in the context of crisis. The study conducted confirms the advent of Covid-19 has permanently and irreversibly transformed the environment in which corporations have found themselves operating, increasingly characterized by high levels of volatility, uncertainty, complexity and ambiguity (Bennett and Lemoine, 2014). This context has, on one hand, posed relevant threats to the businesses and the health of individuals, but on the other hand, it has also acted as an accelerator of the resilience development.

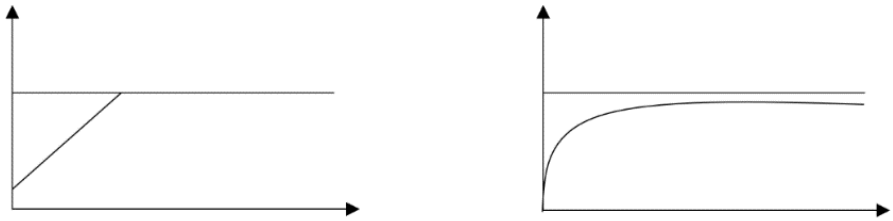
4.2.1. Covid-19 in transport and logistics sector

The imposition of government regulations together with the contraction experienced by the demand, the decrease in liquidity and access to credit have made the management of activities and the reorganization of business processes basically hard (Cascetta et al. 2020). Therefore, freight forwarding companies have registered a highly significant negative impact on the overall business model (Zheng et al. 2020). In particular, economic realities have been called to face disruptive effects in terms of turnover and transport volumes, slowdowns and freezes in activities and processes, visible changes both in end customers purchasing behaviour and in the traditional sales channels and, additionally, increases in enterprise management costs. In other words, corporations have found themselves forced to re-orient their operations, rethink their investment choices shifting them towards higher levels of efficiency and effectiveness, properly evaluate their internal tangible and intangible resources (Porcu, 2020a) and safeguard employees by adopting the right hygienic and sanitary measures inside workplaces (Jullens, 2020a). The entire sample has recorded another relevant incidence on the traditional supply chain that for years has been a paradigm able to efficiently increase the company ROI (Jullens, 2020). Specifically, what was registered is the strong dependence of the sector on the *"World factory",* China (Kilpatrick, 2020), and a movement towards both short and redundant supply chain capable of looking more at territoriality (Agostino et al. 2020). In this context, however, it is interesting to note that, although the sector is characterized by a derivative demand (Agostino et al. 2020), the negativity of these impacts has been strongly mitigated by various elements emblematic of this sector. In fact, it was possible to record a variability in the impacts brought by the pandemic on the business models of the reference sample. First of all, the

essentiality of the sector (Choi, 2020), catalogued with ATECO codes protected by the regulations issued during the health emergency, played a fundamental role and allowed essential services to be guaranteed also in this VUCA scenario (Bennett and Lemoine, 2014) in which businesses found themselves forced to operate. Additionally, the typical bargaining mechanisms have made possible a zero impact on the pricing system, except for one out of six firm that has suffered the strong imposition of the ministry and was forced to apply a surcharge on certain shipments. And, lastly, the highly flexible and variable European cost model has cancelled the impact of the crisis on what was the typical corporate cost structure.

The great and important challenges economic realities have declared to have had to face, because of the advent of the global pandemic Coronavirus, can be divided in the uncertainty that has pervaded the socio-economic context and in the operational and managerial complexity that has directly derived from it. On one hand, the uncertainty and volatility of the environment seem to have been strongly fuelled by the lack of clarity of government regulations, that were unable to offer uniform procedures and standards to enterprises, and the government's lack of support to this essential sector that, given the continuity of business in such a complex period, would have expected sustenance in terms of increased liquidity. On the other hand, the operational and managerial complication to which the reference firms have been exposed derives from different areas of unpreparedness. Some companies have demonstrated an inability to understand the extent of the threat (Pisano et al., 2020) and, others, a low know-how of older operators in the use of digital technologies for remote working. Such inabilities arise from the lack of historicity and useful references to survive efficiently to crises of this or wider scale. For these reasons, the whole sample have declared a sustainability of the crisis in a time horizon no longer than a couple of months and have painted in two different ways the recovery of their sector. The first way follows a positive and gradual recovery able to carry the reality to the old production capacity typical of the pre Covid-19 period; the second, instead, paints a slow and weighted recovery which, however, will not be capable of bringing the business back to the levels of operations of the pre-crisis years. ***Figure 11*** is reported in order to offer a graphic representation of the recovery modalities different corporations expect to experience during the adjustment path that will lead them to the new normality, also known as next normal.

Figure 11. The features of the recovery in the uncertainty of the socio-economic system



11a. *Ramp-up and return* ***11b.*** *Gradual rapprochement*

Source: Personal elaboration

It is now interesting to focus the attention on the reaction capacity that, contrary to the idea of Agostino et al. (2020), corporations have shown in the midst of the Covid-19 crisis. In fact, in order to face all the challenges imposed by the crisis in a winning way, companies have been called to respond reactively by implementing as many quick & dirty solutions as possible in the shortest time. In this context, by leveraging their resources and/or expertise, the realities have implemented:

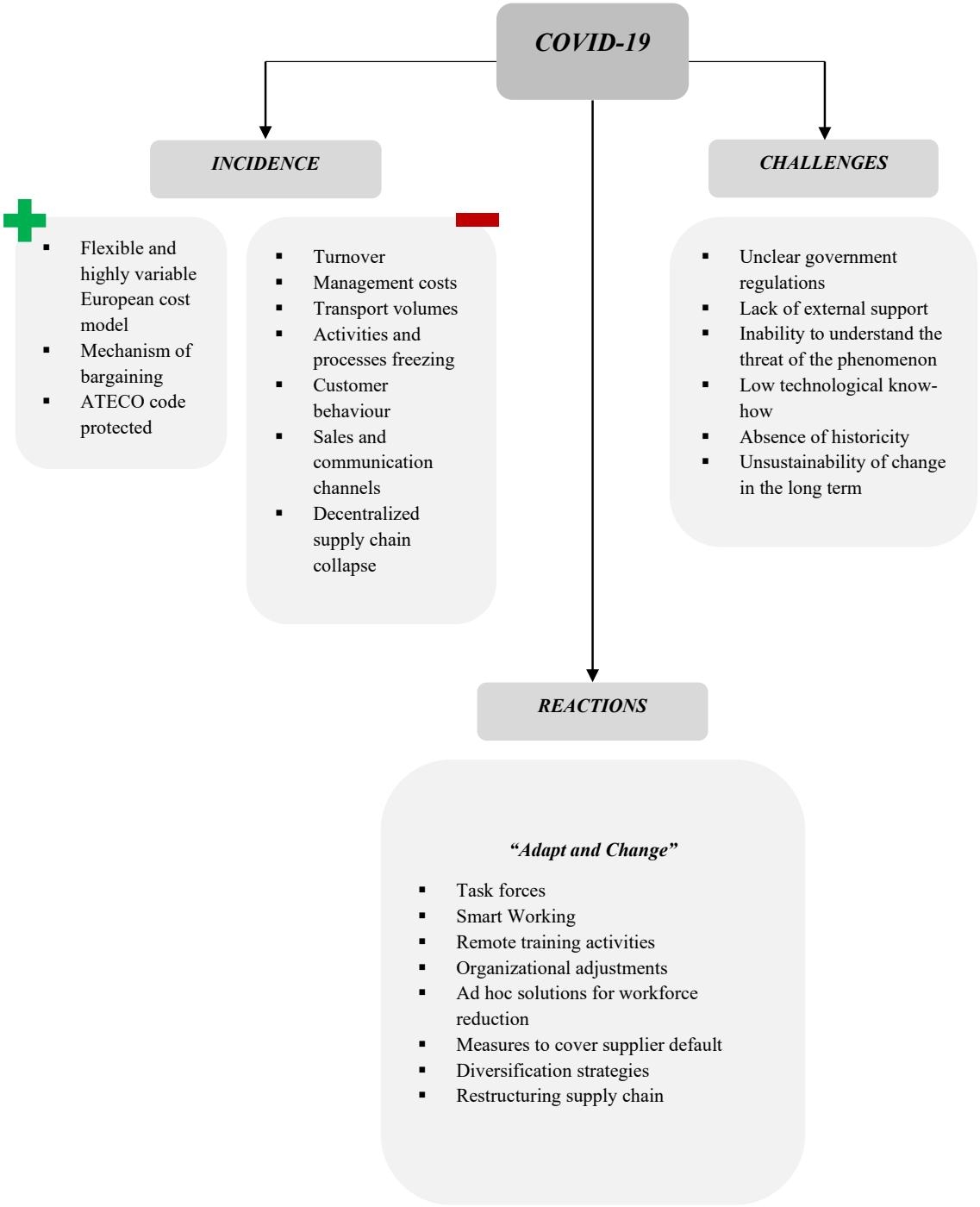
- *Task forces:* enterprises have proven to be prepared to implement crisis units, the right support to provide operational guidance and uniform standards to be applied at corporate level ensuring high levels of security and continuity of activities and processes in full compliance with regulations;
- *Smart working:* companies have quickly and reactively equipped their collaborators with the necessary devices and tools (i.e. desktops, laptops, wi-fi...) to work efficiently remotely without reducing traditional levels of operation;
- *Remote training activities:* economic realities have activated online training activities through the use of digital platforms such as Skype or Zoom in order to ensure high levels of training even in a period characterized by the forced imposition of social distancing;
- *Organizational adjustments:* businesses have modified the corporate spaces in order to ensure the safety of their workers and operate in full compliance with government regulations issued by the Protocol for the regulation of measures to face and contain the spread of Covid-19 viruses in workplace;
- *Ad hoc solutions to financially support the reduction of the workforce*: redundancy payments, vacation and work shifts have been implemented;
- *Measures to cover possible supplier defaults;*
- *Diversification strategies:* Firms have demonstrated they have undertaken diversification strategies aimed at expanding their service offerings, reaching new markets and serving what may be governmental and non-governmental functions;

- *Restructuring of the supply chain:* The safety shock effect (Bellini, 2020) has led companies to a restructuring of the supply chain (Sharma, 2020) increasingly focused on territoriality, redundancy and make to stock strategies (Agostino et al., 2020).

Therefore, the sample have shown its ability to react efficiently and effectively to the challenges Covid-19 has brought to its business models. Indeed, they have been capable of applying, at their best potential, the principle of «Adapt and Change», the fundamental cornerstone on which survival to socio-economic crises of this or broader magnitude revolves (Viani, 2020).

Figure 12 is reported to summarize in a clearer way the advancement of Covid-19 health emergency on transport and logistics corporations. In specific, it highlights the positive and the negative incidence, the main managerial and operational challenges and the way of reactions corporations have put in place to efficiently cope with the disruptive effects of the pandemic. Incidences are divided in positive and negative terms in order to stress the opportunity freight forwarding companies have had to mitigate the negativity of the crisis through their sector' features.

Figure 12. Covid-19 in transport and logistics sector



Source: Personal elaboration

4.2.2. An evaluation of resilience

After a long debate on which were, precisely, the impacts brought by Covid-19 on freight forwarding companies business models and what was the degree of reaction of these economic realities in the volatile and uncertain scenario to which they were subjected, it is now interesting to emphasize and carefully evaluate, for each company in the sample, the degree of resilience

demonstrated in the midst of the health emergency. Specifically, the assessment of this corporate skill is conducted by means of an inductive analysis derived from the responses and the attitudes exhibited by enterprises during the interviews. In order to achieve an efficient result, the research takes into account the broad and precise concept of resilience the authors Rapaccini et al. (2020) have defined in their study and which was discussed in the literature review section previously exposed. Under the researchers' perspective resilience is the perfect mixture of four main elements: agility, entrepreneurial preparedness, elasticity and redundancy.

On one hand, the economic reality number 1 has demonstrated a medium level of entrepreneurial preparedness. This because, on one side, it recorded collaborators struggle in the understanding of the magnitude of the threat posed by Covid-19, but, on the other side, it recognized the pressure of shifting to survive. Addittionally, it shown a low level of agility because it continued to hope for a rapid return to normal levels by activating only the remote work to remain vigorous and competitive in the market; a low level of elasticity resulting from the poor predisposition recorded towards diversification strategies, restructuring plans of the supply chain and other investments useful to the present and the future business development and, finally, a low degree of redundancy intended as no introduction of new assets and processes that would have reinforced the reality during the emergency. Indeed, it has not created a task force, has not implemented online training activities, has not invested in new forms of technology but has only made use of the redundancy fund and vacation disposal to efficiently cope with the personnel reduction.

On the other hand, the residual part of the sample, companies 2, 3, 4, 5 and 6 have demonstrated to possess a high level of entrepreneurial preparedness because they confirmed to be able to recognize the extent of the pandemic threat, and at the same time, they proved to be capable of reacting immediately. They acted, as best they could, using their experience and knowledge in order to remain active and competitive in the volatility and uncertainty of the environment. In other words, they have proven to be highly equipped in terms of expertises, skills and resources but above all from a managerial and operational point of view. In fact, they have emphasized a high ability to make reasoned decisions in order to rebuild the business in a period of crisis and to seize all opportunities for effective rebirth in the new normality. The second element that has distinguished these corporations is the high level of elasticity that is to be found in the well established and visible willingness to support investments and decisions taken in the midst of the health emergency even after the pandemic is over, as a *"lesson learned"* that should never be forgotten. These, in particular, have adopted strategies of diversification, expanding and strengthening their value promise, plans to restructure the supply chain, for example by opening

to new markets and investing in the most innovative digital solutions. All these actions have allowed a more secure survival in time of the crisis, but at the same time gave the hope for a brighter future at the center of the market. Also in terms of redundancy, these corporations have shown their ability in the efficiently exploitation of their internal resources and in the introduction of new assets, skills and infrastructures even in such a complex context. To mention a few introductions, these have developed crisis units to support and re-organize their activities, training programs, new and innovative technologies, smart working, redundancy fund, vacation pay and work shifts. The only element of resilience on which companies are called to work is agility. In fact, they have demonstrated a medium level of it, understood as the capability of adapting and responding quickly, but efficiently, to fluctuations in the surrounding environment. To provide an example, try to imagine the realities that have been faced with the forced need to extreme smart working in all business activities; the solutions implemented in this context are clear proofs of business agility. It should be emphasized this ability has been evaluated as medium because it was one of the main obstacles economic realities have encountered. Indeed, it was stated that the implementation of reactive and decisive actions required, instead, few days of reflection before they were actually developed. In other words, companies have demonstrated agility that has allowed them to survive the crisis by adapting and changing but, at the same time, they recognize the need to invest more in this capability as not as fast as the concept assumes to be. ***Table 12*** shows the details of the resilience assessment for each individual company in the sample.

Table 12. Resilience evaluation

FIRM	*ENTREPRENEURIAL PREPAREDNESS*	*AGILITY*	*ELASTICITY*	*REDUNDANCY*
1	Medium	Low	Low	Low
2	High	Medium	High	High
3	High	Medium	High	High
4	High	Medium	High	High
5	High	Medium	High	High
6	High	Medium	High	High

Note: the assessment is conducted by means of an inductive analysis derived from the responses and the attitudes exhibited by enterprises during the interviews

Source: Personal elaboration

Another interesting result is derived taking into account the digital preparedness demonstrated by the corporations composing the sample. Digital readiness is here understood as a broad transversality of digitalization within the company's business model. What is recorded from the

qualitative analysis is that the most digitally ready corporations, companies 2, 3, 4, 5 and 6, are the same that are defined more resilient in terms of agility, entrepreneurial preparedness, elasticity and redundancy (***Table 13***). This means the companies categorised by higher levels of digital solutions implemented have demonstrated higher degrees of business resilience that has allowed them to win and seize most of the challenges and opportunities the pandemic has brought. Indeed, these corporations underlined, during the interviews, the supportive role played by digital technologies and also, they stressed the need and enthusiasm to invest in new and more sophisticated digital solutions in the future next normal.

Table 13. Resilience and digital readiness

		RESILIENCE EVALUATION			
FIRM	*DIGITAL READINESS*	*ENTREPRENEURIAL PREPAREDNESS*	*AGILITY*	*ELASTICITY*	*REDUNDANCY*
1	Low	Medium	Low	Low	Low
2	Medium	High	Medium	High	High
3	High	High	Medium	High	High
4	High	High	Medium	High	High
5	High	High	Medium	High	High
6	High	High	Medium	High	High

Note: the assessment is conducted by means of an inductive analysis derived from the responses and the attitudes exhibited by enterprises during the interviews

Source: Personal elaboration

It is precisely this result that stimulated the willingness to develop the quantitative analysis with the main objective of understanding the role played by the digital transformation both in the midst of the socio-economic emergency and in the post Covid-19 era. The research therefore has as its main analysis objective the rediscovery of the concept of resilience understood as a set of elements that can constitute a great support to corporations that have to face, leveraging on their unique resources and skills, those that are the fluctuations that can occur, suddenly, in the external operating environment. In this regard, it seemed relevant to investigate, firstly, the concept of digital resilience and, secondly, two other factors, such as the restructuring plans of the supply chain and the diversification strategies, which in turn can affect the levels of business resilience.

5. Quantitative analysis: findings and discussion

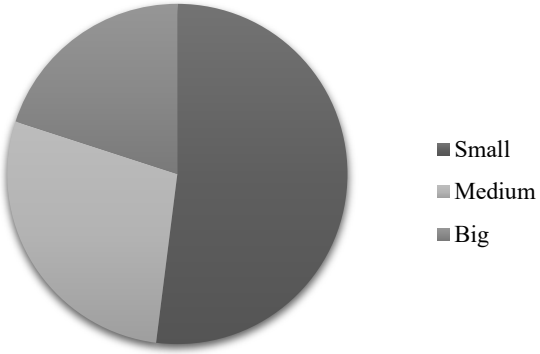
In this section the main results of the quantitative analysis conducted are submitted. Particularly, it reported a clear and a specific characterization of the reference sample that will make the analysis and the subsequent processing of the questionnaire results easier and smoother, in relation to each specific survey question. The main objective of this unit is to analyse the advent of the socio-economic crisis under a completely new light, the opportunity towards digital, new supply chain restructuring plans and diversification strategies, intended as large and relevant sources of sustenance for the economic realities composing the transport and logistics sector.

5.1. Sample features

Figure 13 proposes a simple graphic representation of the reference sample distribution, according to the company size. Specifically, the population has been divided according to the 2019 annual revenues in: small enterprises (2 ≤ millions of euro ≤ 10); medium enterprises (10 ≤ millions of euro ≤ 50); and large enterprises (millions of euro > 50). Most respondents work in small enterprises. In fact, the 52% of the sample is composed by small enterprises, the 28% by medium enterprises and only the remaining 20% by large enterprises. Such numbers should not create wonder because it is strongly known that, in Italy, freight forwarding corporations are, for the most part, small size[27].

Figure 13. Sample distribution according to annual revenues

COMPANY SIZE	
Small Enterprises *(2 ≤ millions of euro ≤ 10)*	26 *(52%)*
Medium Enterprises *(10 ≤ millions of euro ≤ 50)*	14 *(28%)*
Large Enterprises *(millions of euro > 50)*	10 *(20%)*
Total Sample	**50** ***(100%)***



Source: Personal elaboration

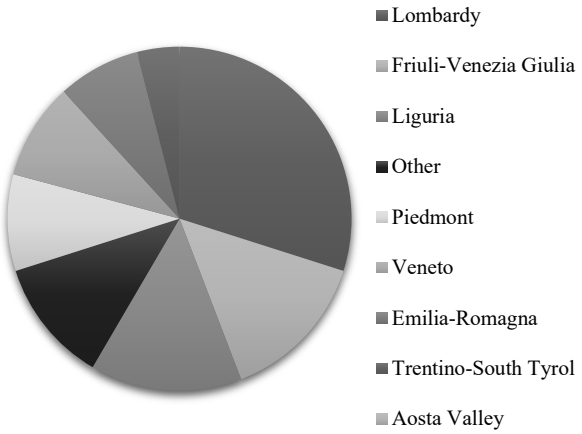
[27] See Eurostat (2003), Panorama of Transport. Statistical overview of transport sector in the European Union

Examining more thoroughly the study sample, it is interesting to report that this includes a very high percentage of companies, equal to 74%, which are not part of larger multinationals realities, and, a remaining smaller percentage of leading multinational enterprises in the sector, equal to 26%. Therefore, in the overall sample it is possible to detect 37 non multinational firms and only 13 multinational corporations.

Guided by the awareness that most freight forwarding organizations and their related economic activities are located in the northern part of Italy (Evangelista and Sweeney, 2006), the questionnaire was addressed only to those realities. The distribution of the sample, in terms of geographical location, is represented by ***Figure 14***. In the analysis of this distribution, it should be taken into account that all the corporations composing the sample are multi-localized companies, meaning that they are present in more than one region of the Italian territory. Specifically, the 30% of the sample, declared to own an operative seat in the Lombardy region; the 28.6% is equally distributed in the regions of Friuli-Venezia Giulia and Liguria; the 18.2% is equally distributed in the regions of Piedmont and Veneto; the 7.79% in the region of Emilia-Romagna; the 3.89% in the region of Trentino-South Tyrol and the 0% in the region of Aosta Valley. Finally, the 11.7% of the sample declared to operate throughout Italy and, in addition to the areas of the north, in other zones of the national territory such as Campania, Lazio, Marche, Molise, Puglia and Tuscany. It seems understandable that the core of the economic activities related to the logistics and transport sector is placed in the region of Lombardy.

Figure 14. Sample distribution according to regions

REGION	
Lombardy	*30%*
Friuli-Venezia Giulia	*14.3%*
Liguria	*14.3%*
Other	*11.7%*
Piedmont	*9.1%*
Veneto	*9.1%*
Emilia-Romagna	*7.79%*
Trentino-South Tyrol	*3.89%*
Aosta Valley	*0%*



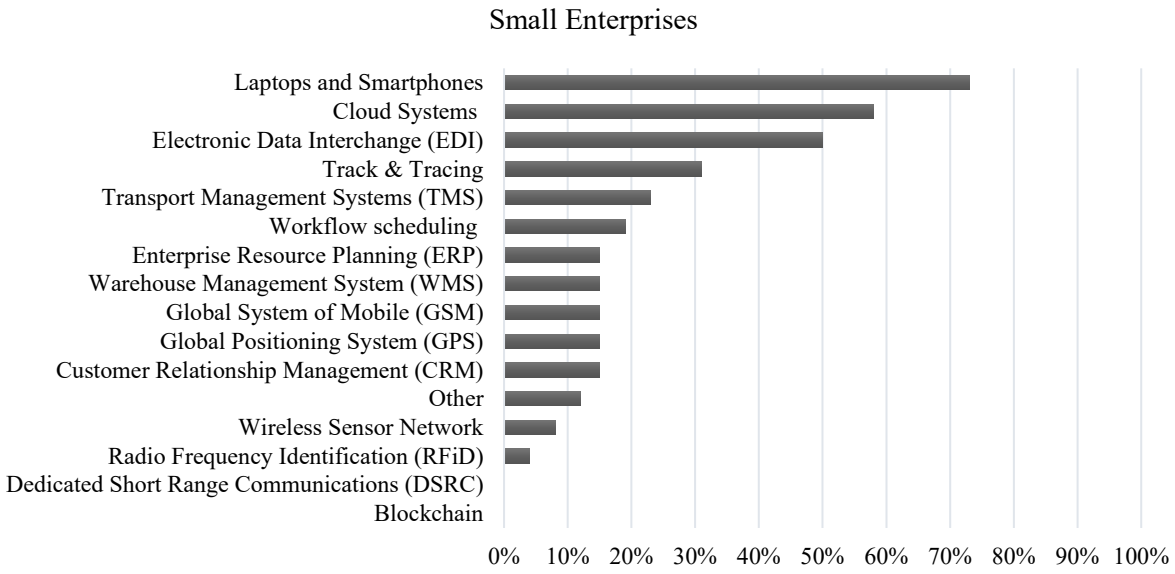
Source: Personal elaboration

5.1.1. Sample digitalization

Approaching further and further to the purposes of the survey, it is now very interesting to investigate the reference sample according to the technological equipment developed over the years. In this regard, the principal aim is to, firstly, highlight the differences in the digital solutions implemented by economics realities characterized by different company dimensions, and secondly, to propose a digital preparedness overview of the sample.

From ***Figure 15*** is possible to note the technologies most developed by the small corporations' sub sample, formed by 26 realities, are: laptops and smartphones equipment, implemented by the 73.07% of the sub sample; cloud systems, developed by the 57.69% of the sub sample; and finally, electronic data interchange systems, used by the 50% of the sub sample. These digital solutions are followed by other alternatives implemented by respectable percentages such as track & tracing systems, transport management system and workflow scheduling systems. Digital technologies operated by the 30.76%, 23.07% and the 19.23% of the sub sample respectively.

Figure 15. Digital technologies in small-size enterprises

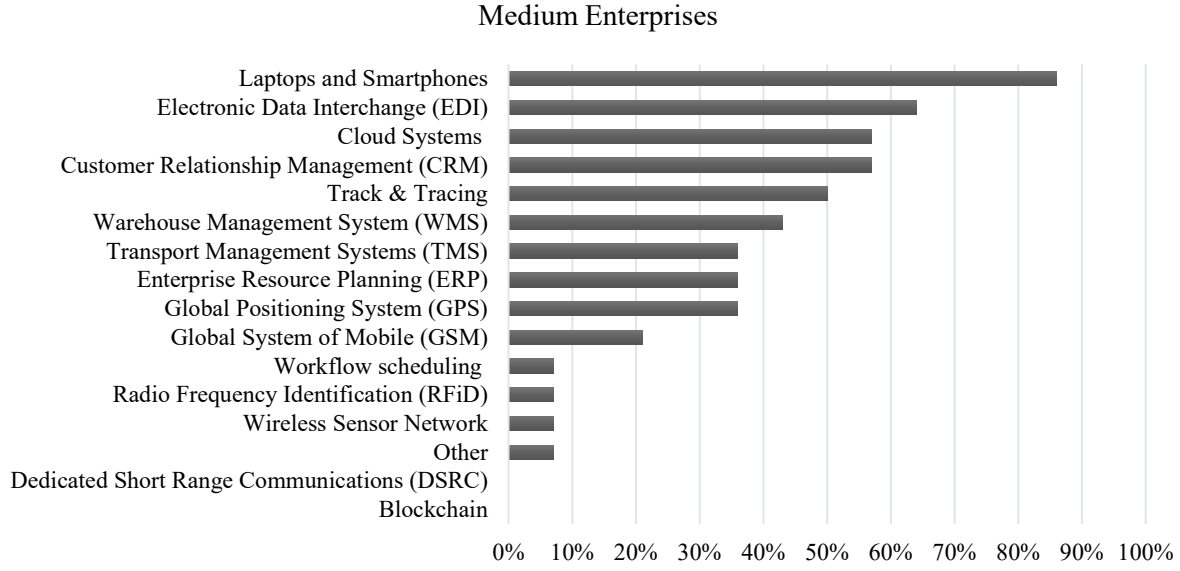


Source: Personal elaboration

Figure 16, instead, examine the sub sample composed of 14 medium-sized companies. This results to be characterized by a massive exploitation of six major digital technologies. Specifically, among these, it is possible to find: laptops and smartphones equipment, implemented by the 85.71% of the sub sample; electronic data interchange systems, developed by the 64.28% of the sub sample; cloud systems and customer relationship management systems, used by the 57.14% of the sub sample; track & tracing systems, operated by the 50%

of the sub sample; and finally, warehouse management system, exploited by the 42.85% of the sub sample. Solutions that are followed by other digital technologies, medium-size enterprise typically used, such as transport management system, enterprise resource planning and global positioning system. These are employed by the 36% of the sub sample.

Figure 16. Digital technologies in medium-size enterprises



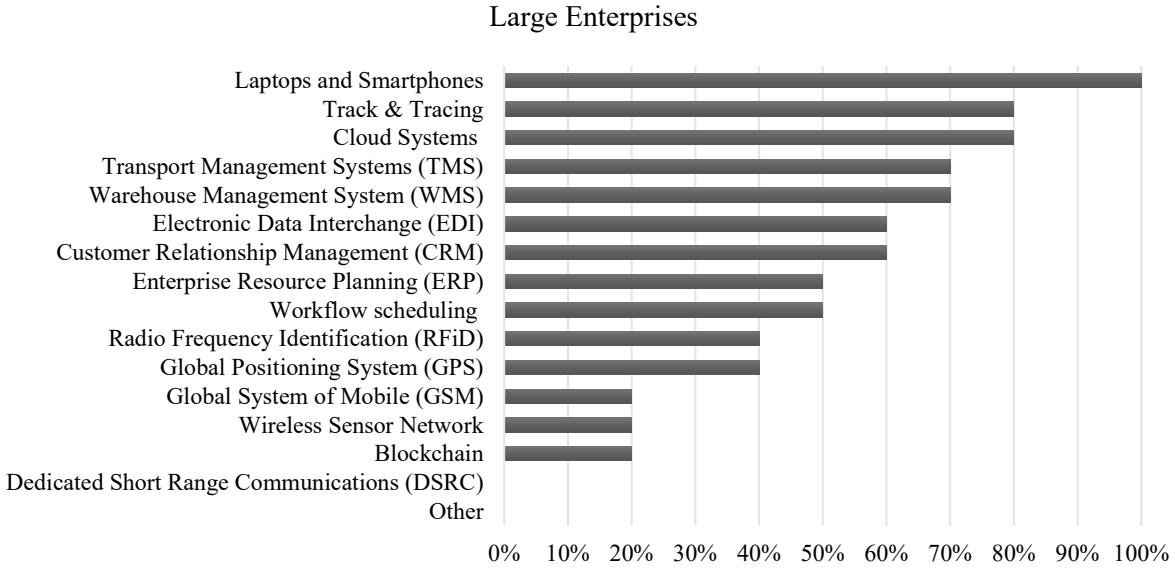
Source: Personal elaboration

Finally, from ***Figure 17*** it is possible to analyse the sub sample consisting of 10 large enterprises. These are characterized by high implementation rates of different digital solutions. Specifically, the entire sub sample, the 100%, declared the employment of laptops and smartphones equipment in their economic realities; the 80% of the sub sample implemented cloud and track & tracing systems; the 70% of the sub sample used transport management system and warehouse management system; the 60% of the sub sample developed electronic data interchange and customer relationship management systems; and lastly, the 50% of the sub sample operated enterprise resource planning and workflow scheduling systems. Global positioning systems and radio frequency identifications are also widely used by the 40% of the sub sample.

From the analysis conducted it is possible to highlight two interesting results. First of all, what it is possible to notice at a glance is the zero use of dedicated short range communication technology by the entire sample, whether small, medium or large corporations. Indeed, the whole model declared a percentage of usage of this digital solution equal to the 0%. Secondly, the advanced and innovative technology provided by the blockchain is employed only by companies belonging to “Large Enterprises” sector. In these, in fact, there is a percentage of

usage of 20%; a high value compared to the zero-percentage recorded in small and medium sized corporations.

Figure 17. Digital technologies in large-size enterprises



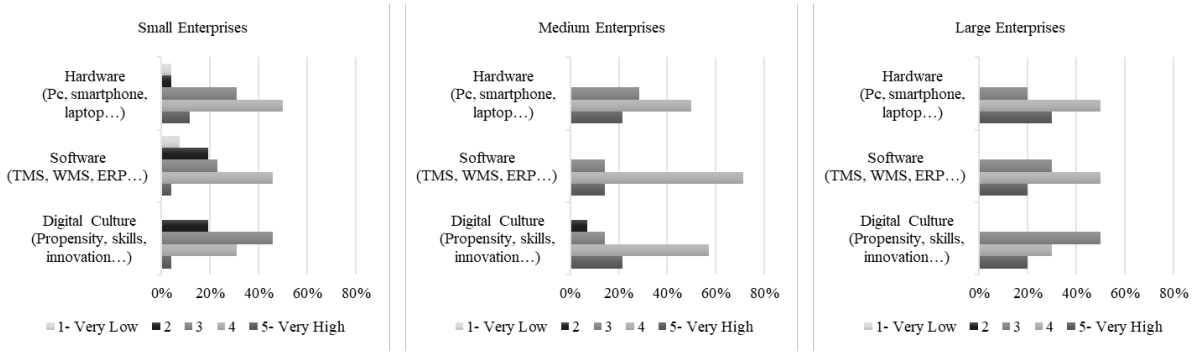
Source: Personal elaboration

The results encountered perfectly follow the thoughts expressed by the empirical research conducted by the authors Evangelista and Sweeney (2006) and Davies et al. (2007). The authors found respectively a high heterogeneity in the adoption of digital solutions when comparing companies characterized by huge differences in size and a positive relationship between large companies and high adoption levels of innovative and sophisticated digital technologies. What is emphasized is a greater predisposition of small companies towards well-established and traditional systems (Evangelista and Sweeney, 2006; Marchet et al., 2009; Perego et al., 2010).

After having carefully examined the habits in digital technologies employed by the various economic realities of the sample, it was deemed attractive to explore it more in depth. For this reason, the corporations participating in the quantitative analysis were asked to evaluate the digital preparedness of their business. Specifically, it was requested an evaluation in terms of hardware (pc, smartphone, laptop...), software (TMS, WMS, ERP...) and, finally, digital culture. The latter is to be understood as responsiveness to technological progress, propensity, skills and innovation. ***Figure 18***, dividing the surveyed enterprises separately by dimension, illustrates the recorded responses. As far as small companies are concerned, of these, the 50% assigned a score of 4, “high”, to their hardware; the 46% the identical score to their software; and finally the 46% a slightly lower and intermediate score of 3 to their IT culture. Medium sized enterprises have recorded different results. Specifically, the 50% assigned a score of 4, “high”, to their hardware; the 71% the identical value to their software; and finally, the 57%

the same score to their digital culture. Finally, focusing the attention on large businesses, the 50% assigned a score of 4, "high", to their hardware and software and a lower and intermittent light score of 3 to their digital culture. What emerges is that, on one hand, medium sized corporations rated their digital preparedness, in all three analysed elements, high; on the other hand, both small and large organizations highlighted slight shortcomings in terms of digital culture.

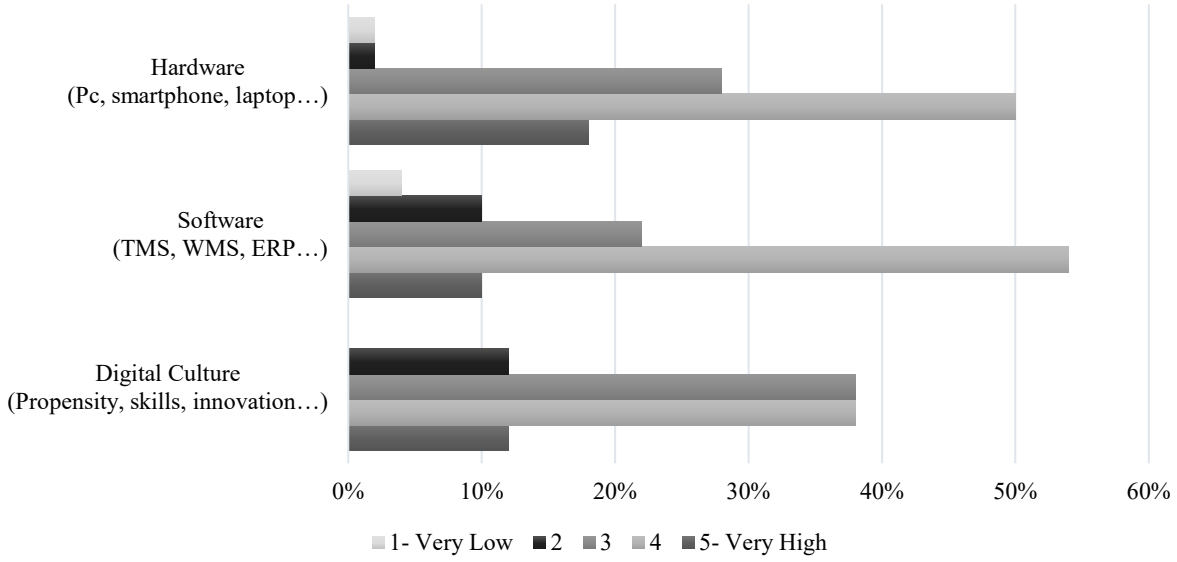
Figure 18. Digital preparedness according to company size



Source: *Personal elaboration*

In order to provide a more complete overview of the businesses participating in the survey, digital preparedness it was also analyzed on the entire sample. ***Figure 19*** is proposed for a better and more interactive representation of the results. With regard to the digital preparedness in terms of hardware implemented: 25 organizations, the 50% of the sample, gave it the "high" score, equal to 4; 9 corporations, the 18% of the sample, the maximum score "very high", equal to 5; and only one reality, the 2% of the sample, the minimum score "very low", equal to 1. As far as the digital preparation in terms of software concerned: 27 corporations, the 54% of the sample, provided it the "high" score, equal to 4; 5 companies, the 10% of the sample, the maximum score "very high", equal to 5; and only 2 realities, the 4% of the sample, the minimum score "very low", equal to 1. Finally, with regard to digital preparedness in terms of digital culture: 19 companies, the 38% of the sample, assigned the "high" score, equal to 4; 19 organizations, the 38% of the sample, assigned the "neutral" score, equal to 3; 6 businesses, the 12% of the sample, assigned the maximum "very high" score, equal to 5; and no company, the minimum "very low" score, equal to 1. Therefore, the entire sample emphasizes high levels of preparedness in terms of hardware and software equipment and an ambiguous level of preparation in terms of corporate digital culture. These results highlight a low level of adoption for what concern advanced and state-of-the-art digital solutions in the corporate business models. Awareness anticipated by different authors such as Merlino and Testa (1998), Minguzzi and Morvillo (1999) and Freight Leaders Club (2003). In fact, only small percentages of the entire sample have declared to own very high levels of digital preparedness.

Figure 19. Overall sample digital preparedness

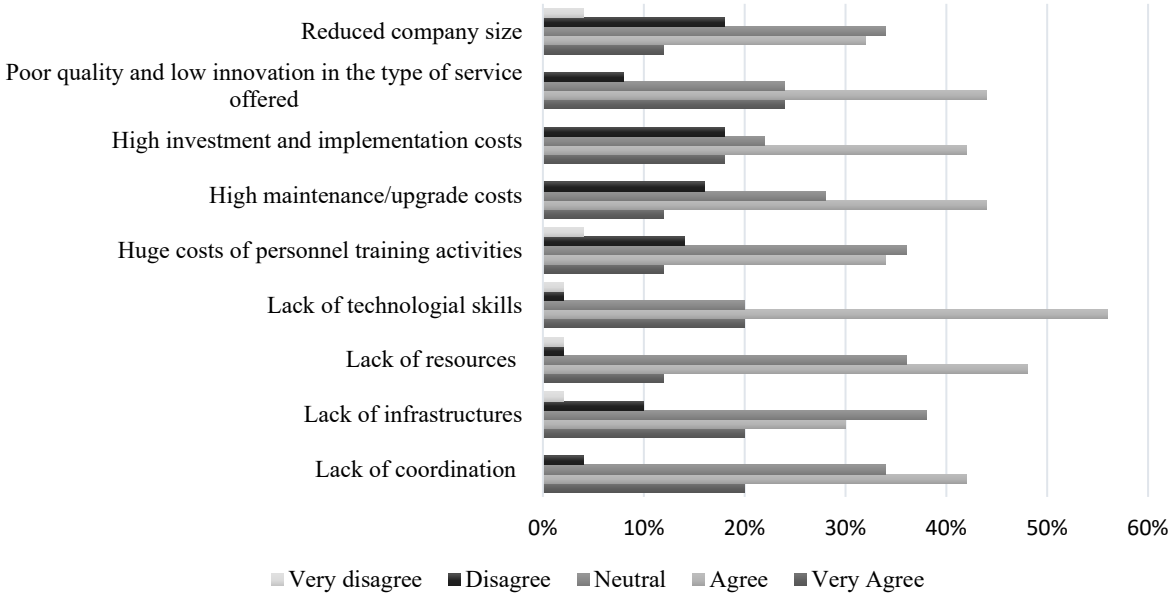


Source: Personal elaboration

Inspired by the curiosity of understanding which are the main inhibiting factors that limit and influence the efficient implementation and development of digital technologies within corporations, a specific interrogation was posed to the reference sample. Precisely, it was asked: *"Do you agree the following elements constitute limitations in the efficient implementation of new and innovative technologies?"* (see ***Figure 20*** for results). Analysing deeply the answers recorded, it can be easily understood the main factors that limit corporations, in the development of new digital solutions in the operational environment, refer to the lack of quality and innovation in the service offered, the high investment and maintenance costs, the poor technological skills of employees, the limited internal resources and the lack of coordination within the economic reality. Specifically, the most warning factor seems to be the deficiency of collaborators' technological skills. In fact, the 56% of respondents has declared to "agree" with the limitations imposed by the low level of technological knowledge possessed. In addition, the 48% said they "agree" with the limitations imposed by the lack of resources; the 44% of the sample declared to "agree" with the limitations imposed by the poor quality and innovation of the service offered; the 44% said they "agree" with the limitations imposed by the high costs of maintenance and updating; the 42% stated they "agree" with the limitations imposed by the high investment costs; and finally, the 42% said they "agree" with the limitations imposed by the lack of coordination within the operational environment. These results are perfectly in line with the thought expressed by the authors Golob and Regan (2002b), Evangelista and Sweeney (2006) and Perego et al. (2010) according to which the most restraining factors, for a correct implementation of digital solutions in the operating environment, are linked to: the low quality of the service offered; the high investment, maintenance and updating costs; and the inability

to align corporate strategy with the adoption of digital solutions. Moreover, in this context, the small dimension of the corporation, the need for constant training activities for the continuous updating of employees expertise together with the lack of infrastructure related to the IT environment do not seem to be such limiting factors. In fact, the 38% declared to consider "neutral" the effect of the lack of *ad hoc* infrastructures in the efficient implementation of digital technologies in their economic realities; the 36% stated to consider "neutral" the effect of the constant training activities required to keep staff updated; and finally, the 34% said to consider "neutral" the effect of the small organization size. These results contrast with the thinking of the authors Evangelista and Sweeney (2006), according to whom the reduced business dimension, the consequent needs of infrastructure and the constant and costly training activities to be organized to allow the development of updated technological knowledge, are significant factors inhibiting the company's technological progress.

Figure 20. Factors inhibiting digital technologies implementation

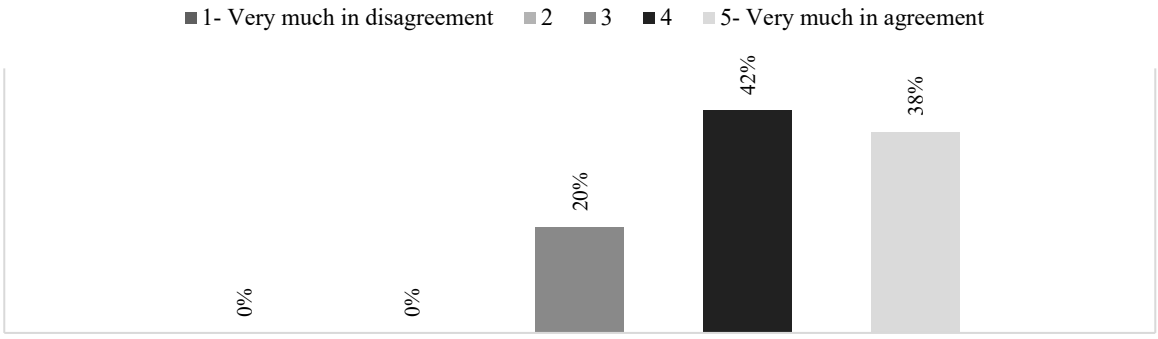


Source: Personal elaboration

5.2. Present and future digital resilience

The use of the most innovative and updated digital technologies has always been an important springboard for all companies willing to expand their competitive advantage by proactively entering their target market. In order to grasp the paradigm shift that, thanks to the advent of Covid-19, has occurred in the concept of digital transformation, this section has been created. In this framework it seemed relevant and stimulating to investigated the role digital technologies have had during the pandemic, and will have, in the business models of the forwarding corporations. Before going to analyse, specifically, what will be seen as the centrality that digital solutions have had in the middle of the Covid-19 emergency and will have in what will be the next normal, it is interesting to study the socio-economic phenomenon under a entirely original perspective. This crisis, in fact, it is possible to affirm thanks to the results recorded by the survey promoted, was not only distinguished by the brutal violence with which it came across business models, but also positively positioned itself as a real accelerator of the digital transformation process for most of the corporations contributing in the research. In order to grasp this nuance, the following question was addressed to the survey sample: *"To what extent do you agree with this statement: The health emergency has set itself as an accelerator of the company's digitalization process?".* The recorded answers are schematically shown in ***Figure 21***. In detail, no company, the 0% of the sample, was "very much in disagreement" or "in disagreement" with this sentence; 10 companies, the 20% of the sample, declared themselves "neutral"; 21 companies, the 42% of the sample, stated to be "in agreement"; and finally, 19 companies, the 38% of the sample, declared themselves "very much in agreement".

Figure 21. Covid-19 as digital transformation accelerator

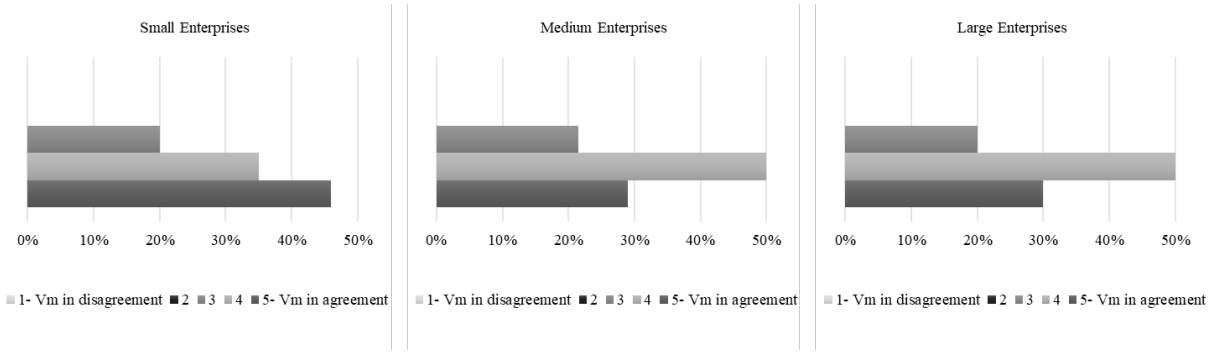


Source: Personal elaboration

Furthermore, if the responses are examined keeping a constant segregation of the participating organisations by dimension, the results are equally thought-provoking. ***Figure 22*** schematically illustrates the answers. Specifically, the majority of small companies, the 46% of the sub sample, i.e. 12 out of 26 companies, declared to be "very much in agreement" with this

sentence; the 50% of medium sized enterprises, corresponding to 7 out of 14 businesses, declared to be “in agreement”, and finally, the 50% of large businesses, equivalent to 5 out of 10 corporations, declared to be “in agreement”.

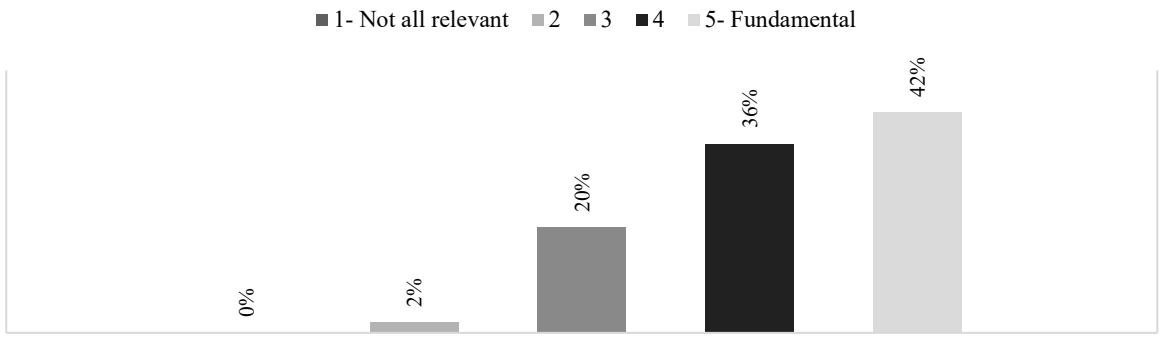
Figure 22. Covid-19 as digital transformation accelerator according to company size



Source: Personal elaboration

These results, as well as underlining a greater digital acceleration in what are the smaller firms, perfectly underline the positive role played by the advent of this socio-economic crisis in the IT field. In fact, this is seen, by a large portion of the sample, as an opportunity to be exploited in order to implement the most innovative and sophisticated digital solutions in a simpler and a faster way. In other words, the investments many organizations had left, in the complexity of the routine, in the *“to-do-list”*, were stimulated by an energetic push, such as the Covid-19 (Lars, 2020; Jorgensen, 2020; D'Auria, 2020; Casali, 2020; Veicoli, 2020; Antonucci, 2020; Scotti, 2020; Pesce, 2020). Therefore, in accordance with the thought expressed by Basu (2020) it becomes possible to link the Covid-19 phenomenon to the acceleration towards the digitalization of processes. The speeding up in the direction of the most immediate process of digital transformation comes from the rethinking, born in the economic actors, towards the concept of digitalization and the consequent benefits that it is capable of providing to freight forwarding corporations. This means, the advent of the health emergency has begun to paint the use of digital technologies in a completely different way from the traditional one. These, in fact, are still closely linked to the increase of the company's competitive advantage but not only to this. To analyse this new fascinating concept, a first question was posed: *“What is the relevance of technology in building competitive advantage in your industry?”*. The answers are shown schematically in ***Figure 23***. Specifically, no company on the whole sample stated that its competitive advantage is completely independent from the efficient implementation of digital solutions within its *modus operandi*, on the other hand, 21 out of 50 companies, the 42% of the sample, declared digital technologies play a “fundamental” role in the efficient building and expansion of its competitive advantage.

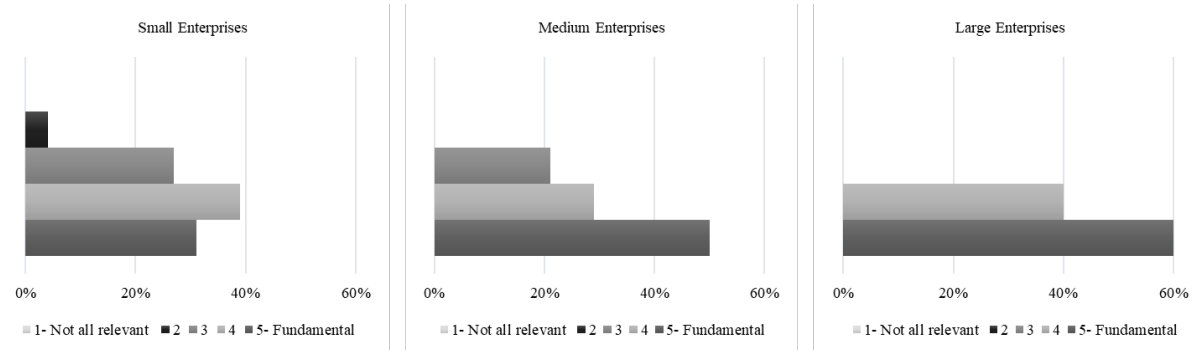
Figure 23. Technology and competitive advantage



Source: Personal elaboration

Again, the survey sample was analysed keeping the organisations separate by dimension. ***Figure 24*** illustrates, in a graphic way, the responses recorded. Specifically, on one hand, medium-sized companies, for the 50% of the sub-sample, and large businesses, for the 60% of the sub-sample, underlined the fundamentality of the implementation of digital technologies in their business models as a useful resource to increase their competitive advantage. On the other hand, small firms, for the 39% of the sub-sample, declared to be aware of the importance and the centrality of digital solutions in the efficient construction of a stable competitive advantage but, by assigning a value equal to 4 to this question, they did not underline its fundamentality.

Figure 24. Technology and competitive advantage according to company size



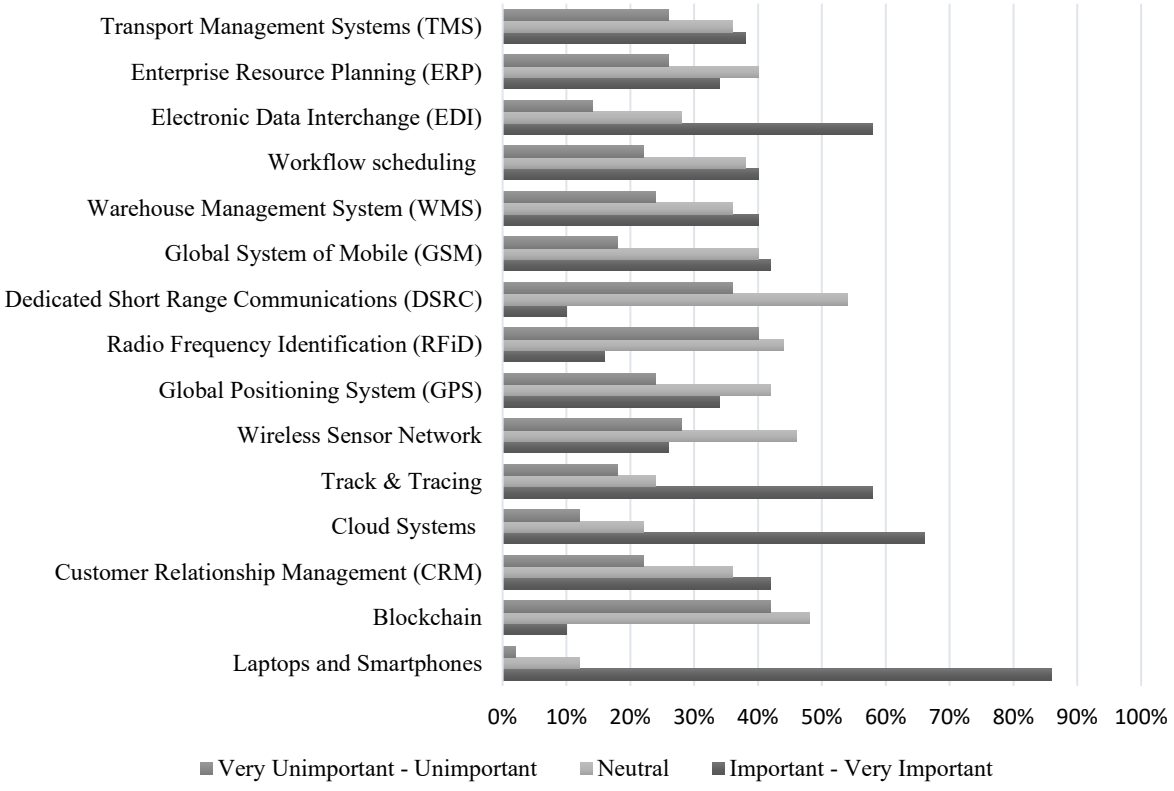
Source: Personal elaboration

Therefore, the relationship between the resourceful employment of digital solutions and upsurges in the efficiency, effectiveness and competitiveness of economic realities is still actual current (Andal-Ancion et al., 2012; Colbert et al., 2016; Chesbrough, 2010; Fitzgerald et al., 2014; Osterwalder et al., 2005).

The first question was followed by a second interrogation. In details, participants were asked: *"How important was the use of the following technologies in tackling the crisis?"*. The answers are reported, in a graphical way, in ***Figure 25***, where for greater visual clarity the scale has

been compacted. Specifically, organizations declared that, on one hand, many digital solutions were "neutral" in terms of business support during the Covid-19 pandemic but, on the other hand, those that demonstrated to support the activities in the midst of the crisis, proved to be "very important". Among the technological solutions that have reinforced businesses in the efficient management of the challenges imposed by the Covid-19 pandemic it is possible to detect the laptops and smartphones equipment owned by corporations, the cloud systems, the track & tracing systems and the electronic data interchange systems. In detail, the 86% of the sample declared the use of laptops and smartphones already consolidated in the company was "important or very important"; the 66% of the sample declared the use of cloud systems was "important or very important"; and, finally, the 58% of the sample declared the use of the track & tracing system and electronic data interchange was "important or very important".

Figure 25. Role of technologies in the midst of Covid-19



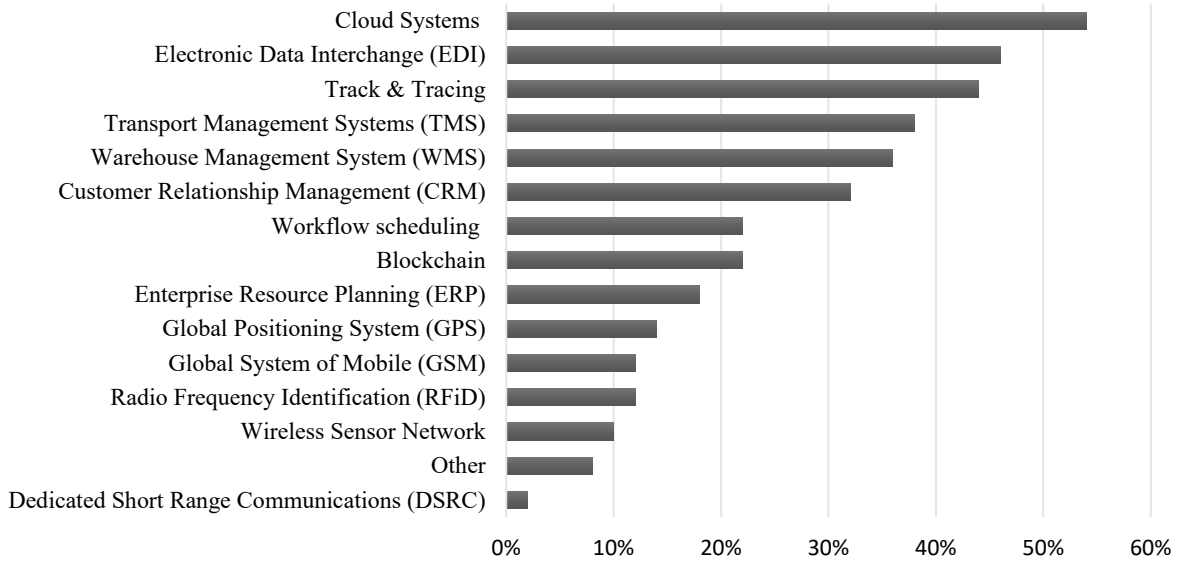
Source: Personal elaboration

From the results discussed it is possible to emphasize that the correct and the efficient implementation of digital solutions does not only play a role related to the competitiveness of corporations within their target market but, at the same time, it arises as a *"glue"* capable of sustaining and guarantying the continuity of the operational activities in times of uncertainty and volatility (Whiteside, 2020). It is exactly in this context that the complex world of digital technologies is directly linked to the concept of resilience (Lillie et al., 2020; Gastaldi et al.,

2020; Close et al., 2020). In other words, what derives is a completely new approach to the usage and deployment of digital technologies. These are becoming relevant tools able to support and effectively sustain organizations in the necessity to adapt and respond quickly to whatever are the challenges brought, suddenly, by the external environment (Ferrajoli and Furfaro, 2020).

According to the responses recorded, thanks to the quantitative survey conducted, businesses declared the digital solutions on which to rely the most, as they are seen as promising and capable of developing and nurturing the business's digital resilience at high levels, are: cloud systems, for the 54% of the sample; electronic data interchange systems, for the 46% of the sample; track & tracing systems, for the 44% of the sample; transport management systems, for the 38% of the sample; and finally, warehouse management systems, for the 36% of the sample. These results are quite dissimilar with the idea proposed by the research conducted by Desai (2020) who stated the most promising technologies on which corporations, in the post Covid-19 era, are called to invest, to remain active and resilient in the next normal, refer to more innovative and sophisticated solutions such as artificial intelligence, blockchain and robotics. However, in the survey sample only the 22% provide the same relevance to blockchain's technology and the 8% refer to robotic process automation, autonomous vehicle driving and instant intelligence. Results are reported, in a graphic mode, in ***Figure 26***.

Figure 26. Most promising technologies for the post Covid-19 era



Source: Personal elaboration

Having observed the sample's awareness regarding the employment of digital technologies as important basis for building a resilient business model and having analysed which, according to the sample, are the solutions that will be able to offer the right support and sustenance to firms in the long-term, the survey has advanced by analysing two other actual interesting facets.

On one hand, it seemed necessary to investigate the quick & dirty technological investments on which businesses have placed particular consideration in the midst of the health emergency and, on the other hand, to analyse the willingness of the same organizations in pursuing and supporting these investments in the next normal. In order to grasp these nuances, two different questions were addressed.

The first question asked: *"Which new technologies have you implemented/developed during the health emergency?"*. To this interrogation, the majority of the respondents, for a percentage equal to the 34% of the sample, specified that they have not invested in any digital solution in the middle of the health emergency. Some investments were registered, instead, by the 20% of the sample in smart working technology, by the 16% in remote conference software such as Google Meets, TeamViewer and We Chat and by an 8% in cloud systems and Virtual Private Networks. Finally, the remaining portion of the sample declared to have invested in other types of hardware and software solutions such as the quality management system and new and more flexible organisation systems. Therefore, most of the sample stated they did not pursue any investment in digital solutions, only a small portion of the sample emerged demonstrating the massive development of smart working aimed at ensuring the continuity of their business.

Through the second question the companies participating in the survey were asked: *"Do you have plans to invest in digital solutions for the coming year (2021)?"*. This question was answered negatively by the 38% of the sample, while, the remaining 62% provide a completely affirmative answer. This result confirms the strong consciousness of the sector with regard to the central role that digital will have in the future next normal to which all economic realities are increasingly approaching (Efficient Logistics, 2020; Hernaes, 2020). To this last portion of the sample, composed of 31 responding corporations, two additional questions were posed. This in order to analyse, firstly, the expected expenditure forecasts for the future digital investments and, secondly, the technologies most taken into account for the same investments. The first question requested: *"What do you think will be the spending band (in percentage) resulting from the development of new technologies on the total business expenses?"* while the second demanded: *"Which technologies are you thinking of investing more in?"*. From the first question, it is reported schematically in ***Figure 27***, 2 businesses out of 31, the 6.5% of the sub sample, has provided a percentage spending range for the support and development of new technologies less than 0.5%; 10 companies out of 31, the 32.3% of the sub sample, a spending range between 0.5% and 1%; 7 corporations out of 31, the 22.6% of the sub sample, a spending range between 1.01% and 3%; 10 firms out of 31, the 32.3% of the sub sample, a spending

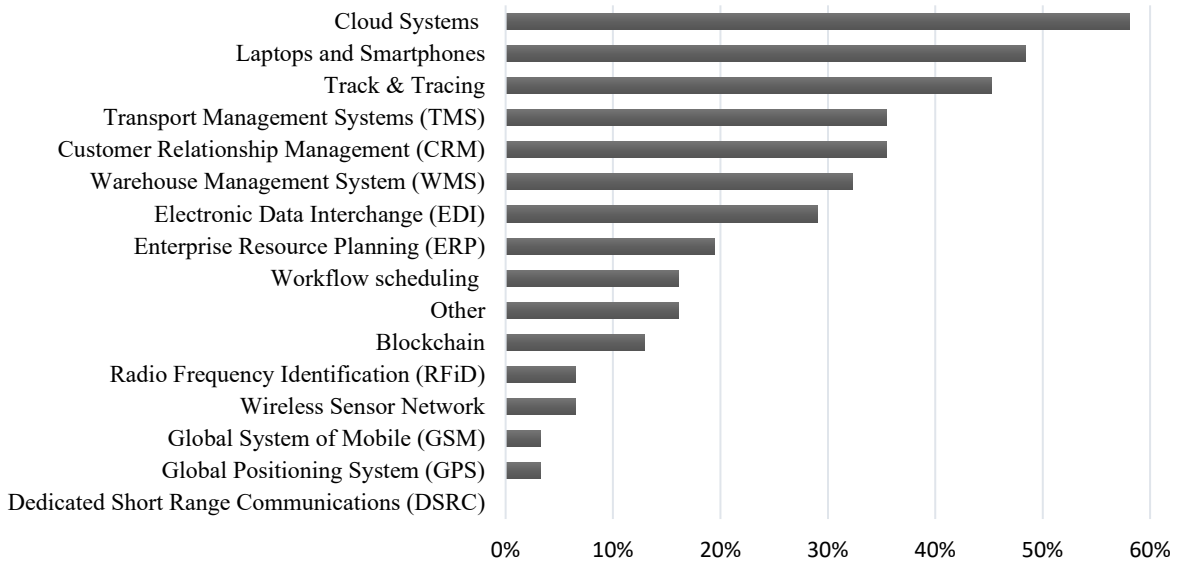
range between 3.01% and 10%; and finally, only 2 organizations out of 31, the 6.5% of the sub sample, a spending range greater than 10%.

Figure 27. Digital technologies budget range (% on total corporation budget)

Source: *Personal elaboration*

By means of the second question, whose results are shown schematically in ***Figure 28***, it was investigating the digital solutions on which the corporations of the sub sample have planned to invest in 2021. On one side, the technologies on which no organization, the 0% of the sub sample, has declared to invest in the dedicated short range communication technology; not surprising given the previous results that reported its zero usage by the entire sample. On the other side, the digital solutions most considered for the future investments were: cloud systems, for the 58% of the sub sample; laptop and smartphone equipment, for the 48% of the sub sample; track & tracing systems, for the 45% of the sub sample; transport management system and customer relationship management, for the 36% of the sub sample; and, finally, warehouse management system, for the 32% of the sub sample.

Figure 28. Scheduled investments in digital technologies



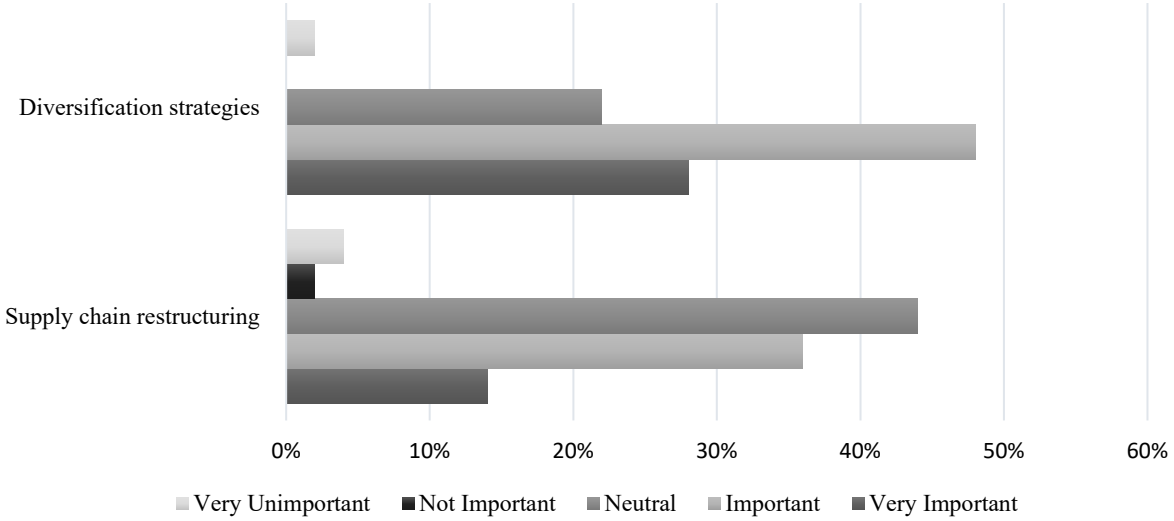
Source: Personal elaboration

These results underline the willingness of the sub sample to invest different spending bands, whether low (0.5% - 1%) or high (3.01% - 10%), in different digital technologies such as cloud systems, laptop and smartphone equipment, track & tracing systems, transport management system software, customer relationship management and warehouse management system. Choices that seem to correctly fall on what have been previously defined the most promising digital technologies on which economic realities are called to invest in order to create a business model that is highly resilient and capable of remaining active in the long-term.

5.3. Beyond digital resilience

Once understood and empirically verified the key role digital technology is progressively achieving thanks to, on one hand, the energetic impulse provided by the advent of the socio-economic emergency Covid-19 and, on the other hand, the supportive function that it is capable of exercising even in the most volatile and uncertain periods such as the current one, it seemed interesting to investigate two other relevant factors such as the restructuring plans of the supply chain and the diversification strategies. Elements that, according to the authors Sharma (2020) and Perona (2020), are able to sustain economic realities, together with the implementation of digital solutions, in the efficient prediction of emergency states and risk exposure. In other words, this investigation stems from a dual awareness acquired through the elaboration of the theoretical background and the qualitative investigation. Indeed, first of all, it has been widely stressed that the super lean operating model, which for years has been at the centre of interest thanks to the high levels of efficiency and effectiveness that it was capable of bringing to the world economy, during the Covid-19 pandemic was strongly questioned (Jullens, 2020). Secondly, thanks to the qualitative analysis conducted in the midst of the pandemic, it has been highlighted the radical and necessary drive towards a change and expansion in value promise, stimulated by the increasingly variable end customer demand. In order to study the weight and the role the restructuring plans of the supply chain, on one hand, and the diversification strategies, on the other, may have in the post Covid-19 era, the following question was posed to the survey sample: *"In the next normal, how important do you think it could be to rethink the supply chain and activate diversification strategies to make your business model more resilient?"* (see ***Figure 29*** for results). Regarding the restructuring plans of the supply chain, 22 companies, the 44% of the sample, stated that their support in the creation of a future business resilience will be almost "neutral", in contrast, 18 corporations, the 36% of the sample, declared that these actions will be "important", and finally, only 7 organizations, the 14% of the sample, underlined their relevant importance. As far as diversification strategies are concerned, the results recorded are very different. In fact, only 11 companies, the 22% of the sample, declared that their support in creating a business resilience will be "neutral", in contrast, 24 corporations, the 48% of the sample, declared that these strategies will be "important", and finally, 14 business, the 28% of the sample, underlined their relevant importance. Therefore, it is possible to highlight that the economic realities will be more inclined, in the future next normal, to implement and focus their efforts on what are the diversification strategies rather than the restructuring plans of the supply chain.

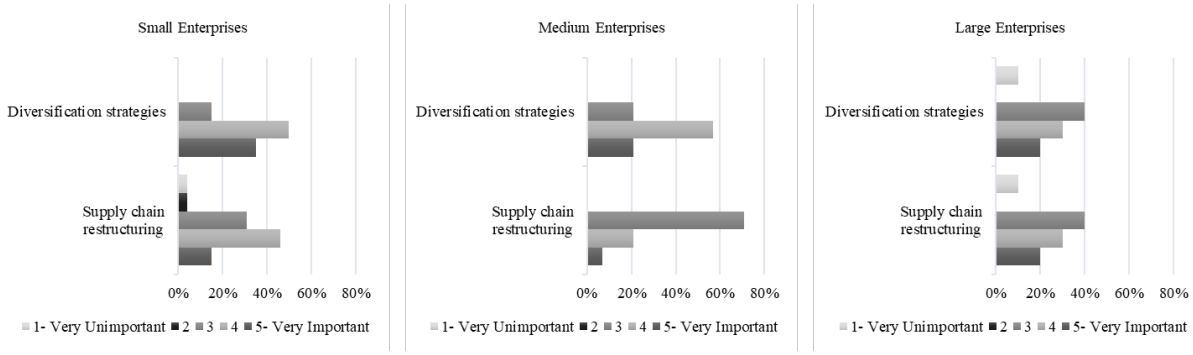
Figure 29. Supply chain restructuring versus diversification strategies



Source: Personal elaboration

Furthermore, if the responses are examined keeping a constant segregation of the participating organisations by dimension, the results are equally interesting. ***Figure 30*** schematically illustrates the answers. As far as economics realities characterized by small dimensions are concerned, these have declared important the support, in terms of corporate resilience, provided by future investment plans in the restructuring of the supply chain and in the diversification strategies of their offer. These responses have been recorded for the 46 % of the sub sample, corresponding to 12 corporations out of 26, and the 50%, equivalent to 13 companies out of 26, of the sub-sample respectively. Medium-sized enterprises, in contrast, described different replies. On one hand, the 71% of the sub-sample, consistent to 10 organizations out of 14, stated that they consider the support provided by supply chain restructuring plans to be neutral and, the 57%, corresponding to 8 companies out of 14 stressed the importance of diversification investments. Finally, as far as large organizations are concerned, they declared the effect of both actions, supply chain restructuring plans and diversification strategies to be neutral. This result has been declared by the 40% of the sub-sample, matching to 4 out of 10 corporations. Thanks to this corporate size analysis it is possible to grasp the nuances present in the sample. In this case, it is noteworthy the high level of heterogeneity that discriminates small businesses from large ones. In fact, the former has underlined the central role that both the restructuring plans of the supply chain and the diversification strategies will have in the construction of a next normal efficient and resilient. While, large companies have proved to be indifferent to the implementation of such actions.

Figure 30. Supply chain restructuring versus diversification strategies according to company size



Source: Personal elaboration

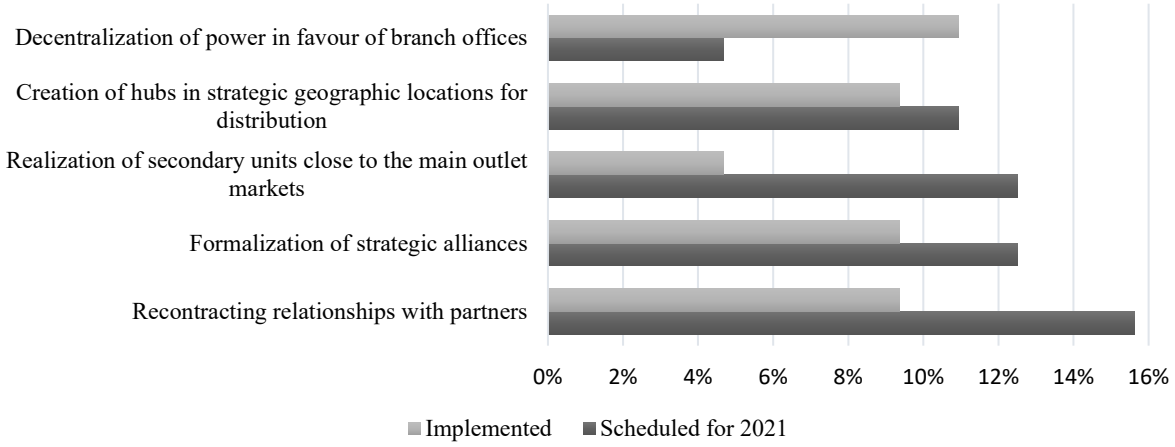
To analyse more in detail the level of centrality that these actions have had in the midst of the health emergency and will have in the future next normal was asked to corporations if they had developed, during the health emergency, or planned to develop during 2021, restructuring plans of the supply chain and / or diversification strategies. On one hand, most of the sample, specifically the 56%, declared they had not developed and have no plan aimed at restructuring their supply chain scheduled for 2021, while the 44% of the sample answered in the affirmative way, underlining their propensity to invest efforts in these actions. On the other hand, more than half of the sample, specifically the 52%, highlighted the existence of present investment and the willingness to make future investments in what are the diversification strategies, while a slightly lower portion, the 48% of the sample, replied in a negative way underlining a zero inclination to invest in such strategies. These numbers only reinforced previous results that emphasized a greater focus on diversification rather than relocation.

At this point the investigation is advanced. The portions of respondents who gave an affirmative answer to these questions were asked two additional questions in order to capture, more specifically, the directions of these plans and strategies.

The first question, regarding supply chain restructuring plans, asked: *"Which of these supply chain restructuring actions have you already implemented and which do you plan to implement during 2021?"* (see ***Figure 31*** for results). The results recorded show that, on one hand, during the Covid-19 socio-economic emergency, most of the economic realities have implemented strategies of decentralization of power in favour of branch offices. In fact, this action was implemented by the 10.93% of the sub sample. On the other hand, the outcomes reported that the 15.62% of the sub sample planned to implement, during 2021, actions aimed at re-contracting what were the traditional relationships with the partners on which they used to daily operate. However, it should be noted that there is a high level of heterogeneity in the actions implemented during the crisis and planned for 2021. In fact, there are no actions that clearly

differ from each other in terms of proportion implementation. However, these results are in agreement with the forecasts made by the author Di Rosa (2020) who predicted a movement of economic realities towards shorter and redundant supply chains capable of looking more at what is territoriality.

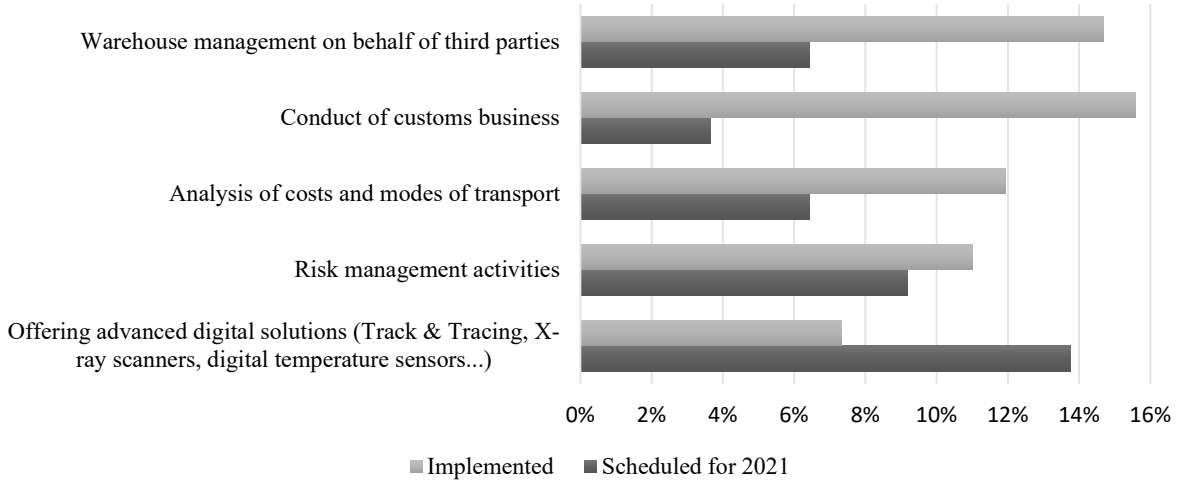
Figure 31. Present and future investments in supply chain restructuring



Source: Personal elaboration

The second question, concerning diversification strategies, asked: "*Which of these diversification strategies have you already implemented and which do you plan to implement during 2021?"* (see ***Figure 32*** for results). The results demonstrate that, on one hand, during the Covid-19 socio-economic emergency, the greater part of the economic realities have implemented strategies of diversification aimed at the conduction of the customs activity and the management of the warehouse for third parties. In fact, such plans have been implemented respectively from the 15.59% and the 14.67% of the sub sample. On the other hand, the outcomes highlight that the 13.76% of the sub sample, has scheduled to develop, during 2021, diversification strategies mainly designed to offering more innovative and sophisticated digital solutions, such as track & tracing systems, X-ray scanners and digital temperature sensors. Also in this case it is possible to outline an important level of heterogeneity in the diversification strategies implemented during the crisis and planned for the year 2021. In fact, there are no actions that clearly differ from each other in terms of proportion implementation. These results demonstrate the fundamental role that diversification strategies have, and will increasingly continue to have, in the construction of an operational business model characterized by high levels of business resilience.

Figure 32. Present and future investments in diversifications strategies



Source: Personal elaboration

6. Conclusions

The core purpose of the thesis was the deepening of the socio-economic crisis Covid-19 in the area of logistics and transport, a crucial sector that proved to be extremely essential in the forced lockdown affecting manufacturing enterprises (Choi, 2020).

Primarily, the research concentrated around two aspects which have marked the current emergency in opposite directions. As widely emphasised, through the instant papers conducted by several economic actors in the midst of the pandemic, the Covid-19 has been painted, on one hand, for the cruelty it spread to forwarding enterprises and, on the other hand, for the great amount of stimuli and incentives it provided to their businesses and operational processes (Zheng et al., 2020; Porcu, 2020). Secondly, the focus of the investigation has been on the broadly debated notion of corporate resilience. Not only is this a fundamental capability that enables organizations to both overcome the challenges imposed by the health emergency and proactively deal with the uncertainty and volatility of the new environment (Sneader and Singhal, 2020b; Danoesastro et al., 2020), but it is also considered as a combination of measures that, when proficiently put into practice, are capable of building and sustaining the businesses in a long-term prosperity. Several authors as Gastaldi et al. (2020), Sharma (2020) and Perona (2020) recognized, among these actions, the digital transformation of processes, the supply chain restructuring plans and the diversification strategies.

In detail, motivated by the desire to merge instant debates with practical observances, two distinct but strictly correlated empirical researches have been performed in sequential time periods. The first one, an exploratory qualitative analysis carried out from March to June 2020 through a structured interview protocol, identified as headline task the comprehension of the major implications, challenges and reaction strategies deployed by organisations in the face of the health emergency. Moreover, extensive clearance is reserved to the inspection of the corporate resilience concept on a sample of six forwarding companies. The second one, a quantitative investigation undertaken from July to October 2020 on the basis of a questionnaire, was directed with the dominant purpose of assessing the contribution of digital transformation, supply chain restructuring plans and diversification strategies in the construction of business resilience, on a sample of forwarding enterprises located in Northern Italy.

The adverse influence of the current pandemic on the forwarding corporation's business models (Cascetta et al., 2020; Zheng et al., 2020) has been thoroughly assessed. Indeed, the interviewed organisations have recorded: disruptive effects in terms of turnover and transport volumes, which have fallen by 50/70% and 50/60% respectively; deceleration and suspension of assets

and processes such as recruiting activities; noticeable alterations both in the purchasing behaviour of end-customers and in traditional sales channels; an augmentation of the management costs, due to the freezing of shipments; and, furthermore, a considerable incidence on the old supply chain paradigm. However, in this calamitous scenario, the evaluation revealed an encouraging outcome. Precisely, the hostile consequences have been widely attenuated by specific features that define the particular field under analysis. In concrete terms, albeit based on a derived demand (Agostino et al., 2020) the logistics and transport sector has been capable of considerably mitigating the intimidating incidence of the Covid-19 spread throughout: its ATECO code (52.29), safeguarded by government regulations enacted in the middle of the crisis, which guaranteed the continuity of operations; the traditional bargaining mechanisms, founded on defined and fixed rates, that have made a zero effect on the pricing systems; and, lastly, the highly flexible and variable European cost model that has nullified the consequences of the epidemic on the corporate cost structure.

Enterprises have found themselves locked up in an entirely new environment portrayed by high degree of volatility, uncertainty, complexity and ambiguity (Bennett and Lemoine, 2014). The foremost challenges forwarding corporations have fronted had their origin in: the inadequacy of governments regulations which demonstrated to be unable to provide uniform processes and standard to guarantee a sufficient level of operational efficiency; the absence of administration assistance, in terms of liquid assets, that the sector would have expect since the never ceased activities; the proved boundaries in perceiving the magnitude of the threat; and, finally, a lacking expertise of aging collaborators in the practice of digital technologies for remote work. These difficulties arose from the lack of historicity and beneficial references to efficiently endure and persevere in times of crises of this or wider scale.

Literally, organizations have been called to re-direct their operations, rethink their investment choices shifting them towards higher levels of efficiency and effectiveness, properly evaluate their internal tangible and intangible resources (Porcu, 2020a) and safeguard employees by adopting the right hygienic and sanitary measures inside workplaces (Jullens, 2020a). Contrary to the idea of Agostino et al. (2020), who highlighted the major weakness demonstrated by leaders stands in the inability to react rapidly to the fluctuating scenario, the respondent corporations have proved to be capable of implementing the key principle of *"Adapt and change"* (Viani, 2020). Indeed, trusting on their own strengths, the firms reacted by deploying, at their best potentiality, several measures such as task forces, smart working, remote training activities, organizational adjustments, *ad hoc* solutions to financially support the reduction of

the workforce, procedures to cover possible supplier defaults, diversification strategies and restructuring plans of the supply chain.

Agility, the skill confirmed by the sample albeit with some limitations imposed by the need for immediacy, is only one of the four elements that nurture the concept of resilience (Rapaccini et al., 2020). In order to evaluate the degree of this corporate ability, research has continued with the assessment of the remaining factors: entrepreneurial preparedness, elasticity and redundancy. The majority of the enterprises, with the exception of one out of six enterprises, proved to possess a high level of entrepreneurial preparedness, powered by the efforts made to accept the necessity for drastic reform; a high level of elasticity, fuelled by the well-established and visible willingness to sustain investments and decisions taken in the midst of the health emergency even after the pandemic will be over, as a *"lesson learned"*; and, lastly, a high level of redundancy, underpinned by the efficient deployment of in-house facilities and capital assets as well as by the introduction of new resources, skills and infrastructures.

After carefully evaluating impacts, challenges, reaction and the degree of resilience with which the sample corporations approached the outbreak of the pandemic, it was worthwhile exploring the same crisis under a completely new perspective. As before mentioned, the advent of the socio-economic crisis Covid-19 was not only distinguished by the violence and brutality with which it came across the business models of forwarding companies (Cascetta et al., 2020), but also by the hidden positive side which is hard to catch in the first place. The instant papers, developed in the heat of the crisis, extensively debate around the interpretation of Coronavirus as an energetic push towards all the processes and operative plans that had been stuck for a very long time in the *"to-do list"* of many businesses (Lars, 2020; Jorgensen, 2020; D'Auria et al., 2020; Casali, 2020; Veicoli, 2020; Antonucci, 2020; Scotti, 2020; Pesce, 2020). From the analysis carried out, the positivity of the spread of this emergency has been widely verified.

First and foremost, it was possible to demonstrate that the pandemic emerged as a real booster of the process of digital transformation, as envisaged by Basu (2020), particularly for small-sized businesses. This reflects the ever-increasing interest of economic players in the digital world. Actually, they have reconsidered the most sophisticated digital technologies, relating them not merely to the advantages they provide in competitiveness but rather to the benefits they can offer in the form of enterprise resilience. Against this background, it has been pointed out that the leveraging of digital solutions within *modus operandi* continues to be strongly anchored to the foreseen enhancements in competitive advantage (Andal-Ancion et al., 2012; Colbert et al., 2016; Chesbrough, 2010; Fitzgerald et al., 2014; Osterwalder et al., 2005), especially for medium and large enterprises. However, at the same time, it proved to be closely

linked to the concept of corporate resilience (Lillie et al., 2020; Gastaldi et al., 2020; Close et al., 2020). This result perfectly confirms the thought expressed by Whiteside (2020) who painted digital technologies as a *"glue"* capable of sustaining and guarantying the continuity of the operational activities in times of uncertainty and volatility. Indeed, economic realities have declared the important sustenance provided, during the pandemic, by digital technologies, such as the laptop and smartphone equipment, cloud, track & tracing and, lastly, electronic data interchange systems. Thanks to this new awareness, on one hand, different digital solutions, such as remote work, conference call tools and Virtual Private Networks, have been put rapidly in place to efficiently face and survive the crisis. On the other hand, several future investments, in new and more innovative digital solutions, have been scheduled for 2021. These are mainly addressed to cloud systems, laptop and smartphone equipment, track & tracing systems, transport management system, customer relationship management, warehouse management system and electronic data interchange. The willingness to invest in such solutions perfectly fits with the technologies the sample revealed to be the most promising for the future as capable of overturning what is today's operating paradigm. This result is at odds with the thought expressed by Desai (2020) who stated the most auspicious technologies on which corporations, in the post Covid-19 era, are called to invest, to endure active and resilient in the next normal, refer to more innovative and sophisticated solutions such as artificial intelligence, blockchain and robotics. In the analysed sample only a small part has revealed the same importance.

Furthermore, it was possible to investigate two other relevant factors in the building of corporate resilience: the supply chain restructuring plans and the diversification strategies. Elements that, according to Sharma (2020) and Perona (2020) might have the same weight in the definition of a resilient business. The outcomes recorded in this last part of the research are very thought-provoking. By deeply investigating these two aspects what has resulted is the great importance verified in terms of diversification. Indeed, corporations, confronted with the challenges imposed by the socio-economic crisis, have declared to find investments in the broadening and diversification of their value promise more relevant than in the rearrangement of the supply chain. The actions undertaken, in the midst of Covid-19 pandemic, and planned, for 2021, are several and refer mainly to the management of customs and warehousing activities for third parties and to the enlargement of their offer towards innovative digital solutions.

Ultimately, it is now possible to depict the Covid-19 as a coin featuring two contrasting facets. On one side, it has placed itself as a threatening phenomenon which has brought enormous managerial and operational obstacles to forwarding corporations. On the other side, it has simultaneously provided imperative prospects which, if successfully exploited, will be capable

of sustaining business models even in the most volatile and uncertain times. In other words, the analysis emphasized the pandemic as an entrepreneurial opportunity (Porcu, 2020b) that would be clever to sustenance economic realities in approaching the market in a totally different way to traditional ones, more agile and reactive to changes. This result perfectly follows the thought expressed by Schumpeter (1952) who defines a model of evolution according to which every disaster is followed by a process of creative disruption capable of allowing a shift towards innovation processes and technological changes which, in the steadiness of routines, would typically remain hidden and not efficiently grasped.

The research defines a series of elements to be taken into consideration when it is necessary to implement an effective response to present and future managerial, operational and organisational difficulties. What emerges is that only few realities, those characterized by specific skills, resources and infrastructures have been able to survive the health emergency and to take advantage of the opportunities, in terms of digitalization, reallocation and diversification, the pandemic has offered. The features required in a volatile, uncertain, ambiguous and complex environment are: entrepreneurial preparedness, agility, redundancy and elasticity. In other words, it is highly essential the building of corporate resilience. This investigation offers a guideline in terms of strategies, resources and skills managers of transport and logistics realities could consider as a sustenance tool to create a resilient base to deal reactively with the actual threats and prepare effectively for the future chances.

It is acknowledged the conducted investigation presents some implicit limitations notwithstanding the use of well-established empirical research methodologies. For what concern the qualitative analysis, the restricted sample, composed only by six economic realities, and the selection criteria implemented may have prevented a generalisation of the results. Moreover, the promoted interview, at the presence of only one business component may have constituted a constraint because, given the density of the current scenario, the CEO contribution could have enriched the response and could have provided a more complete overview of the phenomenon. For what concern the quantitative analysis, the short time through which the questionnaire was addressed may have precluded a generalisation of the outcomes given the 15,38% rate of response obtained. Additionally, the selection of IT managers, as survey respondents, would have been advantageous since technologies know-how may be limited in other company roles.

The review has many interesting arguments which can be explored in the near future. Most promising of them is the investigation into the paradigm shift in forwarding business models

once the Covid-19 is entirely ceased; an intriguing comparative analysis would provide an opportunity to debate and reflect on.

Appendix A. Instant papers review

TITLE	*PUBLICATION DATE*	*AUTHORS*	*ORGANIZATIONS*	*POSITION PAPER/ PRIMARY DATA PAPER*	*KEYWORDS*	*MAIN CONTENT*
COVID: briefing materials, global health and crisis response	06/01/2020	McKinsey & Company	McKinsey & Company	Primary data paper	Smart working, Resilience Next normal, Trends, Future opportunities	The article proposes the analysis of several issues: the current situation of the health emergency, the transition to the next normal and its characteristics, planning and future scenarios. The main focus is on the pages related to the limits of the applicability of smart working and the benefits that the forced implementation of this has brought to economic realities.
New Coronavirus making global shipping worse	01/03/2020	Feng, H. et al.	Nigbo University and Universitat Politecnica de Catalunya	Primary data paper	Impacts, Anti-crisis strategies, ICT resilience	The main objective of the article is the analysis of the impacts that the advent of Covid-19 has brought to the global shipping world. This, in particular, has recorded highly negative impacts. The paper investigates the causes of these impacts and offers three perspectives on which companies are called to reflect to build a resilient basis for the next normal. These include: anti-crisis strategies, investments in automation and information technologies and meetings between UN member countries to develop and discuss contingency plans for future epidemics.
Coronavirus, cigno nero a impatto esponenziale (e le opportunità che offre)	08/03/2020	Andrea Porcu	Il Sole 24 Ore	Position paper	Digitalization, Data driven, Opportunities	The article discusses the Covid-19 phenomenon defining it as a black swan capable of generating exponentially more black swans. The epidemic is seen as both a negative and a positive event. In fact, according to the authors, such an event can become a huge business opportunity for all the economic realities that will be able to react to the challenges ahead. Companies have been faced with a speeded-up implementation of all those projects that had for long time in the drawer and were waiting to be implemented. Technology together with the ability to be data driven and the capability of digitalization processes seem to be very supportive in facing this complex and complicated period.
Coronavirus per la Supply Chain sfide e opportunità: la svolta è nelle strategie digitali	14/03/2020	Patrizia Licata	Network Digital 360	Position paper	Supply Chain, Omnichannel Optics, Digital transformation	The article is based on a McKinsey's analysis which states that the logistics sector is among the most affected by the health and economic crisis brought by Covid-19. The supply chain is, in this context, called to plan actions more and more in charge of online channels, thus placing itself in an omnichannel perspective. The uncertainty of demand from customers together with the drastic decrease in transport volumes have made it difficult for companies to operate. In this context the economic realities are called to work on the development of cross-departmental teams, liquidity management, supply chain stabilization and above all investments in digital technologies.

						This is because the article quotes "we will not return to pre-coronavirus modes but we will go towards a more pervasive digital transformation".
Coronavirus, 5 mosse per tenere un'azienda viva in tempi di resilienza	15/03/2020	Andrea Porcu	Il Sole 24 Ore	Position paper	Smart working, Leadership, Opportunities	The article presents five different initiatives to tackle the pandemic and keep the company alive in the uncertainty of the context. The first aspect is to accept the long-term effects of the pandemic. In particular, it is essential to act and think like innovative start-ups and project managers in the staffing and financing phase of a new project. Secondly, corporations are called to learn how to manage the stress of employees, especially with the implementation of smart working. Thirdly, businesses are called to apply the principle of discomfort & commit, listening and deciding quickly what to do, having the ability to take risks. Fourthly, it is essential to adjust leadership styles at the moment and to the relational contexts in smart working. Finally, continuously project the opportunities of the moment in terms of building value. All this has value only if companies are put in a position to survive.
How CEOs can respond to the crisis and start building a resilient future	18/03/2020	John Jullens	KPMG	Position paper	Smart working, Shock management, Risk management	Protecting the safety and health of collaborators is a top priority for all companies. Smart working is, in this sense, a powerful tool on which CEOs can place confidence and build a digital workforce. In this scenario, Covid-19 acted as an accelerator for innovative changes in companies. The challenges posed by the pandemic are primarily short-term; reference to supply chain and liquidity. It is therefore necessary to plan cash flows immediately, monitor cash flows and inventory, centralize expenses and payments. The crisis has shown how far there is still a long way to go in terms of risk management, which cannot be designed only in strategic terms; predictivity will have to cover more areas. Finally, in order to construct a more resilient supply chain it is important companies will consider tax ambit of the investments.
Innovation imperatives from COVID-19	18/03/2020	Henry Chesbrough	Forbes	Position paper	Speed, Globalization, Collaboration, Openness	Reaction speed, globalization and openness are the elements that have favoured the spread of the virus. These seem to be paradoxically the same elements that can promote the development of solutions. What companies are called to do is to act quickly through techniques of collaboration between states and research centres around the world in order to spread information efficiently and thus increase the possibility of innovation.

8 milioni di italiani in smart working con l'epidemia COVID-19	18/03/2020	Il sole 24 ore	Il sole 24 ore	Primary data paper	Smart Working	The article proposes the results of a survey that shows about 8 million Italians have worked remotely during the period of forced smart working, a number strongly increased from only 500 thousand people who used the agile work before the advent of Covid-19. Data on the sustainability of smart working are reported: 6 out of 10 respondents state they want to continue to use it even after the emergency is over. Information is reported on the methods of implementation of this work remotely: agreed with the employer, unilateral, union intervention. It also talks about the specific skills required for proper implementation.
Beyond Coronavirus: the path to the next normal	23/03/2020	Kevin Sneader and Shubham Singhal	McKinsey & Company	Position paper	Next normal, Resilience, Reform	The article proposes five stages leaders of each business is called to follow to reach efficiently the next normal. The first step is called "Resolution". That is, it is necessary to clarify what the current situation is and what actions are necessary to take with determination, at what pace and at what speed. The second challenge is "Resilience". From health crisis to economic crisis, resilience is of vital importance, acting on broader resilience plans when the shock starts to revive the established industrial structures, resetting forever competitive positions, uncertainty and personal financial stress. The third step is "Bring back". Bringing companies back to operations and business continuity is challenging, re-evaluating the entire business system and planning contingent actions. The fourth step is "Re-imagining". It becomes fundamental to keep pace and be predictive as regards changes in consumer habits to be successful, flexibility without loss of efficiency, reconsider fixed costs and variable costs, adoption of technology. The fifth step is "Reform". Governments with a more central role in economic activity, leaders called to anticipate the future to be ready to face the next challenges that the future may hold, strategic reserves of key supplies, emergency production facilities for critical medical equipment, financial system able to handle exogenous shocks, education systems called to modernize with distance learning modes.
Emergenza Coronavirus: così il digitale può aumentare la resilienza del Paese	24/03/2020	Gastaldi, L. et al.	Network Digital 360	Position paper	Next normal, Resilience, Digital transformation	The article proposes a reflection on the importance of digital technologies in the period marked by Covid-19 and in the future next normal. The concept of digital is associated with the term resilience as the effective implementation of digital solutions is seen as an enabling and key factor to make society less fragile, more reactive and more able to achieve a stable balance. The advent of Coronavirus as a very important lesson, not only does digital increase the competitiveness and efficiency of economic realities but it also makes them more resilient.
Leading through uncertainty	26/03/2020	Deanna Foster	Harvard Business Publishing	Position paper	Next normal, Flexibility, Supply Chain, VUCA model	The article takes up the concept of the VUCA environment and provides tips to overcome the health emergency by winning. It refers to the attention that should be placed on incomplete and false information, the importance of being flexible, the protection of employees that can be ensured through remote

						work, the centrality of the Chinese supply chain and the block of the supply chain.
Lessons from Italy's response to Coronavirus	27/03/2020	Pisano, G. et al.	Harvard Business Review	Position paper	Systematic approach, Failure recognition, Absence of information	After a short intro about the virus a list of errors is made. First, the situation was underestimated, the experts were not listened to from the beginning and the consequences were amplified. There was no systematic approach and partial and unclear solutions were taken: double backlash because the speed of the virus was not considered and a mass exodus to their homes was promoted. Learning from successes and failures is critical. Healthcare is decentralized and neighbouring regions have had different situations, see Lombardy and Veneto. Collecting, analysing and sharing info is very important. In Italy there has been scarcity and inaccuracy of data.
COVID-19 global economic outlook	30/03/2020	Hunter, L.C. et al.	KPMG	Primary data paper	Impacts, Global recession, Supply Chain	The Covid-19 crisis will inevitably collide with the level of debt and capital markets. The risk of a global recession is therefore high as this pandemic has affected demand, supply and market. The virus epidemic has disrupted production supply chains and drastically reduced demand for energy and raw materials. The greatest impacts will be due to a drop in consumption, which in turn will lead to a drop in investment, and lower inventories. These, due to both the supply chain shock and the drop in demand.
Ten ways that COVID-19 could shape our future	01/04/2020	DHL	DHL Insights	Position paper	Supply Chain trends, Logistics, E-commerce, Digitalization, Resilience	Covid-19 not only acted as a digital accelerator but also forces company to rethink what was there before the pandemic. The article reports some possible changes that will occur in the next normal: the boundary between online and offline will disappear, not only omnichannel but also omni supply will be created, an increase in online grocery stores for which consumers have noticed a significant approximation in this period, an increase in purchases in local stores, online marketplace for BtoC but also for BtoB, supply chain from interconnected to closer to end customers, recognition of the importance of IT and digital transformation as a way to mitigate the impact and resilience present and future.

Coronavirus and technology Supply Chains: how to restart and rebuild	01/04/2020	Chenneveau, D. et al.	McKinsey & Company	Primary data paper	Supply Chain, Resilience, Risk management, Demand Volatility, Technologies	How can Asian companies solve supply chain problems? Manufacturers of labour-intensive components have difficulty in producing and selling, also are usually SMEs so they also have difficulty in finding financial resources. Short-term solutions: build a structure, nerve centre, to facilitate agile and control strategic and tactical implementation, examine the question by finding solutions to respond and assess risks. Building real scenario: the supply chain is fragmented because the epidemic is in different phases in the world, small suppliers have failed and finding alternative sources is not easy. Understand and model demand in order to be able to respond, also thanks to the collaboration with various stakeholders. Assess the risks, supply chain failure, and prioritize more important components. Optimize production: thanks to the previous insights, production can balance efficiency and demand, considering customer importance, services and availability. In the long term, the nerve centre becomes a risk management tool: use lessons learned in the short term to develop resilient supply chains.
Spatial transmission of COVID-19 via public and private transportation in China	01/04/2020	Zheng, R. et al.	Travel Med Infect Dis	Primary data paper	Covid-19 expansions, Health measures	The article provides a study that has as its main objective the analysis of the spread of Covid-19 worldwide. In particular, it studies the speed of expansion of the virus finding a positive correlation between this and the use of public transport such as airplanes and trains. This calls on continents around the world to apply designed security and health measures.
COVID-19: people, technology, and the path to organizational resilience	01/04/2020	Lillie, M. et al.	Deloitte	Position paper	Technology, Business continuity, Resilience	Technology as the best weapon to respond decisively and effectively to the challenges brought by the Coronavirus health emergency creating organizational resilience useful in the present but also in the future. To do this, the leader is called upon to focus on three business dimensions such as plans, people and practice. The first dimension requires the ability to respond quickly to all the challenges that may be encountered. The article reports a series of actions needed to implement an effective strategic plan in a time of crisis (rethink the business, create a crisis unit, make predictions on future scenarios by seizing the necessary technologies...). The second dimension is made up of people, the collaborators who as main asset of the company must be protected and supported as first priority. The third dimension concerns the practice, it is important to focus on business continuity and on all those actions that can promote its flexibility and effectiveness in times of crisis. The path to the new normality, next normal, must be characterized by resilient leaders who are able to make decisive choices, putting in the foreground the need to respond reactively and not impeccably.

COVID-19: orchestrating the recovery of Supply Chains	01/04/2020	Kilpatrick, J. et al.	Deloitte	Position paper	Supply Chain, Resilience, Recovery as rebound	The article focuses the attention on three main phases that companies have experienced and will have to live during the period of health emergency brought by the Coronavirus: a response phase in which companies deal with what is happening around them and try to maintain business continuity; a recovery phase in which companies learn from their experiences and a third of prosperity in which companies prepare operational and management plans to deal effectively with the new normality. It emphasizes the importance of creating task forces in the response period in order to lay the foundations and establish flexible plans for the next recovery phase; the uncertainty of the characteristics that will paint the future scenario on which many economists think will be a V-shaped trend (sudden economic crisis followed by a strong rebound). To achieve the rebound is necessary a strong collaboration inside the companies and outside with all the actors of the supply chain and the surrounding environment. Technology will play a key role in supporting the increase in collaboration and coordination. The text proposes some actions that can be crucial for long-term success and preparation for new challenges of this magnitude.
Is the Coronavirus pandemic an engine for the digital transformation?	03/04/2020	Mirko Malev	DM EXCO	Primary data paper	Covid-19 as accelerator, Digitalization cruciality, Collaboration, Coordination, Impacts	The article reports what was recorded by DMEXCO Trend Survey. What the results report is the essentiality of technology as an elementary support of economic realities negatively and heavily affected by the advent of the crisis; the cruciality and essentiality of the role played by coordination and collaboration between actors to ensure business continuity in the next normal. In addition to this, the article reports the results of the study on the impact of Covid-19 on digital realities. Covid-19 for 70% of respondents (DACH regions) has accelerated the movement towards digitalization of processes.
Andrà tutto diverso: ecco come il Coronavirus cambierà per sempre le nostre vite	05/04/2020	Francesco Cancellato	Fanpage	Position paper	Next normal, Digitalization, Resilience	The article proposes a detailed overview of the characteristics that will permanently define the next normal in which companies will be called to operate in the coming months. The economic and social change is destined to remain. Digital companies are the winners because, quotes Andrew Keen, "we are surviving this pandemic thanks to technology". The attributes of the next normal are to be found in the increases in terms of unemployment, inequality and social shock absorbers that are not effective in the long term. The article also emphasizes a need and risk related to higher levels of surveillance.

Coronavirus e Supply Chain: come il digitale supporta la logistica nella filiera Healthcare	06/04/2020	Christian Mondini	Network Digital 360	Position paper	Healthcare, Flexibility, Adaptability, Digital centrality	The article analyses the current context in which the Healthcare supply chain has been forced to operate due to the violent advent of the economic and health crisis Covid-19. This has demonstrated high levels of adaptability and responsiveness in the organization in a context where flexibility plays a key role. This article also emphasizes the importance of complete digitalization of both processes and documentation as a factor that minimizes contact. You have to "push the accelerator" of digital.
Navigating the COVID-19 impact to U.S transportation and logistics ecosystems	07/04/2020	Desai Yatish	KPMG	Position paper	Impacts, Short-term actions, Long-term actions, Digitalization	The article affirms the extraordinary nature of Covid-19 and the negative effects it has had in the logistics and transport sector. It is compared to many hurricanes in the same area at the same time. The article proposes height actions to be implemented in the short term: activate emergency plans, communicate with carriers, stay informed, conduct supplier assessment, perform carrier capacity and service analysis, evaluate mode shifting, consider fleet strategies and execute wave planning. And seven actions to plan for the long term: performance recovery assessment, focus on resiliency, conduct sensitivity analysis, establish partnership, redesign and refine transportation and logistics delivery model, embrace new technology solutions and enhance distribution capabilities.
How COVID-19 is shaping digital transformation	07/04/2020	Dean Nicolls	Techradar.com	Position paper	Impacts, Digital transformation, Resilience	The article analyses the general impacts and repercussions that Covid-19 has had in the world and in different sectors. It analyses the fact that the next normal will be completely different from the typical working environment we were used to working in. Supply chain destruction, decline and volatility in consumer demand and imposition of social distancing are just three of the biggest challenge's society has had to adapt to. Everything has changed remotely. It is necessary to understand that operational resilience can be fuelled by the updated and innovative implementation of digital technologies.
Contro il COVID-19, il ruolo determinante della digitalizzazione	08/04/2020	Pedro Garcia	Il Sole 24 Ore	Position paper	Impacts, Data analysis, Artificial intelligence, Smart working, Digital resilience	The article stresses that the impacts and repercussions brought by Covid-19 on all economic realities will be the common thread that will accompany them for many years. In order to slow down the spread of the virus, increase efficiency in management and migrate the consequences, companies are called to implement more and more digital technologies. Among these, an important role is played by data analysis, artificial intelligence and smart working that has made possible the continuity of operations. The use of cutting-edge technologies makes it possible to better manage the challenges imposed by the crisis.

Aziende e studi professionali, post COVID-19: soluzioni organizzative e adempimenti da ricordare	08/04/2020	Luigi Rendina	Cyber Security 360	Position paper	Organizational adjustments, Government regulatory compliance	The article proposes a reasoned guide on the privacy and regulatory requirements to remember and the organizational solutions post coronavirus.
Leading out of adversity	09/04/2020	Rich Lesser and Martin Reeves	BCG	Primary data paper	Resilience, Digital transformation, Covid-19 as accelerator	The Covid-19 crisis has highlighted the fragility of organizations and the lack of ability to react quickly to this exogenous factor. It is important to understand the new priorities on which leaders are called to work today to create a path of rebirth in the long term. These priorities are divided into five mainly: Sustainability flattens the epidemic curve (seeking a balance between death and economy by flattening the contagion curve by doing something sustainable for both sides); Winning new consumers (analysing future demand trends, understanding whether they are short term or long term trends and adapting to them by recovering old consumers lost during the crisis, shifting to digital platforms and building new customer trusts); accelerate the digital transformation (before it was a choice linked to competition towards competitors now it is a real urgent priority); create advantage through resilience (main type of organization to consider: supply chains connected, fast, efficient, tightened, rethink short supply, redundancy, modularity, prudence, diversity to reach a resilient system); mobilize the purpose in a common interest.
Un kit di sopravvivenza per le aziende manifatturiere	11/04/2020	Marco Perona	Università degli Studi di Brescia	Position paper	Supply chain, Resilience, Digital technologies	The article proposes a survival kit for manufacturing companies. There will be continuous phases of stoppage and restart of demand and production related to new waves of the economy for this is required to be resilient and efficient; Supply chain rethought to be more local in order to ensure transparency and control (near-shoring); increase in the use of digital technologies: control means of production and work remotely and increase of mixed reality; organized adjustments to protect safety in the workplace through automation, elimination of the Fordist model in favour of small factories distributed on the territory.
PLAN for an effective COVID-19 response	13/04/2020	Saxena, S. et al.	BCG	Position paper	PLAN	In this context, it is important to measure the impact of the emergency in both economic and social terms in order to build a well-thought-out action plan through flexible, up-to-date methods capable of providing information on which conclusions can be quickly drawn. BCG has created this tool (PLAN) to prepare localities for the emergency. It is able to detect imbalances in the supply and demand of the American nation: it estimates the current situation of patients and forecasts the number of future infected people who will require treatment;

						date of hospital beds and ventilators; interactive section to see various future scenarios of capacity adjustment, public intervention.
The future is not what it used to be: thoughts on the shape of the next normal	14/04/2020	Kevin Sneader and Shubham Singhal	McKinsey & Company	Primary data paper	Resilience, Speed, Efficacy, Innovation, Digitalization	The article contains a list of seven elements that the company managers are called to follow in order to return to the new normality as soon as possible: distance is back (border restrictions, greater preference for local products and services than global ones, need for resilience through supply chains that push to approach end markets, renewed resistance to globalization); Resilience and efficiency (key to come out victorious from the crisis, not only modify the business model but totally rethink it); The rise of the contactless economy (digital commerce, telemedicine and automation, the COVID-19 pandemic could turn out to be a decisive turning point); More government intervention in the economy; More control for enterprises; Change in industry structures, consumer behaviour, market positions and attractiveness of the industry, find silver coatings (the crisis as accelerating innovation of all business processes, more flexibility more simplicity and less cost).
Il business dopo il Coronavirus: la responsabilità di prendere decisioni che guardano lontano	15/04/2020	Giovanni Viani	Network Digital 360	Position paper	Business continuity, Financing	Key principle: adapt and change; in these times of crisis, the role of the leader is important and he is called to instil security in uncertainty and volatility and to implement business strategies that may be countertrending but fundamental to protect himself from a catastrophic impact. To reach the next normal is essential an action plan designed with steps and continuous updates and it is important to keep in mind that the new normality will be characterized by completely new paradigms compared to the pre Covid-19 ones. Important is the part of business transformation where you keep your historical business model but you continue to innovate aggressively and you move progressively towards the new normal (aggressive innovation + new start-ups). Supply Chain strongly under pressure because it must balance the protection of the suppliers with the flexibility. In synthesis it is called to: to reduce the costs alternating operating finance and technologies (IoT), to identify customers in the areas of towing and new needs; to migrate business model towards paths that were in the drawer, attacking innovation, reviewing the supply chain, broadening the horizon towards new opportunities.

Il COVID-19 e la digital transformation nel settore trasporti	15/04/2020	Veicoli	Veicoli	Position paper	Covid-19 as accelerator, Digital transformation	The article emphasizes the need to project companies towards evolution and innovation. The activity has managed to be guaranteed through specific forms of smart working. It is expected a strong adherence to digital technologies to optimize routes and order management. The crisis as a wake-up call to speed up the process of corporate digitization that has long been at stake.
La resilienza attiva può salvare il trasporto e la logistica	16/04/2020	Dekra	Dekra	Position paper	Logistics centrality, Resilience, Agility	The article confirms the essentiality of the services provided by companies in the logistics and transport sector during the health emergency. It analyses and reports the guidelines that these realities have been called to follow during the crisis. In addition, it reports and studies the future of these companies that will be characterized by the concept of resilience. Companies are called to interpret the context, anticipate change, review skills and internal resources. A complete revision of the old paradigms is necessary.
Seconda edizione dell'indagine sugli effetti della pandemia da COVID-19 per le imprese italiane	17/04/2020	Confindustria	Confindustria	Primary data paper	Impacts, Smart working, Future strategies, Management difficulties	The article reports and analyses all the results of a survey promoted by Confindustria on the effects of the Covid-19 pandemic for Italian companies in which more than 4000 economic realities participated. Worse impact Covid-19, closure of activities, workers in smart working, recourse to social shock absorbers, decrease in turnover, slowdown in demand, difficulty in managing activities, preparation in reaction, liquidity management difficulties.
Trasporto merci: tra innovazione e digitalizzazione la logistica non si ferma	17/04/2020	Gianandrea Ferrajoli and Daniele Furfaro	Network Digital 360	Position paper	Logistics centrality, Digital transformation, Sustainability	The article reports the centrality of logistics services during the Covid-19 health emergency. It is necessary to grasp the importance of digitalization not only from a competitive but also functional and environmental point of view. Digitalization and sustainability two key words to remain active in the market today. Logistics seems to be very interested in expanding its digital investments. In fact, according to "The state of logistic report 2019″ of Eft, more than 70% of companies are increasing their investments in ICT.
Smart working, l'indagine di Digital 360: "Performance migliori per un lavoratore su due"	17/04/2020	Luciana Maci	Economyup	Primary data paper	Smart working	The article proposes the results of a survey that states that 40% of people interviewed believe that work efficiency has improved during weeks of forced smart working, 33% believe that interaction with their responsibilities has improved. In addition, respondents consider positive access to documents and applications (92%), accountability on objectives and results (91%), the level of autonomy achieved (90%) and the perception of trust by their manager (85%). The most complex

						aspect is the reconciliation between private life and work, judged "good or excellent" by 45% of workers.
Supply Chain: come cambiano in funzione dell'emergenza COVID-19	17/04/2020	Mauro Bellini	Industry 4 Business	Position paper	Supply Chain, Safety shock, Customer behaviours, Demand	The article focuses on changing Supply Chains during the Covid-19 emergency. It emphasizes the importance of the application of digital technologies in order to create security, resilience and flexibility that will be at the heart of next normal. It talks about the management difficulties related to the safety stock effect, the radical change in behaviour habits according to the lockdown and changes in demand for goods.
The digital-led recovery from COVID-19: Five questions for CEOs	20/04/2020	Fitzpatrick, M. et al.	McKinsey & Company	Primary data paper	Digital transformation, Reactivity, Agility	Covid-19 requires a fast and reactive transformation towards a very uncertain future, the only thing certain is that it will be marked by a predominantly digital perspective. Companies that will be able to react quickly first will be the winners of every crisis (do not wait for signs of settling because it may be too late). It is necessary to move from active experimentation to active resizing supported by continuous improvement tests. Through two dimensions: at the centre of the company and development of new activities. Creating road maps to follow with definitions of roles, assignments, necessary resources; Developing a capacity to build the business for the future, it is not enough to launch a new business; Implementing agile business model; Searching for talent but not forgetting to develop talent on the forces already in possession; Understand what are the best investments needed to bring the business to an increasingly digital environment.
Driving digital change during a crisis: The chief digital officer and COVID-19	20/04/2020	Alatovic, T. et al.	McKinsey & Company	Primary data paper	E-commerce, Chief Digital Office, Resilience, Digital transformation, Customer engagement, Agility, Collaboration	The demand for digital services and products reached record levels during the crisis. The almost entirely new role of the Chief Digital Office now faces a major challenge: driving digital transformation by creating resilience and a good future foundation. According to McKinsey the CDO must operate through four main areas: creating resilient leadership, guiding and supporting employees in completely new and stressful situations, drawing up a digital strategy by balancing the product road map, developing digital strategies based on scenarios that describe changes in customer behaviour, business model opportunities and their implications on digital and technological choices plus working closely with product leads to focus on urgent products, interact with customers, CDO as the voice of customers, it is important to assess the change in consumer habits through testing, methods and careful analysis

						of data; empathy with the customer and update agile practices to accelerate remote delivery.
La pandemia accelera la digitalizzazione	20/04/2020	Anna Lisa Antonucci	L'osservatorio Romano	Position paper	Covid-19 as accelerator, Digital transformation	The article highlights Covid-19 as a factor accelerating the transition of the economy and the world to digital. It is important to pay attention to countries and economic realities that are not able to guarantee constant updating towards new technologies in order not to create too many inequalities and an unbridgeable gap. Technologies as essential during the emergency as they have allowed telemedicine, telework, online education, the collection of data on the spread of the virus and the ease of information exchange. It is necessary to seize the Covid-19 as an opportunity for growth.
Advantage beyond the crisis	21/04/2020	King, K. et al.	BCG	Primary data paper	Volatility, Uncertainty, Next normal	Volatility as the main factor in times of crisis. The article traces five actions that companies are called to take in order to create a process of transformation: detect and discern the critical shift, create 3 war zones: for consumers, competitors and regulatory issues in order to capture what are the signs of demand and what will persist after the crisis and what are opportunities, circumvent the competition: new brand perceptions, change in purchasing behaviours lead to major competitive challenges; accelerate restructuring or investment: the crisis makes these actions easier in terms of costs and opportunities must be exploited, capture the low asset value: in the crisis the world is for sale, M&A implications in the period of crisis; build the business capacity of the government.
Digital strategy in a time of crisis	22/04/2020	Blackburn, S. et al.	McKinsey & Company	Primary data paper	Digital transformation, Reactivity, Speed	The article reports evidence on Covid-19 as an accelerator of digital transformation: before the implementation horizon was 1-3 years, now we are facing a speed challenge. In a period like this one of crisis, companies are required to be bold and learn, waiting and acting slowly is very penalized because paradigms can change from one day to the next. So, it's time to act with courage by advancing all those digital projects that had put themselves in the drawer but always acting with knowledge and learning what the crisis teaches. However, it remains important to speed up and follow the step that the crisis makes available within which to make decisions.
Logistics sector changes resulting from COVID-19 pandemic	24/04/2020	Marco Melacini	Politecnico Torino	Position paper	Logistics centrality, Smart strategies, Technologies	The article emphasizes the centrality of the logistics and transport sector during the health emergency stating that this has been severely tested. This is because the ability to react quickly and ensure the continuity of a safe and stable essential service

						was required. What companies have done was on the one hand to adopt smart strategies rather than centralized to reduce costs (smart working, cloud technologies and software) and on the other hand to adopt organizational and operational adjustments to ensure the work of employees in total security.
Fase 2, la logistica dovrà riorganizzarsi: il digitale l'ingrediente chiave	24/04/2020	Patrizia Licata	Network Digital 360	Position paper	High-tech, Digital centrality	The article reports four high-tech initiatives that, according to Gartner, companies are called to implement: telematics to protect drivers (safety plus cost reduction); intelligent shift scheduling (vehicle routing for urgent deliveries); Cloud (forms that require paper filling out transferred to the Cloud); anti-theft sensors. Digitization is the key ingredient that makes realities leaner and more proactive in the future (Carly West).
Coronavirus e trasporti, che rivoluzione	25/04/2020	Federico Pesce	La Repubblica	Position paper	Covid-19 as accelerator, Digital transformation	The article, in addition to highlight the centrality assumed by the logistics and transport sector during the period of health emergency, which has ensured the continuity of transport of medical doctors and personal protective equipment to hospitals and medical centres, stressed that despite the critical issues encountered this health emergency can be seen as a great opportunity. In fact, through the efficient implementation and use of innovative and advanced digital solutions such as artificial intelligence and automation, the sector can operate more effectively in the medium and long term.
COVID-19: accelerating the digitalisation of operations	25/04/2020	Jonathan Whiteside	Supplychaindigital.com	Position paper	Covid-19 as accelerator, Digital transformation	The article paints the health emergency as a factor accelerating the digital transformation of business models. This new movement is driven by the increasingly consolidated need to approach and change strategies based on volatile consumer demand. During the crisis new and innovative processes and activities have developed that have made possible a greater efficiency in the results. The implementation of digital solutions was planned for many companies, the advent of Covid-19 has simply speeded up its use. In fact, companies have been able, from day to night, to implement and exploit the benefits of technology.
COVID-19 to accelerate digitalization, automation of container shipping	26/04/2020	Jensen Lars	Joc.com	Position paper	Digitalization, Automation, Containers	The article analyses the impacts of the Covid-19 crisis in the container shipping sector. This world has been negatively affected but despite the critical issues it is necessary to see the crisis as a great opportunity. What is specifically required to companies is the movement towards differentiation of services based on digital solutions that allow to innovate the business model and move away from everything that until yesterday were the operating standards.

Mitigating disruption in transportation amidst COVID-19	26/04/2020	Greg Karr	Supplychaindigital.com	Position paper	Impacts, Reactivity, Digital transformation	The article analyses the impacts that the Covid-19 has brought to transportation in the U.S. and Canada that have operated 89% for heavy trucks and 90% for grocery shops. There is a need to diversify because those realities that depend so much on a single activity if it closes down immediately. Independent owners are the ones who can prevail because they are able to change strategy quickly depending on how the market changes. The keys to survival are: the ability to catch a disaster before it arrives, the ability to implement the right risk strategies and the ability to rapidly flex up. It is necessary to rethink the importance of digital solutions and implement new ones.
La trasformazione dei trasporti e della logistica e le soluzioni post COVID-19	27/04/2020	Emily Capozucca	Corriere della Sera	Primary data paper	Darwinian model, Digital transformation, Logistics centrality, E-commerce	The article underlines the strategic value of the logistics and transport sector. This, according to the author will be changed in a definitive way. The restart will be a recession and an accelerator for the business in general and for the logistics market in particular. The e-commerce and the measures of sanitary security company will grow more and more. A new Darwinian model will go to affirm. Only the enterprises predisposed to the change and the digital transformation will survive to the crisis and they will reach in effective way what will be the next normal.
Digital Supply Chain come nuova normalità	27/04/2020	Annalisa Casali	Network Digital 360	Position paper	Supply Chain, Artificial intelligence, Blockchain, Resilience, Flexibility, Speed	The article emphasizes that companies characterized by high levels of resilience, flexibility, speed, adaptability, ability to react quickly to emergencies, ability and openness to experiment with new services and new business models will undoubtedly survive the crisis and reach the next normal more effectively. In addition, the article analyses the reasons why the old supply chain paradigm is no longer effective in the context of volatility and uncertainty in which companies have found themselves working; the movement that led to the intelligent supply chain; the changes and new features of the supply chain, smart factories and the role of AI and Blockchain in the supply chain management agile and modern.
COVID-19 to accelerate logistics industry toward digital, low-growth reality	30/04/2020	Mark Szakonyi	Joc.com	Position paper	Digital transformation, Covid-19 as accelerator	The article reflects on the role digitalization and automation will play in the next normal. The result is the Covid-19 health emergency as a big opportunity corporation are called to grasp in order to shift their business models from a traditional one to fully digitalized and automated one. Digital solutions as critical enablers to efficiently and efficacy survive the challenges imposed by the crisis.
Agile, flessibile e micro: così il Coronavirus cambia per sempre la supply chain. Parola di KPMG	30/04/2020	Marco Scotti	Industria Italiana	Position paper	Agile, Digitalization, Flexibility, Micro	The article discusses the new attributes that will characterize the distribution logistics in the next normal. Among these are the logistics of the last mile, the click and collect, e-commerce; all processes and solutions that were already in place but that the crisis has accelerated. In the next normal the only acceptable

						model to refer to will be that of Amazon and there will be the prevalence of big players such as DHL, Maersk and UPS.
Logistica e movimento merci dopo il Coronavirus: la voce dei protagonisti del settore	30/04/2020	Valerio Di Rosa	Trasportare Oggi	Position paper	Interconnectivity, Eco sustainability, Digitalization, Intermodality	The article paints the Covid-19 as a butterfly effect, the slightest flutter of a butterfly's wings was able to destroy the economy and society in a very short time. The crisis in the world of logistics should be seen as an opportunity for interconnectivity, eco-sustainability, digitalization and intermodality. The delocalization is no longer feasible, it is necessary to think of a supply chain that looks at territoriality (no longer just in time). It is necessary a control tower that controls the entire logistics system. It is important to invest in alternative and sustainable energies.
COVID-19 BCG Perspectives # 4	01/05/2020	BCG	BCG	Primary data paper	Digital transformation, Covid-19 as accelerator	BCG perspectives propose nine areas of action for the business leader to address the crisis. In this fourth edition, the focus is on accelerating the digital transformation. The Covid-19 is painted as a journey through three distinct phases: Flatten (initial phase, goal is to reduce cases, social distancing, closing activities leads to comical recession); Fight (finding ways to fight the crisis and the virus) and Future (disease control with vaccines, new resilient, redundant and reactive business models). The time to go digital is now and what we see today will be the paradigm of the future. Leaders called to go through two imperatives: in the short term implement digital solutions to control the crisis and come out a winner; in parallel accelerate digital transformation to become resilient and exploit the opportunities of the crisis period.
Alcune considerazioni sugli impatti dell'emergenza COVID-19 per il trasporto merci e la logistica in Italia	01/05/2020	Cascetta, E. et al.	Shipmag	Primary data paper	Impacts, Trends, Opportunities, Resilience	The article proposes a study focused on the analysis of the negativity of the Covid-19 impacts on the logistics sector and the transport of goods in the Italian territory. This, in addition to reporting frightening numbers regarding the impact of the crisis, focuses attention on both trends and opportunities that economic realities have the opportunity to exploit. Among these are sectoral interventions (streamlining regulations/bureaucracy of investments; financing mechanisms; monitoring; streamlining of the logistics supply chain); resilient thinking and action and industrial policies aimed at supporting and protecting the sector.
COVID-19: Managing supply chain risk and disruption	01/05/2020	Jim Kilpatrick	Deloitte	Position paper	Supply Chain, China dependence, Technologies, Resilience	The article proposes a series of actions that companies are called to implement in the medium-long term in order to keep their supply chain active and efficient. Among these are the training activities for employees, the alignment of IT systems and support to evolving work requirements, the creation of succession plans for key executive positions and the attention to cash flow. The study also highlights the high level of

						vulnerability to which global supply chains are exposed and the great support that digital technologies can provide to overcome future challenges (IoT, AI, 5G...).
Is your technology ready for the new digital reality?	08/05/2020	Close, K. et al.	BCG	Primary data paper	Digital transformation, Resilience	In a future of inertia companies must focus on important outcomes, new methods of working and using technologies. Companies that do this have a much better performance and are resilient: they have a better and broader view of their business and are able to change quickly and radically. Companies are asked to rethink their approach to digital transformation by following four simple rules: ensure business continuity, reset investment portfolio, future proof the tech function and build scalable and adaptable data and digital platform.
Restarting national economies during Coronavirus, part two	06/04/2020	Cadena, A. et al.	McKinsey & Company	Primary data paper	Impacts, Selective lock-down, Full lock-down	Comparison between selective lockdown and full lockdown. Selective lockdown is better because health care capacity can be used more effectively and there is a lower cost for the population (fewer restrictions on work activities). But you need skills and tools to implement it. It starts at regional level with suitable control tools to minimize the risk of virus expansion: to restart the less risky and more important sectors for the local economy. More people will be on the street so we need testing, tracking (three steps) and behaviour protocols (problems and limitations) to make the reopening sustainable. Finally strengthening health capacity: the best approach is to understand how much it is possible to sustain the spread of the virus and make sure that this level is not exceeded.
How COVID-19 accelerates digital transformation	11/05/2020	Christoffer Hernaes	Christoffer Hernaes	Position paper	Supply Chain, Covid-19 as accelerator, Digital Transformation	The article analyses the major changes that the advent of Covid-19 has brought about in the economy and society in general. Between these we underline the behaviours of the purchase of the customers, the exponential growth of the e-commerce, the vulnerability of the global supply chain and the increase in the use of advanced digital solutions (AI, Robotics...). Covid-19 as accelerator of the digitization process. According to a senior executive at Gartner, "This is a wake-up call for organizations that have placed too much focus on daily operational needs at the expense of investing in digital business and long-term resilience."
A new era for industrial R&D in Japan	12/05/2020	Chokki, S. et al.	McKinsey & Company	Primary data paper	Industrial R&D, Innovation, Advanced Technologies	Japan is a country with a strong reputation in terms of R&D and, with the successes achieved in various sectors, shows how technologies that were once simple passwords, digital, advanced analytics, robotics, machine vision, additive manufacturing, are growing one sector after another. Everywhere you look, companies offer new types of products and services, find new ways to interact with their customers and transform the way they operate internally. Seizing the resulting opportunities is a central element of the Japanese government's

						strategy to stimulate growth, particularly by promoting a future "5.0 Society" that relies on artificial intelligence, sensors, automation and other technologies to drive convergence between physical and cyber spaces. The high-performance industrial research and development departments aim to beat the competition in three primary dimensions. Higher productivity means they perform more useful R&D work with the resources at their disposal. Shorter time-to-market enables them to gain an early competitive advantage and reduces the delay between R&D investment and financial return. And with a higher rate of innovation, companies generate added value for customers by turning more ideas into products and services. Finally, surveys show that Japanese R&D organizations face five challenges: data & analytics (only 45% of Japanese companies know how to digitize internally); agility & speed (only 23% of companies believe they have the skills to be the first to enter new markets); talent (an aspect on which Japan is in crisis); efficiency & effectiveness (in this sense it is important to have data making tools, meet customer demand); ecosystem logic.
How COVID-19 could accelerate the digital Supply Chain	13/05/2020	Barbara Jorgensen	EPS news	Position paper	Supply Chain, Covid-19 as accelerator, Digital Transformation	The article analyses the impacts that have occurred in terms of global supply chains such as those related to cash flow and lack of coordination and communication between actors involved in the processes. The study also states that the emergency is accelerating the process of digitization of the supply chain that, through the efficient implementation of digital technologies, acquires the right capabilities to respond reactively to challenges and remain sustainable.
The COVID-19 recovery will be digital: a plan for the first 90 days	14/05/2020	Baig, A. et al.	McKinsey & Company	Primary data paper	E-commerce, Artificial intelligence, Digital agenda	Recent data shows that we have made a five-year leap forward in digital adoption by consumers and businesses within about eight weeks. As some regions begin to reopen, companies are considering how to return to some semblance of full speed in an unstable environment. In this sense, there are three structural changes at stake. First, customer behaviour and preferred interactions have changed significantly, and although they will continue to change, the increase in the use of digital services is here to stay, at least to some extent (75 % of people using digital channels for the first time indicate that they will continue to use them when things return to "normal". Companies will need to ensure that their digital channels are on par with or better than their competitors to succeed in this new environment). Second, with the return of the economy, the recovery in demand will be unpredictable, so new data and fully reconstructed analytical models will be essential to guide operational decisions. Finally, many organizations have switched to telework models almost overnight. An initial remote setup allows companies to instantly mobilize global expertise (respond more quickly to customer requests by providing everything from product information to sales and after-sales support in digital format). The digital

						agenda will follow these steps: Refocus digital efforts towards changing customer expectations, use new data and artificial intelligence to improve business operations, selectively modernize technological capabilities, structure the company according to an agile model.
Restore and reimagine: digital and analytics imperatives for insurers	14/05/2020	Balasubramanian, R. et al.	McKinsey & Company	Position paper	Insures, Customer behaviours, E-commerce, Artificial intelligence, Agile	The Covid-19 crisis will cause structural changes that will have significant implications for the insurance sector. A prolonged period of volatility, uncertainty and depressed economic activity will accelerate ongoing changes in consumer behaviour, needs and expectations. Some of these changes will be irreversible. In such an environment, digitally enabled intermediaries and exclusively digital sales models are proving effective and could accelerate the trend to "take it all". These changes, coupled with continued economic pressures, will require insurers to develop radically simple solutions, highly efficient operating models and consistently innovative business models. Insurers should prioritize seven key digital and analytical imperatives: 1. Future interaction will have digital features; 2. Preserving and increasing an existing customer's revenue is usually a better bet than acquiring new customers. During the pandemic-fuelled crisis, insurers should therefore find ways to be relevant to their customers and engage them; 3. Frictionless underwriting and granular pricing, based on better data capture; 4. AI-driven capabilities for a more empathic service (Use AI to transfer information between channels and create a seamless all-channel experience, allowing chatbots and virtual agents to provide a fast service and transferring clients to traditional agents as needed; 5. Next-generation claims model from hiring to payment; 6. workforce reskilling and new ways of working (includes adoption of agile practices); 7. New products and ecosystems.
Is your Supply Chain risk blind or risk resilient?	14/05/2020	Alicke, K. et al.	McKinsey & Company	Primary data paper	Vulnerability analysis, Risk management, Resilience, Supply chain, Interconnectivity	For more than a generation, organizations have relied on global, interconnected supply chains to improve margins. Over the same period, supply-chain efficiency indicators, such as inventory levels, on-time delivery and delivery times, have improved for those companies that have managed to create lean, global networks. However, a growing set of global challenges has increased the surface area and scale of supply chain risks, from climate change and the rise of a multipolar economic system to increased mobility and digitization. In this context, organizations need a new approach to supply chain risk management and resilience building. Companies will need a much deeper view of the vulnerability and exposure of their supply chain to create effective mitigation and business continuity plans. A comprehensive understanding of supply chain risk considers two distinct elements: first, the underlying vulnerabilities in the supply chain that make it fragile, and second, the level of exposure or susceptibility to unforeseen events (or shocks) that exploit those vulnerabilities. In addition,

						the combination of the mosaic of publicly available data and network analysis algorithms can illuminate the likely supply chain of many companies. Finally, supply chain resilience requires a risk-aware culture to help an organization establish and maintain strong defensive levels against unknown risks, as well as respond more quickly in the event of a major crisis or operational threat. As Covid-19 has uncovered the vulnerabilities in companies' supply chains, building resilience is not just a matter of awareness, but of establishing intent throughout the organization, communicating clearly to the entire workforce and taking tangible action to address immediate and long-term risks.
The new reality for Chief Supply Chain Officers	14/05/2020	Knapp, J. et al	BCG	Primary data paper	Supply chain officers, Agile, Risk strategy, Digital solutions, Visibility	The supply chain officers of the various companies worldwide have gone through the fight phase, where it was necessary to ensure security and, at the same time, to guarantee the supply through increasingly digitized processes. There are five main areas on which it will be necessary to focus in order to obtain a greater efficiency and effectiveness about the supply chains: 1. Mandate visibility end-to-end (it can bring to an improvement of the service from 8% to 15% and an improvement from 5% to 20% of the working capital); 2. Redefining the capacity through flexible/priority processes; 3. Reaching a greater integration with suppliers, vendors and customers (weekly meetings); 4. Simplifying the complexity (increasing the plant efficiency, decreasing the low-volume SKUs, decreasing the number of locations for the SKU). 5. Develop a future risk strategy (invest in automation, be agile, cut end-to-end supply chain costs).
From thinking about the next normal to making it work: what to stop, start, and accelerate	15/05/2020	Kevin Sneader and Shubham Singhal	McKinsey & Company	Primary data paper	Remote working, Agility, Flexibility, Supply chain, Just-in-time, Just-in-case, Innovation, Partner relationship	Remote working is not a panacea for today's workplace challenges such as training, unemployment and loss of productivity. For work from home to be sustainable, companies need to help their staff create these boundaries: the kind of interaction that used to take place in the hallway can be handled with a quick phone call, not a video conference. Collaboration, flexibility, inclusion and responsibility are things that organizations have been thinking about for years, with some progress. But the massive change associated with the coronavirus could and should accelerate the changes that foster these values. In addition, the organizational structures of the past should be replaced with those capable of boosting corporate decision-making (agile, teams = Agile companies are more decentralized and less dependent on top-down decision-making, command and control. They create agile teams, which are allowed to make most of the day-to-day decisions; senior executives still make the big bets they can make or destroy a company. Agile teams are not out-of-control teams: responsibility, in the form of tracking and measuring accurately declared results, is as much a part of their responsibility as flexibility. The basic idea is that the right people are able to make and execute decisions). Finally, it is essential to proceed

						through resilient supply chains, combining alignment of resources and investment.
Reimagining the post-pandemic organization	15/05/2020	D'Auria, G. et al.	McKinsey & Company	Position paper	Value creation, Agile, Decision-making, Talents, Ecosystem logistics, Data analysis	The organization of the future is taking shape in the moves that companies are making now. That's what's changing and why some companies say they won't come back. The Covid-19 pandemic and the ensuing economic shock have changed everything; inertia is clearly riskier than action right now, so companies are mobilizing to address the immediate threat in ways they may have struggled to face when faced with more abstract challenges, such as digital technology, automation and artificial intelligence. Post-pandemic organizations will take shape along three dimensions: "Who we are (1)", "How we operate (2)", "How we can grow (3)". (1) Choosing strategic responses and priorities is difficult enough at this time, and it is much more difficult for companies that do not have a crystallized agenda of values to help them go beyond the overall numbers to zero actions and opportunities to move resources effectively. On the contrary, companies that have such a vision are more likely to be able to hinge on operations and reallocate resources quickly, attitudes that will only become more important when a new competitive landscape emerges from the waves of seismic economic shock we are experiencing now. (2) The transition to more agile work structures has always involved two things. The first is to encourage a high degree of autonomy for people on the margins of the organization (those closest to customers, partners and communities) to make decisions, innovate and do things. The second is to achieve a high degree of alignment between groups so that the right things are done in the first place; companies that see hierarchy as the only way to map and structure formal relationships - or, indeed, the only way to get things right - find the current environment paralyzing. Finally, about growth, it will be necessary to invest in a concept of ecosystem, integration between the various actors, embracing technological platforms rich in data.
Fase 2: via libera alla logistica 4.0. L'emergenza accelera l'innovazione digitale	19/05/2020	Annalisa Casali	Network Digital 360	Position paper	Automation, E-commerce, Logistica 4.0, End-to-end management	The article analyses the challenges and the scenario in which the logistics sector will operate in the next normal. It is emphasized the boom registered in the e-commerce (+ 20,7% in the month of March); it is spoken about logistics 4.0 where the password to remain active and resilient is to digitalize and it is discussed about the future of the logistics. Increases are expected in digital projects (smart working, digital workflow management) in order to increase the visibility of the supply chain, achieve effective transport planning, optimize warehouse capacity and automate the handling of goods.

Come cambia la logistica	20/05/2020	Emanuela Stifano	Il Giornale della Logistica	Position paper	Logistics centrality, Digital transformation, Resilience	The article reports the changes that have taken place in the logistics sector and underlines on the one hand the cruciality of future technological innovation and on the other hand the increasingly important role that logistics and transport are achieving. They have been the salvation of an entire country and have proved to be resilient and able to face all the challenges imposed by the crisis. We highlight the role of digital for the next normal (stop signature paper, paper documents ...), the need to better manage stocks by distributing them. It is necessary to see the crisis as an opportunity for development.
When the ground shifts, it pays to be agile	26/05/2020	Danoesastro, M. et al.	BCG	Position paper	Resilience, Reactivity, Agility	The article stresses the importance of three main factors on which companies are called to focus attention: cost reduction, speed and resilience. Agility seems to be the answer. That is, the alignment of objectives, strategies and priorities that allows teams to work independently, effectively and develop resilience. In addition, there are quick examples of companies that have implemented corporate organizations in some business departments. Certainly, this transformation to agile requires time and a structural cost and cultural transformation.
COVID-19 and the acceleration of digital transformations in maritime logistics	26/05/2020	Basu Pratnashree	Observed Research Foundation	Position paper	Covid-19 as accelerator, Digitalization	The article analyses the centrality of maritime shipments both in times of normality and in times of crisis. In order to be optimized, this sector needs to: adapt the business model so as to achieve greater simplicity in operations, implement digital technologies and create digital platforms that can allow greater levels of agility and responsiveness in solutions. A study conducted by Transparency Market Research reports that this sector will reach $ 38.4 billion over the next 28 years, thanks to digital transformation. This article also highlights Covid-19 as an accelerator of the company's digitization process and processes.
Supply Chain and first mover advantages insight from the frontlines of the pandemic	27/05/2020	Philippe Gilbert	UPS-Longitude	Position paper	Supply Chain, Digital transformation, Resiliency, Flexibility	The crisis calls on business leaders to act responsibly and adapt to the rapid changes taking place in the business in order to create an agile and resilient organization capable of meeting the challenges of the moment. It is important to analyse and predict what will be the new normality in terms of customer acquisition behaviour (increasingly focused on flexible and immediate online purchases), investment in digital solutions (digital marketing, close connection with consumers, digital dashboards to accelerate supply chain control), employee behaviour (increasingly focused on flexible and agile remote work). Those who will be able to adapt and change management and operational mentality in a reactive way (first mover) will reap great benefits and act as a pilot for other realities.

Il trasporto e la logistica in Italia durante l'emergenza COVID-19	01/06/2020	Agostino, M. et al.	Politecnico Torino	Primary data paper	Impacts, Opportunities, Resilience	The article analyses the impacts that have occurred in the field of logistics and transport analysing them separately, in a first part, and in an aggregate way, in a second part. These numbers have made it possible to highlight the expected consequences (environmental, social, timing, costs, competitiveness, resilience) and the actions that companies in the sector are called to undertake, of infrastructural, organizational, management and technological (ICT) nature.
Factory of the Future: the need for a broader approach to achieve success	02/06/2020	Mikael Ternhult	BCG	Position paper	Technology infrastructure, Resources, Competences, Ambition, Strategy	The article talks about the concept of Factory of the Future. A broader concept that encompasses not only the technologies in place in factories, but also the context in which those technologies operate. In particular, the interaction between technology and the structure and processes of a factory. With a more integrated vision, even greater improvements can be achieved than simply focusing on technology. Only after moving from pilot and concept testing to true scalability to an entire factory network, do the bottom-line improvements begin to emerge. And to be successful in the scalability of Factory of the Future, companies must have three enabling factors. Start by thinking about what is needed in terms of, for example, how many factories should we include and in what timeframe? How many factories do you want to build the Factory of the Future in the first year, second year and third year? It is also important to recognize that the different factories will have different starting points. Some will be more mature when it comes to lean production, for example, and others less. Therefore, the roadmap should take this into account. Second, companies that want to implement Factory of the Future must also have the resources and skills needed, as well as an organization that allows for scalability. The article recommend a programmatic approach rather than an incremental approach to implementation. This means having dedicated resources rather than trying to settle for available resources. In other words, the resources should be adapted to meet the desired needs and ambitions, not the other way around.
How COVID-19 could reshape the digital future of Supply Chains	09/06/2020	Maria Jesus Saenz	UPS-Longitude	Position paper	Supply Chain, Digital transformation, Resiliency, Flexibility	Before the advent of the health emergency the digitalization of the entire supply chain was one of the main operational plans of most realities, now this project has become a real need. The digital transformation is seen as a tool to create a resilient supply chain able to deal with the uncertainty, volatility and variance that characterizes crisis situations such as the one imposed by the coronavirus. Flexibility and robustness as keys to success brought by the use of technology in business and international trade; digitalized supply chains can make it easier to change the model whenever government policies change.

Smart working dopo il COVID? Per l'84 % dei manager diventerà una realtà consolidata	10/06/2020	Alice Scaglioni	Corriere della Sera	Primary data paper	Smart working, Digital culture	Article reports the results of a survey promoted by Hermes Consulting that states that for 84% of the interviewed managers smart working will become a stable base in the future working world, it is not only a necessary and passing trend. The digital culture for the 90% of the interviewees is a fundamental investment for the new normal. Data related to the preparation of companies to the revolution of remote working are reported (60% already with workstation in their home). Reference is made to the lack of human contact that is fundamental for many employees as a disadvantage of working remotely.
COVID-19 & necessity accelerate Supply Chain digitization	16/06/2020	Barbara Jorgensen	EPS news	Primary data paper	Covid-19 as accelerator, Digital transformation, Necessity	The article highlights the concept of necessity by linking it directly to the concept of acceleration. This is to say that the advent of Covid-19 has highlighted the importance of being agile, being fast and being able to plan and manage the flow of operations. For example, it is reported the case of companies that typically manufactured sneakers that found themselves redesigning their supply chain and started to produce masks. The study also speaks about Covid-19 as an accelerator of the digital transformation process, which has always been on the company's "to-do list" but has been drastically accelerated by this crisis.
Digitale, resiliente e strategica: ecco la logistica di domani	01/07/2020	Logistica Efficiente	Logistica Efficiente	Position paper	Logistics centrality, Digital transformation, Resilience	The article underlines that the next normal will be characterized by a totally different paradigm from the one we were used to. Logistics has demonstrated high levels of resilience and a high capacity to adapt, although operating in a highly complicated and uncertain context. The future is digital with a drastic conversion from paper to digital which will result in environmental, economic and organizational sustainability. In the next normal this sector will become a science that will be increasingly in the foreground and with a fundamental role from a strategic point of view.
Global freight flows after COVID-19: what's next?	02/07/2020	Condon, J. et al.	McKinsey & Company	Primary data paper	Opportunities, Impacts, Action to survive	The article proposes a detailed analysis of the impacts of Covid-19 on logistics and freight transport, both at a general level and by commodity and modes of transport. The crisis is seen as an opportunity to enter new markets, to innovate the services offered and to gain positions with respect to competitors. The granular trade flow modelling is useful to know company's position in the market and its exposure to risk. Three are the actions proposed to operate in the middle of the crisis: scenario development, commercial strategy and operational strategy.
From now on: Supply Chain sfide e opportunità, da oggi in poi	05/07/2020	Umberto Mazzucco	Deloitte	Primary data paper	Supply Chain, Deglobalization, Digitalization, Risk management	The article stresses the need to rethink supply chain models during the pandemic given the systemic risks arising from the high degree of dependency with China, the world's leading supplier. The article reports three ways to follow to optimize the supply chain and understand the ability to react of organizational model: Deglobalization (constraints in the selection of suppliers, stock sizing mechanisms, flexible

						logistics structure, supply sources leased closer); Digitalization (Digital supply Network as a new model for efficiency, responsiveness and collaboration); Risk Management (fundamental importance to monitor credit and supply risks).
COVID-19 e digitalizzazione: le sfide per le pmi	09/07/2020	Manager Italia	Manager Italia	Primary data paper	Readiness, Reactivity, Digital cruciality	The article reports the results of a survey conducted by the Capterra team between 15 and 19 May 2020. This survey was directed to 8 countries (Australia, Brazil, France, Germany, Great Britain, Spain, Italy and Netherlands) and 3,144 people from small and medium enterprises were interviewed. The analysis was directed to the measures available to face the crisis: 53% SMEs had no business continuity plans, 60% said they could not support the crisis beyond 6 months and 65% said they had to invest heavily in software. The situation in Italy is drastic, in fact it is the least prepared country to face the crisis. 39% of decision makers said they needed the technology to face the current situation. The most prepared countries are Germany, France, Australia and the Netherlands.
Logistics: challenges and opportunities in the post COVID-19 world	17/07/2020	Sharma Bobbi	Atos.net	Position paper	Supply chain, E-commerce, Technologies cruciality	The article analyses the changes that have occurred in the logistics sector. Between these the destruction of the supply chain in favour of strategies of diversification and relocation; the exponential growth of the e-commerce in favour of a rapid growth of the sector and very rapid investments to answer to the changing demand. The operations can be optimized through data and technologies as critical enablers able to predict any disruptions and risks.
L'impatto del COVID-19	22/07/2020	Centro Studi Fedespedi	Centro Studi Fedespedi	Primary data paper	Impacts, Global trade, Transportation volumes, Hope	The article reports the study conducted by the Fedespedi Study Centre that analyses in detail the negativity of Covid-19 incidence on the logistics and transport sector. In particular, the article emphasizes the dramatic nature of international trade, which has seen decreases in imports and exports of -19.2% and -16.8%. As far as containers and air transport are concerned, these have recorded reductions of - 11.4% and - 16.8%. Silvia Moretto, president of Fedespedi, admits the critical situation in which the sector has found itself working but is hopeful for the next normal future.
La digitalizzazione della logistica: una necessità, non più un optional	23/07/2020	Campisa	Campisa	Position paper	Digital necessity, IoT, Blockchain, AI, Robotics	The article, in addition to provide a brief analysis of the impact of Covid-19 on the logistics and transport sector, opens an important parenthesis on digitalization as a necessity and no longer an optional. The authors emphasize that technologies such as IoT, for the optimization of every step in the warehouse, the Blockchain, for product traceability and digitalization of documents, artificial intelligence, for the development of a predictive logistics of demand and capacity of the warehouse and robotics for the minimization of errors are the most important on which the sector is called to pay more and more attention.

Ridisegnare la Supply Chain di beni e servizi per reagire al COVID-19	05/08/2020	Adrodegari, F. et al	Network Digital 360	Primary data paper	Supply Chain, Risk Management, Digital Servitization	The article reports the results obtained from a survey promised by RISE laboratory of the University of Brescia and ASAP Service Management Forum. Survey proposed to over 180 companies in order to capture the impacts of the Covid-19 emergency on the Supply Chain. The need to rethink supply chains based on internationalization that have lost stability and resilience in the period of health emergency is underlined. Risk management is a key lever to know in advance the impacts that exogenous factors could bring. The results show that the service business has been able to mitigate the negativity of the impact that will tend to increase leading companies to focus attention on a serviced business model. It is necessary to redesign supply chains of products and services by creating agile.
Le leve per la ripresa. Le parole d'ordine sono agilità e resilienza	19/08/2020	Redazione Romana	Avvenire	Primary data paper	Flexibility, Reactivity, Covid-19 as opportunity, Resilience	The article reports the results of a survey conducted by BDO and addressed to 244 senior managers from 8 European countries (Belgium, Denmark, France, Germany, Italy, Norway, Spain and United Kingdom). The results for Italy are: 38% considered the incidence of Covid-19 relevant or serious, 84% implemented agile work to protect employees, 42% intend to increase the levels of smart working in the post Covid-19 period, 39% reduced wages, 39% recontacted relationships with partners and 35% suspended activities. The key words are flexibility, decision making ability and resilience; keys to winning the challenges of post Covid-19. The crisis is seen as an opportunity to creatively and constructively rethink business models by focusing on innovation and digitization.

Appendix B. Interview outline - The impact of Covid-19 crisis on operating and business models of freight forwarding enterprises

1. ROLE OF THE RESPONDENT AND CORPORATE FEATURES

This part aims to understand what is the current business model of his company (pre-crisis situation), with particular attention to the dimension of services and digital technologies.

1.1. Describe briefly the role you cover within the company

1.2. What is the technological equipment of your company?

(TMS and WMS systems, ERP systems, cloud and SaaS systems, laptop and smartphone equipment for employees, workflow systems, sales force management tools and CRM, Load Building, Radio Frequency Identification...)

1.3. How do you evaluate the digital readiness of your company (modernity of the solutions adopted and sharing a digital culture in the company)?

1.4. What is, currently, the share of turnover represented by warehousing services compared to those related to distribution and transport (%) and what expansion spaces in the services not yet exploited do you think there are for you?

1.5. You believe Covid-19 crisis is prevalent:
- An opportunity
- A threat

1.6. Regarding the resolution of the crisis and return to normality you believe rather:
- Optimistic
- Pessimistic

2. GENERAL BUSINESS IMPACT OF THE CRISIS ("DURING" PHASE, QUICK & DIRTY)

This part aims to understand the impact of the crisis on the main management areas of the company. The logic of response should be to give more space to the most important issues or those most affected by the emergency.

2.1. What has been the impact of the crisis on the main areas of the business model? In particular:
[if possible, respond by providing an order of magnitude % of the phenomena; respond where applicable].
- What was the % impact on warehousing/storage activities (e.g. full warehouses)?
- What was the % impact on revenues and customer orders for road transport (truck and/or rail)?
- What was the % impact on revenues and customer orders for maritime transport?
- What was the % impact on revenues and customer orders for air transport?
- What was the level of loss of operations (% reduction of staff, vacations, CIG...)?
- How much did you use smart working for the different types of work (in % on the type of employees)?
- Which training activities were implemented during the crisis period?

2.2. Which were the main problems that emerged when facing the crisis and which interventions did you implement to address them? In particular:
- On the internal side (*Organizational skills and equipment, procedures, infrastructure and software…).*

- On the external side (*Government regulations and provisions, local or supralocal institutions, other environmental variables, international markets, international supply chains...)*

2.3. What were you ready for and what were you unprepared for?

2.4. In particular, how much has your digital readiness influenced you in dealing with the crisis?

(Previous technological choices - adaptation of IT infrastructure and cloud migration of archives, documents, applications and office automation tools, and adaptation of devices and infrastructure - which were immediately subject to use and experimentation).

2.5. Which activity has enabled you most to survive the crisis?

(Warehouse activities, customs activities, transport also of strictly necessary material such as fans/masks...)

3. SITUATION AT THE REOPENING IMMEDIATELY AFTER THE CRISIS ("RESTART" PHASE)

This part has the objective to understand which is the situation to the restart (Phase 2) of the main managerial areas of the enterprise. The logic of answer should be that one to give more space to the more important themes or more affected from the emergency.

3.1. How the restart for your enterprise has happened (Phase 2, Restart)? In particular:

- What is your current production capacity?
- What degree of operation do you have TODAY in the areas mentioned in question 2.1 (warehousing/storage, road, sea and air transport)?
- What is the situation in your channels (distributors and logistics)?
- What is the situation of your customers? (how has the crisis impacted on service purchasing behaviour, communication and customer relationship, customer segmentation)
- What kind of settlement phase do you expect (gradual increase, rebound, market reduction)?
- Do you foresee intermittent reopening / closing phases? If yes, which solutions do you have in mind?
- Are there any problems resulting from international lockdowns?
- Which capacity adjustment challenges do you have in mind?
- Have you thought about offering new and/or additional services to the previous offer for this restart phase?
- Have you started using technology solutions not previously used? If yes, which ones?
  (TMS and WMS systems, ERP systems, cloud and SaaS systems, laptop and smartphone equipment for employees, workflow systems, sales force management tools and CRM, Load Building, Radio Frequency Identification...)
- Which organizational adjustments have you made in this phase?
  (Employee accounting information, disciplining supplier entry, transit and exit procedures, periodic sanitization, closure or limitation of access to areas where groups can be created).
- How much recourse to smart working (in % on the type of employees) do you have TODAY?
- Which innovative projects or others "in the drawer" have been resumed or relaunched during the crisis?

4. SITUATION AFTER THE CRISIS ("ADAPT" PHASE, THE NEW NORMAL)

Economists agree that the world will no longer be the same as before and the "new normal" will see balances different from the business as usual we know. It will therefore be necessary to put in place all the adaptive skills available. The response logic should be to give more space to the most important issues or those most affected by the emergency.

4.1. What will be the "new normal" and which changes are required from your company to adapt to it? In particular:

- Which opportunities and threats does the future present to you (*Market contraction, default of suppliers and partners, distributors, infrastructural and legal conditions, new mobility...*)?
- Do you have plans to increase the use of smart working (*Digital transformation of back-end processes, new tools for collaboration and content sharing, training and cultural change from control to responsibility...*)? If yes, which ones?
- Do you have plans to restructure your supply chain (*Re-treating relationships with partners, opening branches / offices, greater autonomy to branch offices…)?*
- Do you have plans to change your commercial network? (*Articulation and typology of resources and skills; strengthening of sales capacity for services…)*
- Do you have plans to invest in digital solutions?
  (Factory robotization, IIOT and IOT solutions, retrofitting of distributed products, Remote Condition Monitoring, Augmented Reality, Digital Twins, Cloud platforms, 3D printing, TMS and WMS systems, ERP systems, cloud and SaaS systems, employee laptops and smartphones, workflow systems, sales force management tools and CRM, Load Building, Radio Frequency Identification...)
- Which of these (and other) technologies are most promising for you?
- Do you have plans to enter new markets?
- Do you have plans for the introduction of new service solutions for your customers (*Integrative/innovative service packages beyond mere transport...)*
- Do you have plans to invest in digital solutions concerning communication and relationship with the market and customers? (*BtoB e-commerce, digital trade fairs, BtoB social presence...*).
- Do you have programs of recruitment or development of new skills and/or resources? If yes, which ones?

Appendix C. Representative quotations

AGGREGATE DIMENSIONS	*SECOND ORDER THEMES*	*FIRST ORDER CONCEPTS*	*REPRESENTATIVE QUOTATIONS (Company)*
VARIABILITY OF THE CRISIS IMPACT ON BUSINESS MODELS	**INCIDENCE OF THE CRISIS ON VALUE CAPTURE**	The lockdown of production enterprises causes a strong impact of the crisis on the corporate revenues, at the present and in the near future.	"Ci sono settori nostri che hanno fatto 75% in meno in aprile...noi abbiamo fatto dal 50 al 70% in meno di lavoro nel mese di aprile. E presumo che sarà uguale anche per il mese di maggio a meno che le aziende non iniziano a lavorare" (4)
		The lockdown of production companies and the block of shipments causes a strong impact of the crisis on the management costs of the enterprise.	"I magazzini sono pieni, i nostri magazzini sono pieni perché quando c'è stata la chiusura generale noi avevamo merce che doveva andare in consegna e non siamo riusciti ad andarci. Attualmente ritiriamo e riceviamo i mandati di spedizioni solo previa conferma di chi ci da il mandato che il destinatario è aperto e che può ricevere la merce" (4)
		The specificity of the sector for which the rates offered to the final customer are predefined and not variable with respect to exogenous factors has mitigated the negativity of the impact of the production companies' lockdown on the business price system.	"Per quanto riguarda il sistema dei prezzi...abbiamo dei tender globali legati al trasporto nel senso che anno per anno i nostri contract managers contrattano per la parte rail, per la parte strada, per la parte sea i contratti quindi diciamo quelli sono e quelle sono le tariffe diciamo per cui non è che sia cambiato qualcosa a livello di…. noi abbiamo già i costi fissati container per container diciamo già da mesi prima quindi non sono cambiati" (2)
		The flexible and highly variable European cost model has made the impact of production companies lockdown on the corporate cost structure null.	"In Europa ce un modello più flessibile soprattutto in Italia che è variabile paghiamo sostanzialmente i nostri distributori a pacco e se non ci sono pacchi non subiamo il costo" (5)
		The uncertainty and the volatility of the market during the lockdown period of the production companies have forced some changes in the prices offered to clients.	"Subiremo quello che è stata l'imposizione del ministero della salute ovvero che oltre un certo peso di pacchi dobbiamo per forza porre un surcharge perché in magazzino non possiamo tenere due impiegati vicini i pacchi sotto un determinato peso costringono ad aggiungere un prezzo su queste…in questo caso qui c'è stata la sospensione dei prezzi, è eccezionale" (5)
	INCIDENCE OF THE CRISIS ON VALUE PROPOSITION	The lockdown of production companies has led the industry to increase and diversify its promise of value for the end customer.	"Stiamo iniziando con dei servizi nuovi che vanno a sostituire il trasporto marittimo, ad esempio, perché non c'erano più disponibilità. Adesso stiamo facendo un servizio ferroviario dalla Cina...per quanto riguarda l'aereo, i prezzi sono andati alle stelle per cui ci siamo organizzati con dei charter parziali" (4)

		The company has expanded its portfolio of services during the health emergency by offering and supporting the transportation of PPE to disadvantaged areas making itself fully available to governmental and non-governmental functions.	"Il trasporto diciamo cosi di mascherine si li abbiamo fatti e li stiamo facendo però dato il volume diciamo di business della nostra azienda non è che le mascherine possano fare la differenza...noi abbiamo anche partecipato a supportare le ONG a livello proprio come … a trasportare questi prodotti anche in aree diciamo disagiate e quindi comunque ci siamo messi a disposizione delle funzioni governative non governative per supportare questi aspetti" (6)
		The sector being based on an offer composed exclusively of services, is one of the ATECO codes protected by the d.p.c.m; this has allowed the continuity of the business and a strengthening of its market position.	"La nostra vendita di valore sul cliente finale si è addirittura rafforzata perché non avendo avuto molto l'impatto di service failures, perché anche in giorni in cui gli autisti non sono andati fuori siamo riusciti a sopperire con i dipendenti diretti per cui non abbiamo avuto interruzioni di servizio...ci ha posizionato addirittura meglio questa crisi di quanto non fossimo già posizionati prima" (5)
	INCIDENCE OF THE CRISIS ON VALUE CREATION	The blockage of shipments, a direct consequence of the lockdown of production companies, has caused a strong impact of the crisis on transport volumes that have suffered a significant reduction.	"La logistica diciamo mediamente sarà stato intorno al 40% però con alcune attività come dicevo prima che invece sono addirittura cresciute tipo la grande distribuzione nel canale retail per l'alimentare e il farmaceutico e invece automotive industrial hanno subito o dei blocchi totali....per il trasporto via gomma anche lì abbiamo avuto un periodo in cui il calo è stato circa del 50% adesso però ad esempio con il trasporto via gomma abbiamo già, siamo già tornati ai volumi pre-Covid-19.. il marittimo in realtà ha avuto un calo circa del 30% più o meno in realtà ci saremo aspettati inizialmente sulla parte marittima di più... l'aereo ha avuto un calo di volumi del 50%" (6)
		The forced imposition of workforce reduction has slowed down and blocked all recruitment activities and the search for new skills in the market.	"È logico che in questo momento il tutto si è fermato ma sicuramente ripartirà ecco quindi sicuramente le assunzioni quando sarà il momento ripatirà, nuove competenze...forse per quello che era già poi nel nostro modo di lavorare quindi la parte digitale già molto evoluta probabilmente non avremmo secondo me cambiamenti incredibili sulle competenze che già stavamo cercando nelle nostre risorse" (6)
		The uncertainty and volatility of the market that took over during the health emergency period led to the inevitable slowdown of many business activities and processes.	"I progetti tante aziende ci hanno già detto sono congelati...tante cose sono andate in stand-by" (5)

	INCIDENCE OF THE CRISIS ON VALUE DELIVERY	The increase in air fares, a direct consequence of the decrease in active fleets during the Covid-19 period, has led to a visible change in customers' purchasing behaviour.	"Il primo impatto quando andavi ad offrire la tariffa, il cliente ti diceva di no se eri matto ad offrire una tariffa del genere, tornando da te dopo magari un paio di giorni perché sentiva un po' in giro come era la situazione, la situazione era identica alla nostra per cui magari, o peggiore, e per cui tornava indietro. Tanti hanno rinunciato alle spedizioni o le hanno trasformate da aereo a marittime però chi era obbligato a consegnare la merce, magari entro determinate date, ha dovuto pagare nettamente di più di quello che gli era stato offerto" (4)
		The initial unpreparedness on the part of clients dictated by the fear of forced social distancing and communication difficulties has resulted in their positive adaptation to the new remote working paradigm.	"I clienti nelle prime due settimane erano assolutamente impreparati alla cosa, noi avevamo già zoom e tutte queste piattaforme digitalizzate per cui siamo riusciti ad indirizzare il cliente...il cliente preferirebbe vederci in sicurezza ma preferirebbe vederci ma comunque piattaforme come zoom o come altre sono adattati, ci hanno messo un paio di settimane comunque" (5)
	INCIDENCE OF THE CRISIS ON SUPPLY CHAIN	The crisis and the consequent total blockage of imports from China have challenged the traditional supply chain model, forcing the rethinking of a more flexible, reactive and local model for the next normal.	"Quello che abbiamo visto è che sicuramente l'impatto è stato trasversale su tutti è logico che la crisi maggiore è su aziende che sono state colpite con il codice ATECO non essenziale e che magari erano molto verticalizzate" (6)
THE MANAGERIAL CHALLENGES POSED BY THE EMERGENCY	**THE UNCERTAINTY OF THE SOCIO-ECONOMIC CONTEXT**	Uncertainty about the resilience of the local and supralocal (national) economic system and of the enterprise.	"Per cui io spero che vada tutto bene, sono convinto che noi viviamo in una regione che ha un grosso impatto lavorativo per l'Italia e per carattere dei veneti sono convinto che dovremmo ricominciare" (4)
		The lack of clarity of the government regulations and the lack of uniform operating procedures have constituted for the company great managerial difficulties and slow reactions to the imposed changes.	"Non avere un'idea chiara di quali erano le intenzioni e le posizioni del governo non ha aiutato e soprattutto poi anche adesso la fase due una mancanza di quella che può essere una procedura uniforme anche delle cose che dobbiamo fare noi all'interno dell'azienda per poter operare in tranquillità" (1)
		Forecast of a gradual and positive business recovery characterized by a safe return to the old production capacity.	"Sarà un ramp-up che si svilupperà pian piano e sicuramente arriveremo ai livelli di prima" (2)

		Forecast of a gradual business recovery characterised by a slow and weighted rapprochement to the old production capacity but the return to previous volumes is excluded.	"Il 3 Maggio se vogliamo rappresenta un momento di ripartenza da parte nostra siamo diciamo con le redini ancora tirate però pronti a rilasciarle non appena i business arrivano quindi questo vale a 360 gradi per tutte le nostre attività...ci aspettiamo sicuramente un aumento dei volumi però ecco non di ritornare al 100%" (6)
	THE OPERATIONAL AND MANAGERIAL COMPLEXITY	The changes imposed by the health emergency, related to the business model of the business, are sustainable in a limited time horizon because the lack of personnel lead to major managerial and operational difficulties.	"Sicuramente fino all'estate compresa. Sarebbe difficile avere 36 persone da avere in ufficio se qualcosa non cambia" (4)
		The company has found employees' inability and unpreparedness in understanding and analysing the extent of the health emergency.	"Non è che hanno dimostrato una particolare abilità nel comprendere il problema, nell'analizzarlo" (1)
		Lack of past experiences and reference models in the company for the management of crisis situations such as the actual Covid-19.	"Ritengo che non c'è storicità su una situazione simile, mentre magari ad alti e bassi delle borse uno si poteva essere abituato e bene o male sapeva come andava a finire" (4)
		The high average age of the collaborators that characterizes the company has been an element of management and operational difficulty because it is linked to unpreparedness and lack of skills related to the use of technological tools for remote work.	"È stato complicato insegnare magari al reparto di quello che poteva essere il call center o altri a lavorare da casa ecco mancavano alcune competenza informatiche diciamo l'età media dell'azienda non è proprio bassissima per cui li c'è stato da insegnare, l'azienda si è adoperata ci siamo trovati inizialmente a coprire alcune hard skills di alcuni nostri collaboratori" (5)
REACTION AND RESILIENCE	**QUICK & DIRTY SOLUTIONS**	Recourse to several instruments and *ad hoc* solutions (flexibility and creativity) to economically support the reduction of the workforce.	"Abbiamo portato avanti fondamentalmente due modi per ridurre diciamo la nostra capacità produttiva...cassa integrazione che abbiamo applicato nelle varie forme in funzione delle tipologie e degli accordi che abbiamo sul territorio...non c'è stato un blocco totale di alcune persone che sono andate totalmente in cassa integrazione ma sono stati distribuiti dei giorni all'interno delle settimane sulle varie persone purtroppo è logico che invece dove l'attività è stata bloccata al 100% per via dei nostri committenti e questo è successo solo nella logistica alcuni magazzini hanno invece avuto le persone che si sono dovute totalmente bloccare per il periodo legato al blocco del cliente. Abbiamo aggiunto logicamente anche uno smaltimento ferie quindi toccando anche le tasche dei nostri dipendenti le ferie logicamente è stato un modo anche per lasciare lo stipendio intaccato ma però ridurre la presenza diciamo come ore di lavoro" (6)

			High reactivity and effectiveness of quick & dirty measures put in place to allow remote work (reactivity).	“Abbiamo avuto ad esempio nella parte operativa nostre persone che si sono portate a casa il desktop che era una scatoletta più piccola di un laptop e hanno potuto iniziare a lavorare da casa con una enorme facilità quindi questo è stato un’attività che noi abbiamo messo in piedi fin da subito in tempi molto molto veloci, questo sicuramente è stato diciamo importante a livello di infrastruttura e di software logicamente che ha permesso di supportare questa nuova modalità di lavorare...abbiamo dovuto portarlo in diciamo in una modalità estrema cinque giorni su cinque prima facevamo solo un giorno su cinque alla settimana e abbiamo dovuto anche agli operativi con dei desktop dire di lavorare a casa, portarsi a casa il computer, portarsi a casa un monitor, la tastiera e tutto quello che serviva verificare se avevano una connessione Wi-Fi insomma queste cose logicamente” (6)
			The quick & dirty solutions, implemented by the company during the period of health emergency, in order to keep alive, the training activity limited by the forced imposition of social distancing.	“Abbiamo attivato diversi corsi di formazione con delle tecnologie diciamo di e-learning quindi con trading remoti attraverso webinar, zoom siamo riusciti a direi fare una numerica di corsi molto elevata sfruttando questo periodo quindi migliorando anche quello che è la parte di skills set delle nostre persone adesso alla ripresa, abbiamo fatto dei corsi per le nostre persone di remote selling quindi come aiutarli ad una vendita e una comunicazione diversa rispetto a quella che sono normalmente abituati a gestire anche altre situazioni per gestire al meglio il modo di stare al telefono quindi come usare gli strumenti, zoom, ma anche come interloquire con le persone in una modalità diversa da quella che è la face to face, poi abbiamo logicamente sfruttato per formare le nostre persone su quelle che sono invece tutta una serie di nostri strumenti di valore aggiunto di sistemi di tools per che vengono messi a disposizione dei nostri clienti” (6)
			Immediate reaction to the health emergency through the creation of a task force, a support tool to provide guidance on procedures and standards to be applied during the crisis.	“È stata istituita sia per motivi di sicurezza del personale, chiaramente per informarci su come andare a fare le consegne in zone rosse o comunque a rischio, sia proprio per l’operativo per muovere fader o aeroplani in generale” (5)

		Readiness in the organisational and operational adjustments made in order to operate in full compliance with government regulations and to safeguard the employees' health.	"Ci sono tutte una serie di misure che sono state prese relativamente alla stesura di procedure per la parte igenical una serie di misure prese a livello organizzativo, e una serie prese a livello di comunicazioni...fuori dal plant di Porcia, c'è un tendone dove...viene misurata la temperatura e data obbligatoriamente la mascherina, le normative da noi sono strettamente seguite...mensa c'è un distanziamento, poi c'è tutta la parte legata alle misure igieniche, la parte dei dispenser e poi c'è le postazioni di lavoro nei magazzini in fabbrica sono state delimitate e diciamo deve essere sempre rispettata la distanza di almeno un metro e mezzo, due, l'uno dall'altro" (2)
		Instant development of activities and internal procedures to deal with possible supplier defaults.	"Una cosa diciamo dove ci siamo trovati pronti è stato nel gestire la cassa quindi noi abbiamo avuto un blocco dei pagamenti da parte dei nostri clienti quindi abbiamo dovuto gestire il fatto di non essere pagati e dover pagare comunque i nostri fornitori che non è una cosa molto semplice è ovvio che devo gestire...ricevo 10 e pago per 10 perché se comincio a ricevere per 10 e pagare per 10 dopo un po' mi trovo in default per cui dover gestire... parlare con i fornitori spiegare la situazione dire guarda hai fatture per 100 ti mando un bonifico per 80 intanto ti do qualcosa ma cerca di capire che se ricevo 10 e pago 15 per due mesi dopo un pò ovviamente mi trovo a corto di liquidità" (3)
	SMART WORKING	The lack of experience and culture of smart working of the company at the time of the crisis.	"Noi abbiamo sempre snobbato lo smart working come azienda, non era quasi incentivato, non era scritto da nessuna parte ma era detto tra le righe" (4)
		Smart working as a pre-emergence health policy for the company.	"Per noi lo smart working non era un cambiamento perché noi come politica, comunque policy aziendale qui in Italia, avevamo fino al pre-crisi COVID 5 giorni al mese di smart working, per cui noi siamo già abituati a lavorare in smart working" (2)
		Partial applicability of smart working between roles and professionals involved in production processes.	"Noi abbiamo operato praticamente con la modalità di smart working diffuso il più possibile, siamo arrivati ad avere poco meno di 500 persone in smart working che però diciamo pesate sulle attività possiamo dire che abbiamo messo in smart working sicuramente per tutte le attività di trasporto quindi che sia trasporto marittimo, aereo o terrestre direi più del 95% delle persone sia la parte commerciale che la parte operatività, Logicamente è stato diverso il rapporto nella parte logistica questo perché logicamente le persone di magazzino devono fare l'Handling quindi devono per forza essere presenti ma anche le attività amministrative sono molte legate alle attività di magazzino per la stampa delle bolle, per tutto...la stampa di fatture piuttosto che di altri documenti e quindi la parte di smart working è stata applicata solo su alcune funzioni di staff che potevano effettivamente lavorare con questa modalità" (6)
		Uncertainty about the sustainability of smart working in the next normal.	"Abbiamo attivato del lavoro da casa, questo sicuramente è stato come input del coronavirus che altrimenti non lo avremmo mai attualizzato, non so se in futuro resterà o meno, per il momento l'impatto è positivo" (1)

		Prediction of a lasting sustainability of remote work as a new working paradigm that will characterize the new normality.	"L'intenzione è diciamo di non tornare velocemente indietro quindi anche per giugno stiamo vedendo di mantenere e solo poi a descrizione delle varie funzioni di manager vedere se qualche attività che in realtà ha avuto una gestione critica in smart working di riportarla in ufficio pero non dobbiamo assolutamente fare tornare tutta la gente in ufficio di colpo...quelle che stiamo usando oggi che abbiamo messo in atto non scompariranno quindi i webinar, le zoom call lo stare vicino al cliente e anche internamente i meeting che noi stiamo facendo difficilmente si ritornerà a rassembrare tutte le persone...la parte social e quindi la relazione con il cliente e la relazione umane un must però inevitabilmente verrà gestita e distribuita in una maniera diversa" (5)
	DIGITAL READINESS FOR CRISIS SUPPORT	The cross-sectional nature of technology across all business activities at the time of the crisis is a resilient base to address the challenges imposed by the advent of the emergency.	"Ragionavamo che con le tecnologie di un anno fa ci fossimo trovati ad affrontare una crisi di questo tipo qua probabilmente boh non voglio dire che non l'avremmo passata ma avremmo avuto grosse grosse difficoltà...insomma per fortuna la digitalizzazione è uno dei nostri capi saldi e siamo riusciti con quella a poter dare da lavorare alle persone, servire servizi ai clienti, fornire comunque un'infrastruttura continua per tutti i nostri operatori" (3)
		The company's in-depth experience and culture of smart working at the time of the crisis, a resilient base to react effectively to the crisis and maintain a high level of productivity.	"Essendo già automatizzati ma per motivi più di filosofia aziendale, di struttura aziendale, quindi già muniti di strumenti di smart working già le persone sapevano per la maggior parte usurarli e ha mantenuto la produttività a livelli non ottimi perché ottimi sarebbe se non ci fosse il coronavirus ma assolutamente accettabili" (5)
		The specialisation in e-commerce, during the health emergency, proved to be an essential tool that allowed to maintain very high levels of operations and a long-term sustainability of the paradigm change.	"La fortuna che essendo specializzati nell'e-commerce rispetto anche ai nostri competitor la percentuale è stata sicuramente meno… cioè lavorare al 40 anziché al 20% come altri sicuramente ha aiutato...stiamo andando da dio in questo momento perché l'e-commerce è esploso" (5)
	THE FUTURE CENTRALITY OF DIGITALIZATION	The essentiality of present and future investments on the most innovative digital solutions in order to create a resilient base able to react to new possible exogenous factors of this magnitude.	"Abbiamo già iniziato ad investire in digitalizzazione dei processi amministrativi. Abbiamo acquistato qualche settimana fa una piattaforma di e-learning per poter dare ancora più formazione online, piuttosto che stiamo investendo in un nuovo TMS, che ci permetta anche di raggiungere…permette di far gestire a un operatore più trasporti di quanti ne stia gestendo oggi grazie all'automazione di attività a zero valore aggiunto" (3)

		The health emergency highlights the need to invest in the future on the automation of the driving process, certain strategic choice to remain active in the market.	“La guida autonoma… quella sarà la vera rivoluzione…, ma tutto quello che il fader quindi quello che è un camion che deve andare da hub a hub non deve metterci più sopra una persona, quella è la rivoluzione assoluta, l’automazione di quel processo sarà determinante per chi vuole rimanere nel mercato” (5)
		The company is developing innovative services in order to allow a total integration of e-commerce in the traditional channels.	“Noi stiamo sviluppando sempre di più e dando sempre di più la possibilità di mettere in piedi delle piattaforme in ambito supply chain dove la parte e-commerce può essere assolutamente integrata alla modalità tradizionale quindi la nostra suite di servizi copre assolutamente questa parte di e-commerce direi molto nella parte logistica di magazzino poi nella parte di trasporto bisogna capire l' execution verso quali mercati va però anche lì logicamente dipende dal tipo di servizio poi necessario se un servizio espresso, un servizio diciamo comunque che internazionale però ecco su questo noi stiamo lavorando molto proprio come piattaforma” (6)

Appendix D. Survey - The centrality of digital transformation in the post Covid-19 era

The main survey object is the analysis of the role played by digital technologies during the Covid-19 health emergency, in freight forwarding companies located in northern Italy which offer direct transport services or through the purchase from third parties, truck, air and sea and logistics services such as warehousing and handling of goods. In particular, the questionnaire wants to investigate the most common digitalization processes and their influence in terms of business model resilience.

The research is carried out by DT-Lab, Digital Transformation Laboratory (http://www.dt-lab.it; https://economia.unipd.it/DT-LAB/index) of the Department of Economic and Business Sciences of the University of Padua.

Your email address has been used as it is in our possession for previous contacts made by DT-Lab or as it is publicly available on the web (LinkedIn etc.).

The data and information collected will be treated confidentially and disseminated only in anonymous and aggregate form, without any explicit reference to companies or people who have participated. The information collected will be processed in a report that will be distributed free of charge to participating companies. Regarding the protection of data collected in scientific research, please see the appropriate section on the website of the University of Padua (https://www.unipd.it/privacy).

For any further information on data processing and research purposes please contact the scientific responsible, Prof. Marco Paiola (marco.paiola@unipd.it) and Dr. Agnese Blarasin (agnese.blarasin96@gmail.it).

There are 23 questions in this survey.

The completion of the questionnaire will take 7 minutes.

Thank you for your cooperation!

SECTION 1: Registry

This section aims to obtain some basic information about your company and the level of digital preparedness that it has developed over the years

Company Name

Role of the respondent

Corporate website*

Email (for sending the final search report)

In which region(s) is your company located?

- Emilia Romagna
- Friuli-Venezia Giulia
- Liguria
- Lombardy

- Piedmont
- Trentino-South Tyrol
- Aosta Valley
- Veneto
- Other_____

Is your company part of a multinational?

- Yes
- No

What was your company's 2019 turnover?

- 2 ≤ millions ≤ 10
- 10 ≤ millions ≤ 50
- millions of euro > 50

What is the technological equipment of your company?

- Transport Management Systems (TMS)
- Enterprise Resource Planning (ERP)
- Electronic Data Interchange (EDI)
- Workflow scheduling
- Warehouse Management System (WMS)
- Global System of Mobile (GSM)
- Dedicated Short Range Communication (DSRC)
- Radio Frequency Identification (RFiD)
- Global Positioning System (GPS)
- Wireless Sensor Network
- Track & Tracing
- Cloud Systems
- Customer Relationship Management (CRM)
- Blockchain
- Laptops and smartphones
- Other_____

How do you evaluate the digital preparedness of your company (innovation in hardware and software equipment implemented and responsiveness to technological progress)?

	1-Very low	2	3	4	5-Very high
Hardware (Pc, Smartphone, laptop…)					
Software (TMS, WMS, ERP…)					
Digital culture (Propensity, skills, innovation…)					

SECTION 2: The role of digital technologies during the Covid-19 pandemic

This section aims to analyse the role digital solutions have assumed during the advent of the Covid-19 health emergency.

How important was the use of the following technologies in tackling the crisis?

	Very unimportant	Not important	Neutral	Important	Very important
Transport Management Systems (TMS)					
Enterprise Resource Planning (ERP)					
Electronic Data Interchange (EDI)					
Workflow scheduling					
Warehouse Management System (WMS)					
Global System of Mobile (GSM)					
Dedicate Short Range Communication (DSRC)					
Radio Frequency Identification (RFiD)					
Global Positioning System (GPS)					
Wireless Sensor Network					
Track & Tracing					
Cloud Systems					
Customer Relationship Management (CRM)					
Blockchain					
Laptop and Smartphones					

To what extent do you agree with this statement "The health emergency has set itself as an accelerator of the company's digitalization process"?

Very much in disagreement □ □ □ □ □ Very much in agreement

Which new technologies have you implemented/developed during the health emergency?

Do you have plans to invest in digital solutions for the coming year (2021)?

- □ Yes
- □ No

If you answered "yes" to the question "Do you have plans to invest in digital solutions for the coming year (2021)?"

- What do you think will be the spending band (in percentage) resulting from the development of new technologies on the total business expenses?
  - □ Less than 0.5%
  - □ From 0.5% to 1%
  - □ From 1.01% to 3%
  - □ From 3.01% to 10%
  - □ More than 10%

- Which technologies are you thinking of investing more in?
  - □ Transport Management Systems (TMS)
  - □ Enterprise Resource Planning (ERP)
  - □ Electronic Data Interchange (EDI)
  - □ Workflow scheduling
  - □ Warehouse Management System (WMS)
  - □ Global System of Mobile (GSM)
  - □ Dedicated Short Range Communication (DSRC)
  - □ Radio Frequency Identification (RFiD)
  - □ Global Positioning System (GPS)
  - □ Wireless Sensor Network
  - □ Track & Tracing
  - □ Cloud Systems
  - □ Customer Relationship Management (CRM)
  - □ Blockchain
  - □ Laptops and smartphones
  - □ Other_____

What is the relevance of technology in building competitive advantage in your industry?

Not at all relevant □ □ □ □ □ Fundamental

Which technologies, in your opinion, will be able to radically transform the way your industry operates?

- □ Transport Management Systems (TMS)
- □ Enterprise Resource Planning (ERP)
- □ Electronic Data Interchange (EDI)
- □ Workflow scheduling
- □ Warehouse Management System (WMS)
- □ Global System of Mobile (GSM)
- □ Dedicated Short Range Communication (DSRC)
- □ Radio Frequency Identification (RFiD)
- □ Global Positioning System (GPS)
- □ Wireless Sensor Network
- □ Track & Tracing
- □ Cloud Systems
- □ Customer Relationship Management (CRM)
- □ Blockchain
- □ Other_____

Do you agree that the following elements constitute limitations in the efficient implementation of new and innovative technologies?

	Very disagree	Disagree	Neutral	Agree	Very agree
Reduced company size					
Poor quality and low innovation in the type of service offered					
High investment and implementation costs					
High maintenance/upgrade costs					
Huge costs of personnel training activities					
Lack of technological skills					
Lack of resources					
Lack of infrastructures					
Lack of coordination					

SECTION 3: Beyond digital resilience

This section aims to understand which other elements, in addition to digital transformation, can be important pushes towards the creation of a business resilience.

Have you developed, during the emergency, or do you have in mind to develop, during 2021, plans to restructure the supply chain (*Recontracting relationships with partners, opening branches and/or offices, greater autonomy to the branch offices…)?*

- ☐ Yes
- ☐ No

If you answered "yes" to the question "Have you developed, during the emergency, or do you have in mind to develop, during 2021, plans to restructure the supply chain?"

- Which of these supply chain restructuring actions have you already implemented and which do you plan to implement during 2021?

	Implemented	Scheduled for 2021
Decentralization of power in favour of branch offices		
Creation of hubs in strategic geographic locations for distribution		
Realization of secondary units close to the main outlet markets		

Formalization of strategic alliances		
Recontracting relationships with partners		

Have you developed, during the emergency, or are you planning to develop, during 2021, diversification strategies (*for example by offering new/supplementary services*)?

- ☐ Yes
- ☐ No

If you answered "yes" to the question "Have you developed, during the emergency, or do you have in mind to develop, during 2021, diversification strategies?"

- Which of these diversification strategies have you already implemented and which do you plan to implement during 2021?

	Implemented	Scheduled for 2021
Warehouse management on behalf of third parties		
Conduct of customs business		
Analysis of costs and modes of transport		
Risk management activities		
Offering advanced digital solutions (Track & Tracing, X-ray scanners, digital temperature sensors...)		

In the next normal, how important do you think it could be to rethink the supply chain and activate diversification strategies to make your business model more resilient?

	Very unimportant	Unimportant	Neutral	Important	Very important
Supply chain restructuring					
Diversification strategies					

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