THESIS

GHIZLANE SBAIHI

Supply chain management MSc

Gödöllő

2023

Hungarian University of Agriculture and Life Sciences

Szent István Campus

Supply Chain Management Programme

The role of supply chain digitalization in organizational resilience.

Case of a sample of Moroccan companies

Internal supervisor: **Dr.Gyenge Balázs**

Leader of the Supply Chain Management
Master Programme (MSC)

Author: **Ghizlane SBAIHI**

CUXMGD

Supply Chain Management

Institute/Department: Institute of Agriculture and Food Economics,

Department of Agricultural Logistics, Trade and
Marketing

Gödöllő

2023

Table of contents

Liste of tables

Liste of figures

1. Introduction

1.1. Background of the research

With the globalization of the economy, companies tend to assert themselves internationally, regardless of their sector of activity. They must therefore master trade including the logistics chain, as well as watch over competition in order to improve their performance. The goal is to respond effectively to the needs of customers and provide quality service to optimize their turnover (Erick H., 2019).

In the broad sense, logistics involves the coordination process put in place to move resources, people, goods, and equipment from the place of storage or production to a predefined destination. This requires a great mastery of the various flows of information, production, or handling. Packaging's, storage, security as well as the transport of goods are also an integral part of logistics.

For any commercial or industrial enterprise, the goal is to produce and profit from goods and services. But the sales function is not enough to optimize profits and ensure customer satisfaction, it is also necessary to master logistics because it is a real tool to be able to stand out from the competition.

Over time and with the many innovations (GPS devices, shipment tracking software, etc.), the productivity and efficiency of the supply chain have increased tenfold, leading with them to significantly improved performance for companies that make good use of it. Such progress also improves the customer experience and, most importantly, it saves the company time and ultimately maximizes its profits. It is obvious that if a company wants to remain competitive, it must invest in and be informed about the latest technologies. In any case, logistics play an important role in the economic life of a society since the latter cannot subsist without trade with the outside.

The rapid progress of logistics 4.0 is stimulating the digital transformation of companies, which are increasingly global. The concept of digital transformation refers to the implementation of new technologies in all areas of a business in order to improve its efficiency. In this way, the digital transformation in logistics represents the integration of new digital capacities in areas such as storage, order preparation or transport, among others.

The digitization of all sectors of a company is a trend that is gradually penetrating the main economic sectors which will continue into the future. According to a McKinsey study, companies favor the use of new technologies in their marketing strategy (49% are part of it)

and in their products and services (21%). Only 2% of the companies surveyed recognized that they implemented digital transformation initiatives in the Supply Chain.

Digitizing the supply chain appears to be the most effective way to achieve the organizations' objectives. Why the supply chain? Because it encompasses the entire business cycle of an industrial company (sales forecasting, supply, production, storage, shipping, after-sales service, etc.). By intervening in the supply chain, and more precisely in the extended supply chain, encompassing all the suppliers and partners involved in production, we give ourselves the best means to optimize products, costs, logistics, deadlines and, ultimately, customer satisfaction. With an additional requirement today: a demonstrated environmental and societal dimension. To achieve this, the digitization of tools and processes provides supply chain players with the qualified information and visibility they need.

Faced with an increasingly turbulent and uncertain environment, the company must develop its resilience, its capacity for adaptation and its reactivity. In short, to become an agile company, able to face the vagaries of the market and to remain competitive. Digitization is today the royal road to such agility and a Gartner study carried out in 2017 already confirmed that digital is one of the major challenges for companies. Tools such as ERP, CRM, Business Intelligence or even RFID are becoming essential for efficient management. Far from a simple fad, it is a real opportunity for growth and sustainability that opens to companies open to digital transformation (Barbara L., 2019).

Resilience appears as an attractive dynamic capacity for decision-makers in the supply chain. At the same time, in recent years, we have observed an ever-growing interest from these same decision-makers in the digitization of the supply chain. Indeed, the digital tools of Industry 4.0 (based on the interconnection between systems enabled by new technologies) aim to provide more visibility in real time on the activities of the chain with an international dimension, automate certain tasks, help decision-making, etc. supply chain resilience is mainly linked to an ability to control processes and resources. This is also the case with the digital maturity of the supply chain. This is where businesses have the opportunity to focus.

Today, global supply chains have become more and more significant by connecting developing countries to international markets. Previously, global supply chain operations were limited to a few economic sectors and were largely confined to developed countries. Recent changes in the business world and improvements in Supply Chain Management as well as changes in the industrial structure of developing countries have enabled these countries to

integrate global supply chains. The typical example of this integration is the automotive industry where production and distribution networks have emerged globally and where suppliers from developing countries play their part (Grawe S., 2015).

Moroccan industry is no exception. No one today can deny the place the automotive industry occupies in the Moroccan economy. Dominated mainly by automotive suppliers, this sector has experienced significant and continuous growth over the past ten years. Indeed, it proudly occupies the second place of automobile producer in Africa and the first export sector of Morocco.

In this case I have chosen to work on Bontaz Center Morocco. The Bontaz-Center group began in 1965 in a small artisan workshop in Marnaz and its industrial development has known 4 major periods, Bontaz-Center has marked the evolution of the automotive industry through the design and production of hydraulic subassemblies for the automobile, a tier 1 supplier to major manufacturers around the world. Present in eleven sites around the world: **FRANCE - US - BRAZIL - INDIA - CHINA - JAPAN - SOUTH KOREA - CZECH REPUBLIC - MOROCCO - TUNISIA - PORTUGAL.** The purpose of the logistics process is to manage the physical flows as well as the informative data of BCMO, to provide the resources corresponding to the needs.

1.2. Problem of the research

The logistics chain within Bontaz begins with the purchase of raw materials or goods from the supplier, then these goods are transported to a store, which returns them to an assembly station or to a factory, then these products leave the assembly station for a new destination which is the bonded warehouse and finally, the products will be delivered to the store, where the consumer can purchase them.

Because each company in the automotive industry is at the heart of a network and linked by inter-organizational logistics processes, we will study the links between the digitalization of the supply chain and organizational resilience.

So, our general research problem can be stated as follows:

1. How digital technologies may help to increase SC and organizational resilience?
In the spirit of clarity, the following questions are worth to be asked:

- **What is the supply chain digitalization?**

- **How to build up a resilient organization?**
- **What is the role of supply chain digitalization in organizational resilience?**

1.3. Research Objectives

- Know the role of digital technologies in increasing resilience and organizational flexibility.
- Define the concept of digitizing the supply chain.
- Define tools for building a flexible organization.

The contribution of the research is related to its contribution to the competitiveness to be achieved in BONTAZ Company once a digitalization system has been designed that in turn would allow:

- Increase SC resilience.
- Increase organizational resilience.
- Generate greater economic income.
- A competitive strategy based on digitalization.

1.4. Method and Structure of the research

1.4.1. Method

Before answering our main research question, and since the integration and adoption of digital supply chain within a company first requires that it has already initiated and succeeded in its digital transformation, by setting up a change management, with the definition of new objectives, new communication strategies and implementation through the acquisition of new skills and the assumption of new responsibilities (Chaffey & Ellis C., 2014), we ask the following question:

- **What are the essential skills and capacities that allow the success of the digital transformation of Moroccan companies?**

In this regard, we have made the following hypotheses:

Hypothesis 1: The success of digital transformation depends on certain intrinsic skills and capacities.

Hypothesis 2: the company's capacity for innovation and collaboration are linked to a developed level of digital transformation.

In order to answer this first research question, we conducted a survey (Descriptive analysis) using Google Forms of a random sample of companies, as well as the professional network LinkedIn. More than 100 electronic questionnaires were sent and 60 valid questionnaires were received.

The central research question of our thesis focuses on digital technologies and their role in increasing the supply chain and organizational resilience, to answer the central question of our research we will analyze the digitalization strategy adopted by Bontaz Center Morocco within its supply chain department.

I will work on my thesis using data and information from Bontaz Center Morocco since I have already done an internship there, I still have contact with them and they are ready to collaborate with me. Quantitative method (a questionnaire) will be used to determine **"The skills and the essential capabilities for a successful digital transformation"** and a case study of the digitalization of Supply Chain in Bontaz Center, the relationship with the organization, with the objective of determining what are the changes and increases on organizational resilience.

1.4.2. Structure

To better understand my research, i propose the following structure :

General

Supply Chain Management and its importance to the organization in general

Supply Chain Digitalization and its role in the organization

Organizational resilience and the role of digitalization to improve it

The questionnaire and the case study (Analysis and discussion)

Conclusion
and
Recommendations

Specific
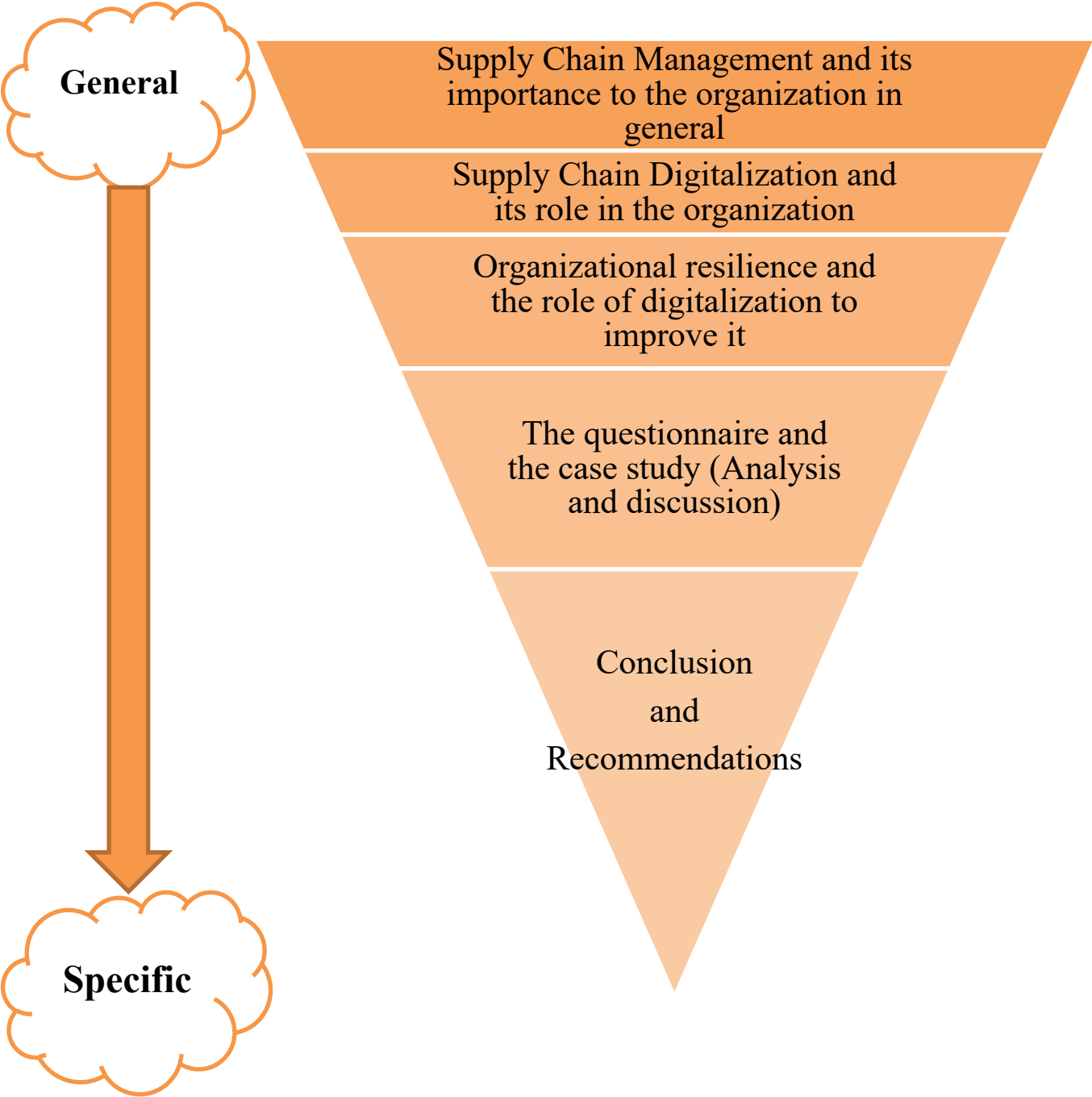
Figure 1: Proposed research structure

2. Literature Review

2.1. Supply Chain Management

Supply Chain Management has become a theme very usual. The Google search finds more than 25 million web pages containing the term supply chain management. All the major industrial groups have set up a supply chain management function.

But what is the definition of supply chain management and what is the definition of related terms: logistics, chain logistics and operations management? What is also the history of supply chain management?...

2.1.1. Definition and Concept of SCM

2.1.1.1. Definition

The SC brings together all the tasks and actors acting on the physical and information flows, to enable the transformation of goods from the state of raw material to that of marketed finished product. The management tools and methods used to optimize this chain are referred to as "Supply Chain Management", the process of which consists in refocusing the organization, essentially, on the needs of the customer.

Supply chain management is the management of the flow of goods and services and includes all processes that transform raw materials into final products. It involves the active streamlining of a business's supply-side activities to maximize customer value and gain a competitive advantage in the marketplace (Jason F., 2020).

SCM represents an effort by suppliers to develop and implement supply chains that are as efficient and economical as possible. Supply chains cover everything from production to product development to the information systems needed to direct these undertakings.

Typically, SCM attempts to centrally control or link the production, shipment, and distribution of a product. By managing the supply chain, companies can cut excess costs and deliver products to the consumer faster. This is done by keeping tighter control of internal inventories, internal production, distribution, sales, and the inventories of company vendors.

SCM is based on the idea that nearly every product that comes to market results from the efforts of various organizations that make up a supply chain. Although supply chains have existed for

ages, most companies have only recently paid attention to them as a value-add to their operations.

In SCM, the supply chain manager coordinates the logistics of all aspects of the supply chain which consists of five parts:

- The plan or strategy.
- The source (of raw materials or services).
- Manufacturing (focused on productivity and efficiency).
- Delivery and logistics.
- The return system (for defective or unwanted products).

2.1.1.2. The concept of SCM

Supply chain activities cover everything from product development, sourcing, production, and logistics, as well as the information systems needed to coordinate these activities.

The concept of Supply Chain Management (SCM) is based on two core ideas:

1. The first is that practically every product that reaches an end user represents the cumulative effort of multiple organizations. These organizations are referred to collectively as the supply chain.
2. The second idea is that while supply chains have existed for a long time, most organizations have only paid attention to what was happening within their "four walls." Few businesses understood, much less managed, the entire chain of activities that ultimately delivered products to the final customer. The result was disjointed and often ineffective supply chains.

The organizations that make up the supply chain are "linked" together through physical flows, information flows and financial flows.
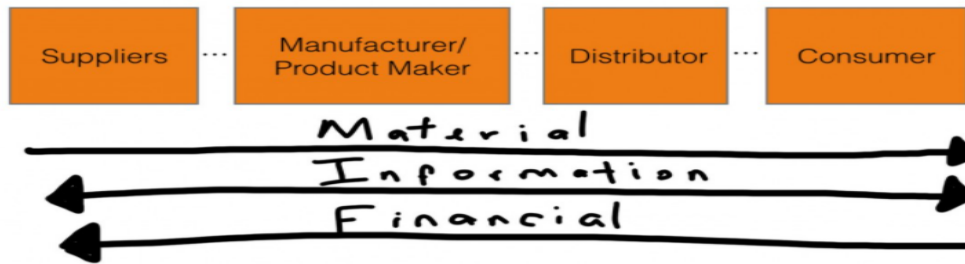
Figure 2: The 3 flows of supply chain (https://kpakpakpa.com/the-three-flows-of-supply-chain/)

Physical Flows: Physical flows involve the transformation, movement, and storage of goods and materials. They are the most visible piece of the supply chain. But just as important are information flows.

Information Flows: Information flows allow the various supply chain partners to coordinate their long-term plans, and to control the day-to-day flow of goods and materials up and down the supply chain.

Financial Flow: Lastly, financial flow involves the movement of money from the customer to the supplier. Usually, when the customer receives the product and verifies it, the customer pays and the money travels back to the supplier. Sometimes the finances flow the other direction (from supplier to customer) in form of debit (Nifemi A., 2016).

For an efficient and effective supply chain, it is important that all three flows are managed properly with minimal effort. By understanding your supply chain and how products, information and money flow through it, you will be in a good position to find several inefficiencies and figure out how to significantly improve your business.

More than ten years ago, a research study of 100+ manufacturers, distributors, and retailers uncovered some widely used supply chain strategies and initiatives. These ideas and practices were distilled down to seven principles and presented in an article in Supply Chain Management Review, a magazine widely read by SCM professionals.

- **Principle 1**: Segment customers based on the service needs of distinct groups and adapt the supply chain to serve these segments profitably.

- **Principle 2**: Customize the logistics network to the service requirements and profitability of customer segments.

- **Principle 3**: Listen to market signals and align demand planning accordingly across the supply chain, ensuring consistent forecasts and optimal resource allocation.

- **Principle 4**: Differentiate product closer to the customer and speed conversation across the supply chain.

- **Principle 5**: Manage sources of supply strategically to reduce the total cost of owning materials and services.

- **Principle 6**: Develop a supply chain-wide technology strategy that supports multiple levels of decision making and gives clear view of the flow of products, services, and information.

- **Principle 7**: Adopt channel-spanning performance measures to gauge collective success in reaching the end-user effectively and efficiently

(David L., Anderson, Frank F.,Britt, & Donavon J., Favre F.,1997).

Though they are more than a decade old, these timeless principles highlight the need for supply chain leaders to focus on the customer. They also stress the importance of coordinating activities (demand planning, sourcing, assembly, delivery, and information sharing) within and across organizations (Council of Supply Chain Management Professional).

2.1.2. Supply Chain or Logistics

Supply chain and logistics are two terms that can easily be confused. Yet even though they are interrelated, they are very distinct activities that serve different purposes.

2.1.2.1. What is the supply chain

The supply chain is the set of stages between the moment a customer places an order and when it is paid and delivered. Schematically, the three main stages are:

- The Supply.
- The production.
- The distribution.

There are, however, a multitude of intermediate steps, the most important of which are:

- The choice of a supplier.
- Receipt of raw materials.

- The assembly and manufacture of the product.

- Storage.

- Transport to the point of sale then receipt of goods.

- The purchase and payment of the product by the final customer.

The supply chain therefore brings together many professions, including manufacturers, commercial service providers, suppliers, carriers, distributors. It is thus supplied by various companies which each represent a link in the chain (Simon E & John S., 2018).

The supply chain is today an extremely complex activity, involving a large number of players, sometimes in different countries, and having to respond to consumption patterns which are constantly evolving, and which vary from one country to another. It is piloted with the help of IT tools which make it possible to coordinate the various actors involved, control and monitor goods and orders, and optimize processes, to strive for ever more efficiency.

We then talk about supply chain management: to estimate as accurately as possible the needs, availability, and capacities of each link in the chain to optimize them synchronize them and obtain the best results. A SCM strategy is essential to improve flow management and reduce delays, while controlling costs.

There can be another confusion between the supply chain and the value chain, but again, these are two very different terms: the more stages in the supply chain products go, the more they gain in value. They go, for example, from a simple raw material in the first step to a final product that combines several of these materials that have been transformed, to become a finished product, personalized, packaged and ready to be delivered to a customer. Therefore, we talk about a value chain, but this valuation takes place within the supply chain.

2.1.2.2. What is logistics

Logistics is an integral part of supply chain management, but it is just one of many activities in the supply chain. It relates more specifically to the stages linked to inventory management, transport and then distribution of goods (Prachi J., 2015).

To fully understand the difference between logistics and supply chain management, here is an example with a company specializing in the sale of clothing:

- The supply chain will involve all stages, from fabric manufacturing to collection design, including quality control, point-of-sale distribution and home delivery. There are

therefore a large number of steps that range from purchasing the raw material to delivering the final product to the customer, and even returning it as needed.

- Logistics is only one of the stages in the supply chain: the acquisition and storage of clothing, then their transport to a specific destination. Logistics is therefore linked to the supply chain, but these are indeed two terms covering different activities.

2.1.2.3. The main specificities between logistics and supply chain

Here are the three main specificities that distinguish supply chain and logistics:

- Logistics is part of the processes integrated in the supply chain. It can relate to external activities, since it includes movement flows.
- The supply chain represents all the processes implemented; it is like an economic model aimed at optimizing all the processes involved. It is internal to a company.
- Logistics have been around for many years, while the concept of the supply chain is newer. Some say supply chain management is nothing more than a new form of logistics, but that would partially deny the important differences between these two terms and what they mean.

Supply chain and logistics are two different activities, but they work together. To effectively manage a supply chain, it is essential to optimize logistics as much as possible. Likewise, optimized and highly efficient logistics will have little impact if the entire supply chain shows weaknesses (Catherine P., 2020).

2.1.3. Key components of successful SCM

Demand management, Promoting and protecting flow, Throughput and productivity, RFID for distribution and Supply chain talent (Coleman H.,2017).

These are key factors that can make or break any distribution business. In a recent white paper, management consultant Howard Coleman identifies them as the 5 key strategies for supply chain management excellence.

Supply chain management is all about "increasing the velocity of the supply chain, promoting and protecting flow, and aligning operating strategies and adequate decision support systems," Coleman writes. And he stresses that speed, efficiency, and control are as important to smaller enterprises as they are to multinational corporations

"You are a part of the supply chain, too!" he notes. "The commonality that exists between larger companies and smaller ones is, in fact, the path to SCM operational excellence." He cites processes, people, and technology as the pillars of successful SCM in organizations of all sizes, and elaborates on 5 key success factors, "which even today are not sufficiently, I believe, really part of the SCM lexicon of wholesale distribution"

1. **Sales, inventory & operations planning:** The standard silos that develop within organizations "result in friction, conflict, and communication difficulties between functions," ultimately because different business units are controlled through different metrics. "Surely a collaborative and integrated plan would need to achieve management's objectives related to maintaining, raising, or lowering inventories, minimizing backlogs and back orders, productivity objectives, and 'getting a bead' on inventory and operational budgets," he writes. "Working to achieve total efficiencies serves the interests of the entire supply chain."

2. **Promoting and protecting flow:** The primary objective of any hub-and-spoke distribution organization is to meet target service levels while minimizing inventory. "Distributors can begin to 'pull' inventory through their supply chain, rather than 'push' it, and form more collaborative relationships with suppliers," Coleman explains. Success depends on synchronizing procurement and order replenishment strategies, and relying on customer signals rather than demand forecasts to set the pace.

3. **Throughput and productivity:** Coleman points to the warehouse, home of the "picker-packer-rack-stackers," as a weak link in many distributors' supply chains. "It's sometimes done under severe constraints, whether it's space, obsolete storage methods, outdated receiving and picking methods, [or] the absence of or underutilization of technology," he writes. "These facilities need to be thought of more as distribution activity hubs, adding SCM value to the processing and flow of product."

4. **RFID for distribution:** Radio frequency identification (RFID) is on the way, and distributors need to learn about it, since "it's about the flow of information," Coleman writes. RFID scanning provides immediate verification and real-time visibility for an entire shipment, and then transfers the data to the warehouse management system, where incoming product can be reconciled against open purchase orders. "The entire process occurs without human intervention. No clunky barcode scanners. No scanning of the visible bar codes of individual items, where warehouse associates have to be sure to align them with the scanner."

5. **Supply chain talent:** SCM talent is a weak link in the chain, Coleman warns. "The SCM position, as it is today, requires not only a good understanding of your business, but strong influence skills and deep analytical capabilities," he writes. "[Just] anyone can't do the job."

Coleman says distributors should plan for a process of continuous improvement, focusing on every aspect of supply chain management. Team development and technology will be two essential ingredients—and they're related, since the next generation of innovative, energetic employees will be attracted by the latest, most intuitive distribution and SCM software.

How to optimize your supply chain efficiently?

It is common to observe many dysfunctions and additional costs in the organization of the supply chain. They are usually due to the following factors:

- Services that are too fragmented, which do not cooperate sufficiently with each other. This is often a lack of communication between these different departments, which hinders productivity and responsiveness.
- A lack of cooperation between the various suppliers and customers of the Supply Chain. Each carries out its missions on its own, without any real common vision or effective communication.
- A lack of efficiency in the various information systems, often resulting from the absence or poor performance of the supply chain management software.

It is therefore essential to choose the right ERP (Enterprise Resource Planning) and WMS (Warehouse Management System). What these problems have in common is a lack of coordination and information, always with the same consequences: reduced performance and the inability to be reactive in the event of a problem.

As we will see in the rest of this research, process automation is a key factor in optimizing the supply chain, but we must not neglect the human factor: relations with the various actors of the Supply Chain and the communication of information.

2.1.4. The importance of SCM to the organization

The supply chain is the logistics chain of a company. It is all the different networks that take care of the production of raw materials until the sale of the finished product. The networks for transporting raw materials, processing, storage and distribution are part of the supply chain. All these networks are interconnected and allow the company to supply itself with raw materials and distribute a given product (Ambre H.,2019).

The supply chain or logistics chain within a company has been increasingly valued in recent years. Companies around the world have realized the importance of the supply chain and its impact on their growth. Indeed, the supply chain takes care of the coordinates of the various networks within a company, from production to delivery. It's all meticulous work that leads those responsible for the supply chain to get in touch with each actor in each network, to find out about the prices of raw materials, the various taxes and even the standards in force in the various countries of production and distribution. The goal is for the supply chain to be able to provide the product that the customer wants at the right market price.

Supply Chain Management is an important part of every organization, whether small or large. SCM is the active management of supply chain activities to maximize customer value and achieve a sustainable competitive advantage, according to Robert Handfield, SCM also deals with the movement and storing of materials needed to create a product, as well as inventory management, and keeping track of finished goods from where they were created to who they go to. Bottom line: there is no overstating the importance of Supply Chain Management.

According to SCM experts, it's also defined as the design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally. The other areas that SCM is related to are operations, logistics, procurement, and information technology (Michael W., 2017).

If companies use Strategic Supply Chain Management, the organization is then able to function at optimal capacity to provide and distribute various products and materials.

The impact of globalization on various businesses across the world is enormous. With an increasingly varied demand, companies are faced with new realities. As customers want different product lines, the business must ensure that this demand is met. Likewise, when the

customer wants a cheaper product, the company must adjust the supply of raw materials, processing, handling and delivery to ensure the desired product for the customer.

Everything is done with a view to provide the product desired by the consumer. And the best way to retain customers is to adapt to their needs. An efficient supply chain allows a company to ensure good growth and reduce the costs of production, transport, storage and delivery.

2.1.5. For a resilient supply chain

The term "resilience" means the ability of a material or system to return to its original state when subjected to a disturbance. In logistics, a supply chain is resilient if it can effectively overcome multiple disruptions that may arise. So, even with the possibility of incidents, your order will be prepared and delivered according to the previously agreed terms.

resilient supply chains must be based on an integrated logistics strategy, where all data is shared between their various stakeholders. It must be considered that a digital and integrated supply chain adapts better to change.

- **The capacity of resilience:**

Michigan State University study reveals that supply chain resilience must be based on two fundamental pillars:

Resistance capacity, is the ability of all parties in the logistics chain to slow down disruptions and, in particular, reduce the impact on products. The first step is to avoid problems as much as possible. Appropriate measures should then be taken to mitigate the impact.

Recovery ability, the ability to analyze and make result-based decisions to overcome disruption. Companies in the supply chain should first go through a period of stabilization and then return to previous or better results if necessary.
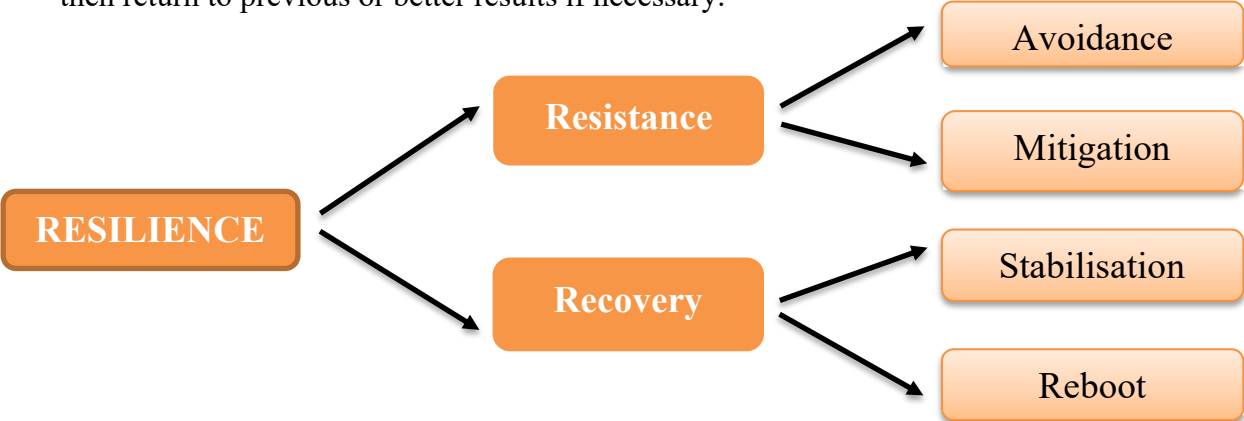
Figure 3: Resilience of the supply chain (Michigan State University)

- **How to measure the resilience of a company?**

the supply chain can experience many types of incidents that disrupt its functioning, from natural phenomena to technological problems. By disruption in the logistics chain, it means any disruption of one or more links in the chain, having an external origin.

In logistics, disturbances can be included by natural agents, such as an earthquake or snowfall; biological agents, such as a pandemic such as Covid-19; political decisions, such as an international trade war; or, finally, technological reasons, such as a cyber-attack or a data breach (Trevor R., 2021)

What is the impact of disruption on your supply chain? And above all, how to make it resistant to these disturbances? A theory on the "triangle of resilience" has been published by researchers at the New University of Lisbon (NOVA).
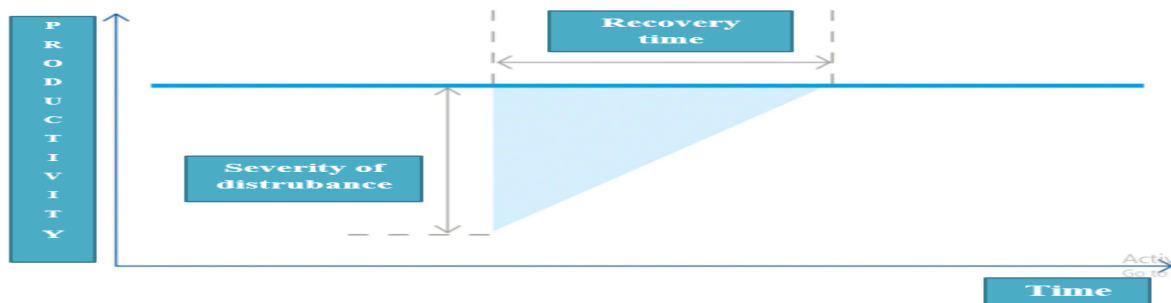
Figure 4: The resilience triangle theory (Tierney K, Bruneau M, 2015)

The graph represents the impact of a disruption according to its severity and the recovery time of each actor in the chain. The smaller the triangle, the greater the resilience of the analyzed company.

- **How to have a resilient supply chain?**

What are the strategies to be adopted to guarantee the stability of a logistics chain in the face of any disruption? Let's see the 5 pillars of building resilient logistics:

Digitization and information sharing with all links in the logistics chain: today, the risk of information loss is almost greater than the loss of the material itself. A data breach can defeat any logistics operation. Therefore, the use of software such as WMS, ERP or an MES system for production is essential to synchronize your entire supply chain and protect it against any disruption.

Advance logistics planning: there are many digital tools on the market allowing to carry out

analyzes on the KPIs of the company and the sector, to anticipate new outbreaks. This is why the planning must include a study of the activity of the competitors and that of the suppliers, but above all, of the customers' expectations.

The implementation of a policy of continuous improvement of the logistics strategy: a publication from the consulting firm EY emphasizes that it is essential to apply continuous improvement techniques to your logistics chain to reduce costs and in particular to respond better to changes in its environment. This trend is based on identifying problems, defining them and implementing solutions to remove or decrease the difficulties.

Designing a flexible and adaptable logistics and production plan: rapid recovery is one of the keys to a resilient supply chain. This is why companies must synchronize their operations so that production and logistics are flexible and adapt quickly to new scenarios. By anticipating and integrating trends in an agile manner.

In a complex logistics environment, where companies interact with their customers through multiple channels, any disruption can mean errors or loss of efficiency on the part of one link in the supply chain.

Therefore, companies must share data, ensure the traceability of their products and ensure transparency in the manufacture, storage and delivery of the order in order to avoid such failures. An integrated supply chain whose actors work together is better able to overcome external and internal challenges (mecalux supply chain resiliente, 2020)

From the design of a manufacturing and logistics plan to the need to invest in automated solutions within your production and distribution site, the supply chain requires the implementation of continuous improvement techniques to enhance its resilience to changes in the environment. The digitization of logistics processes and the automation of operations have become the best solution to benefit from a resilient and integrated supply chain.

2.2. Supply Chain Digitalization and organizational resilience

Most companies are aware of the need to digitize their supply chain to remain competitive. But, faced with an abundant supply of new technologies, they often find it difficult to choose and widely deploy the most useful for their profession.

"A company that does not take the digitalization train is not sure that it will still be competitive in 5 years," says Selim Boughedir, smart industries director of the Wevioo group. New

technologies are tools for operational improvement. "Moreover, one in two large companies considers the digitization of the supply chain as one of its three organizational priorities, reveals a recent study by the Cap Gemini Research Institute, The digital supply chains (Luc P., 2019).

Faced with an increasingly uncertain environment, the company must develop its resilience, its capacity for adaptation and its reactivity. In short, to become an agile company, able to face the vagaries of the market and to remain competitive. Digitization is today the royal road to such agility and a Gartner study carried out in 2017 already confirmed that digitalization is one of the major challenges for companies. Tools such as ERP, CRM, Business Intelligence or even RFID are becoming essential for efficient management. Far from a simple fad, it is a real opportunity for growth and sustainability that opens to companies open to digital transformation. (Luc P., 2019).

2.2.1. Supply Chain and Digitalization

The supply chain is a network of organized structures that manage the transport and storage of raw materials or finished products, from suppliers to the customer of the customer, the end consumer. This chain of specialized intermediaries can be more or less long depending on the geographical distance between suppliers and customers, but also more or less integrated.

In order to be able to give a standard and operational definition of the supply chain, it should be considered that it is intended to deliver the right product, to the right place (where the demand exists), to the right moment (as quickly as the flow tension demands), and of course at the best cost, because the cost of the supply chain is included in the final price of the product passing through the consumer.

2.2.1.1. What is Digitalization

Figure 5: The digital Transformation Pyramid (https://uppkoppladbygg.se/)

Digitization refers to creating a digital representation of physical objects or attributes. For instance, we scan a paper document and save it as a digital document (PDF). In other words, digitization is about converting something non-digital into a digital representation or artifact. Computerized systems can then use it for various use cases. An example from manufacturing would be when a measurement is converted from a manual or mechanical reading to an electronic one (Mark S., 2020).

As "Gartner" defines it, **digitalization** is "the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business." Digitalization moves beyond digitization, leveraging digital information technology to entirely transform a business' processes — evaluating, reengineering and reimagining the way you do business.

If digitization is a conversion of data and processes, digitalization is a transformation. More than just making existing data digital, digitalization embraces the ability of digital technology to collect data, establish trends and make better business decisions.

As the adoption of Industry 4.0 continues to sweep through industries around the world, the supply chain sector included, it brings with it never-seen-before innovative technologies that can completely transform the operations of a supply chain network, company or procurement process.

Two of the biggest benefits that supply chains can take from digitizing their processes are speed and cost. Taking your operations to the next technological level can significantly cut the time it takes to make strategic decisions, whilst also boosting operational efficiency. By improving pricing and operating costs, manufacturers also believe they will see increased sales from more digital processes (Grimshaw J., 2018).

End-to-end transparency is the ultimate goal for a number of supply chain operators, being the crucial component to achieving significant efficiency gains. In a system with end-to-end transparency, every member of every step along the supply chain network will have access to all data. Digitizing processes can enable improved visibility and provide real-time insights into the supply chain, giving people along the chain full control.

2.2.1.2. The concept of supply chain digitalization

Driven by several reasons, the emergence of the phenomenon of the digital supply chain (DSC) does not date back many years. Its initiation is illustrated mainly in the effects of Industry 4.0,

the development of technological tools and the current characteristics of the competitive environment, in particular in uncertainty, complexity and strong dynamics.

Digitization is becoming a requirement so that Supply Chain (SC) systems can hold up in this context. At the same time, scientific research in this area was very active; many researchers have explored the phenomenon in several visions: its definitions and the conceptualization of the term, its tools and its impacts. To this end, we propose through this paragraph to study the definitions of the Digital Supply Chain.

However, the state of the art of definitions of the concept of Digital Supply Chain, also called Supply Chain 4.0 has brought out a lot of attempts at conceptualization and relative definitions of this phenomenon, moreover (Kinnett D., 2015) defined the Digital Supply Chain as: "an intelligent, value-driven network that harnesses new technological and analytical approaches to create new forms of revenue and business value, through a centralized platform that captures and maximizes usage real-time information from various sources ". The phenomenon of the Digital Supply Chain has also been analyzed more deeply by authors in particular: "Büyüközkan Feyzioğlu and fethallah gocer", who in their research have indicated definitions and explanations of the term:

- Büyüközkan, G. et al., (2018) asserted that the Digital Supply Chain is defined as a set of interconnected activities that take place between suppliers and customers, and which are processed through new technologies.

- Büyüközkan, G. et al., (2018) stated that the digital supply chain is seen as a smart, customer-centric, system-integrated, globally connected, data-driven mechanism that harnesses new technologies to provide more accessible and affordable value products and services.

- Büyüközkan, G. et al., (2018) A digital supply chain is an intelligent, value-driven, efficient process that generates new forms of business income for firms through the exploitation of both new approaches with new technological and analytical methods. In other words, the DSC does not indicate whether goods and services are digital or physical; rather, it is the way supply chain processes are managed with a wide variety of innovative technologies.

- The Digital Supply Chain is defined as: "an intelligent and responsive technological system that relies on the capacity for mass elimination of data and excellent cooperation and communication for hardware, software and digital networks to support and

synchronize the interaction between organizations making services more valuable, accessible and affordable with results (Büyüközkan F & Fethallah G., 2018).

More recently, other attempts to conceptualize the concept have been indicated by the literature, in this case (Frederico et al., 2019) which has defined Supply Chain 4.0 as follows: "The supply chain 4.0 is a transformational approach to supply chain management that uses disruptive Industry 4.0 technologies to streamline supply chain processes, activities and relationships to generate significant strategic benefits for all stakeholders in the supply chain supply chain ".

In the same vein, (Ehie & Ferreira, 2019) have described that this concept calls for two measures at the same time: the first relates to the implementation of new digital technologies in the processes of the Supply Chain allowing the creation of commercial relationships with suppliers and customers, while the second relates to the roles of these technologies in transforming supply chain capabilities and operational performance.

2.2.2. Digital Supply Chain technologies

In this paragraph, we focus on studying the main digital technologies with the possibility and the capacity to correctly transform the traditional supply chain towards DSC; these tools are chosen based on their role in the digitization of supply chain processes. We provide a detailed description of these technologies below.

- **Cyber Security Systems:**

Cyber Security Systems are defined as digital systems that control physical processes not only in one direction, but also linked to feedback loops with the system, while allowing real-time harmonization of information and physical flows (Hofmann & Rüsch, 2017).

According to (Wang et al., 2016), Cyber Security Systems (SCS) are illustrated through a network infrastructure with embedded devices (sensors) allowing self-management of physical processes and their feedback. It is an infrastructure that integrates both physical and digital components.

They are also described as systems that "enable the collection, transmission and sharing of data and information throughout the product lifecycle in a fast, reliable and secure manner" (Helu et al., 2017)

- **Big Data Analytics:**

The notion of Big Data is a term that describes the large volume of structured and unstructured data that organizations regularly manage. In view of the large mass of its data, their analysis

makes it possible to select the most important which are used for better decision-making for companies. According to (Wamba et al., 2015) from a management perspective, (BD) is a global approach to obtain actionable insights to create competitive advantage. This is how (BDA) uses the application of advanced statistics to any type of data stored in the form of electronic communication, in particular messages, updates and images posted on social networks, sensor readings and GPS signals from cell phones (Kache & Seuring, 2017).

From a DSC perspective, (Tan and al., 2015) asserted that Big Data Analytics (BDA) helps reduce lead times from order to delivery, improve customer relationships and increase the efficiency and competitiveness of the supply chain. They allow the collection of large amounts of data from several sources (videos, social networks, etc.). Other authors (Alter and al., 2016; Dubey et al., 2020; Wamba et al., 2017) have demonstrated the positive impact of (BDA) on company performance.

Therefore, taking advantage of the use of (BDA) faces several challenges, especially in data quality and qualified data analysis capabilities, achieving consistency and confidentiality for supply chains complex and long (Kamble et al., 2018). It is obvious that the challenge for companies for this technology is to have the capacity in real time to collect and analyze in the shortest possible time, all the data produced by the supply chains and in relation to the competition.

- **Artificial Intelligence:**

Artificial Intelligence (AI) refers to "The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision making, and translation between languages" according to the Oxford English Dictionary.

According to (Haenlein & Kaplan, 2019), it is also defined as a set of "theories and techniques used to create machines capable of simulating intelligence. AI is a general term that involves the use of a computer to model intelligent behavior with minimal human resource intervention. "In other words, (IA) indicates that machines learn autonomously and behave similarly to humans (Wamba-Taguimdje et al, 2020).

However, with regard to DSC, the continuous development of new IT skills for human resources is a major challenge for firms (Waibel et al., 2017). This is how (Queiroz et al., 2019) indicate that the essential nature of qualified human resources in the implementation of DSC. In addition, (Barreto et al., 2017) affirmed the need for firms to take into account the integration

and interaction of human resources - machine. We add here that the scientific literature has indicated that (AI) can increase the efficiency of operations, support supply chain operations, optimize and improve the customer experience.

- **Internet of things:**

Internet of things is defined as a network of objects that is connected to an intranet and can communicate with each other without a human interface (Fortino & Trunfio, 2014; Wortmann & Flüchter, 2015). According to (Okano M., 2017), IoT can be described as an internet-based technical infrastructure, which enables the exchange of goods and services throughout the global supply chain network. (IoT) allows a set of objects to communicate with each other, without the need for human resources (Queiroz & al., 2019).

Nonetheless (IoT) provides the DSC with important data for all parts of the supply chain, which allows simplification for suppliers and also warning for customers in case of delay of goods (Kumar et al., 2016). In addition, (IoT) also has impacts on the supply chain, by allowing the connection of the products that circulate in this chain and also to provide and monitor real-time information on its products, which improves the visibility of the supply chain (Kumar et al.,2016). However, aside from its positive impacts, (IoT) can create potential threats to business security and stakeholder privacy (Okano M., 2017).

- **The Block chain:**

The Blockchain is a new technological paradigm of technical origin, it has gone from a simple technology that supports bit coins and facilitates their transfers to a new approach that can be applied in different fields to dematerialize all types of transaction (Dhiba & Alaoui.,2020). According to (Swan M., 2015), Blockchain technology is defined as a ledger of transaction data recorded in a network of several members. Its transaction data is stored in blocks that are chronologically chained together. It refers to a distributed digital ledger in which all transactions are shared within a network whose transactions cannot be changed (Al-Saqaf & Seidler., 2017).

However, (Wang J., 2019) claims that in the context of the supply chain, blockchain technology enables improved transparency, ensures secure information sharing and builds trust, as well as effecting improvements, operational, particularly by accelerating the execution of the end-to-end supply chain and increasing the volume as well as the accuracy of data. It also helps validate data integrity and build an entire foundation for smart contracts, enabling automation throughout the supply chain. In addition, blockchain technology allows the DSC to improve

agility, responsiveness, and disintermediation, which reduces costs and improves the efficiency of Supply Chain processes for companies (Queiroz et al., 2019).

The blockchain also allows real-time sharing of data relating to the Supply Chain to the various partners to achieve high transparency allowing the use of resources and services between suppliers and customers in virtual markets (Culot et al., 2019).

2.2.3. Why digitize the Supply Chain

We call supply chain, the logistics chain which brings together all the supply links: purchasing, inventory management, handling, storage, distribution, delivery ...

The digital transformation of the logistics function can only be considered in a comprehensive and concrete way and be integrated into the entire value chain. It is therefore important to pool the processes and allow the different actors a harmonized consultation of the data in order to improve the efficiency of the operations. The sharing of information coupled with the use of the data collected can only be done by developing tools for internal and external stakeholders.

Constantly adapting to changes in the market and to the expectations of its customers is vital for a business. The digital transformation of the supply chain significantly improves this agility and resilience (Meredith F., 2022)

Dematerialization and information processing are essential here:

- Responsiveness to breaks in the chain in order to limit their impact,
- Real-time improvement of customer service and product offering,
- Inventory management, anticipation of customer needs,
- Delivery on demand,
- Reduce delivery times ...

With an agile end-to-end supply chain, it becomes possible to offer new consumers a personalized experience, while maintaining a controlled level of profitability.

2.2.4. Resilience

Resilience is a concept that is arousing growing interest but the definition of which varies greatly between different authors and fields. In addition, in order to obtain a method for assessing the resilience potential of organizations, it is necessary to define the essential

characteristics for an organization to be resilient as well as the parameters to assess this resilience potential.

2.2.4.1. The concept of resilience

Originally, the term resilience comes from the field of physics and corresponds to the ability of a material or an object to return to its initial state after having undergone continuous shock or pressure (Mathieu J-P., 1991). Subsequently, various fields such as psychology, ecology, engineering or even economics appropriated the term, which then underwent changes in its definition. Thus, the notions of learning and anticipation have emerged in the field of economics as characteristics of a resilient society (Berkes & Folke, 1998). Sociology, for its part, considers that the three essential characteristics of individual resilience are: acceptance of reality, a strong belief in the fact that life has a meaning and the capacity to improvise (Coutu P., 2002). In psychology, resilience is considered to be the ability to bounce back from adversity (Luthans, Volgelgesang & Lester, 2016). Holling (1973) was the first to give a definition of the resilience of a system, more specifically of an ecological system. He defined it as "a measure of the ability of a system to absorb disturbances while maintaining the same functioning and the same relationships between the different entities of the system".

2.2.4.2. Organizational resilience

The concept of organizational resilience has existed since the 1990s, but it is only since the recent upheavals (ice storm in Quebec in 1998, the attacks of September 11, 2001, in the United States, Hurricane Katrina in 2005 in the United States, etc.) that it has spread strongly in public opinion. The definition of organizational resilience was therefore naturally inspired by definitions of resilience in other fields. Thus, as in physics, psychology, ecology and informatics, organizational resilience is a capacity. In addition, it is a capability deployed during and after a disturbance. Home (2017) thus defines organizational resilience as the organization's resistance to disruption and its ability to recover.

However, a difference appears between the organizational domain and the other domains. Unlike other areas, organizational resilience also appears before the disruption with the anticipation component. Madni (2017) thus defines resilience as the capacity to anticipate a disturbance, to resist it by adapting, and to reestablish oneself by regaining as much as possible the state before the disturbance.

Organizational resilience is therefore a capacity that the organization deploys before the disruption (in the prevention and preparation phase), but also during the disruption (in the intervention phase) and finally after the disruption (in the recovery phase).

According to Madni & Jackson (2018), organizational resilience is based on four axes: avoid, withstand, adapt and recover (Figure 6).

Figure 6: The four axes of resilience (Madni & Jackson, 2018)

The four axes of organizational resilience promoted by Madni & Jackson (2018) are therefore:

- Avoid disturbances: this axe of resilience reflects the need to anticipate hazards in order to be proactive;
- Withstand disturbances: this axe of resilience reflects the need for robustness of the system to absorb shocks without modifying its balance;
- Adapt: this axe of resilience reflects the need for flexibility of the system to reconfigure itself according to the disturbances undergone;
- Recover: this axis of resilience reflects the system's ability to find a state of equilibrium, as close as possible to that existing before the disturbance.

This approach to resilience allows the authors to deduce that the three essential properties of a resilient organization are the anticipation of disturbances, the learning of past disturbances and the adaptation to always have a response capacity close to reality.

2.2.4.3. Supply chain resilience

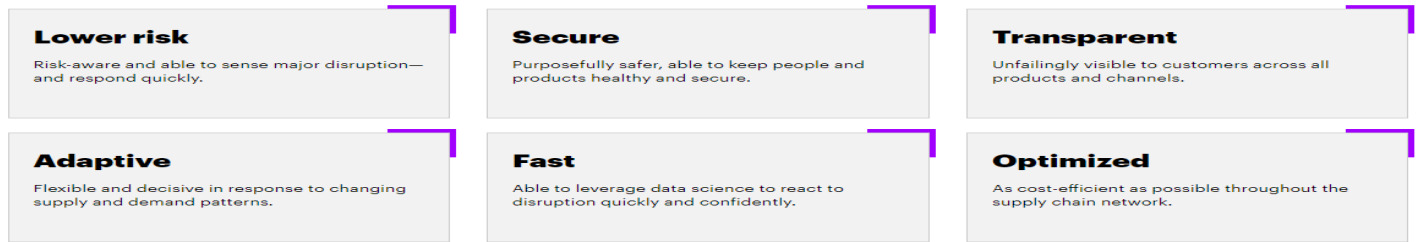Intelligent and resilient supply chains are:

Lower risk
Risk-aware and able to sense major disruption—and respond quickly.

Secure
Purposefully safer, able to keep people and products healthy and secure.

Transparent
Unfailingly visible to customers across all products and channels.

Adaptive
Flexible and decisive in response to changing supply and demand patterns.

Fast
Able to leverage data science to react to disruption quickly and confidently.

Optimized
As cost-efficient as possible throughout the supply chain network.

Figure 7: The characteristics of resilient SC (Kris Temmermans, 2019)

COVID-19 has demonstrated the need for supply chain resilience ; the ability to bounce back and adapt to disruptive change.

As supply chain networks span more continents and become more complex, the ability to quantify and mitigate supply chain risks throughout the purchasing, manufacturing, transportation and of the product life cycle is essential. Organizations need to identify critical risks to minimize disruption and help protect themselves from global operational, financial and reputational exhibitions (Blehadi A., 2020)

Companies trying to maintain their competitive edge and margin have been forced to relocate some or all of their manufacturing activities to countries with more affordable labor costs. Modern manufacturing relies on global supply chains for raw materials are all the more dependent on how well these steps work. Likewise, businesses and professional service companies often depend on consulting and support services from around the world. However, reliance on larger supply chains, outsourcing and the globalization of activities can have negative effects, including work disruptions, a tarnished reputation and damaged brand value. Large organizations can be complex and unable to access the right information, and thus make the right decisions, and do not know how to effectively measure the real impact of malfunctions.

While resilience and sustainability have much in common, with both seeking enduring supply chain solutions, their subtle differences are nevertheless important. A sustainable supply chain is one that seeks to practice policies that benefit society and the environment to ensure resources continue to be available. In that context, sustainability and resilience have a similar meaning. However, resource limitations that affect availability are detrimental to resilience. As sustainable resources usually need careful management to ensure future availability, this may mean reducing off-take and other conservation policies that may affect supply chain resilience.

2.2.5. Digital technologies : its role in increasing SC and organizational resilience

- **On Supply Chain:**

The adoption of technologies in the field of the supply chain implies impacts on it, especially with the rapid emergence of cutting-edge tools that companies are striving to take advantage of, which has led to the emergence of the Digital Supply Chain, or also Supply Chain 4.0. However, the scientific literature on the subject, which is only in its initial phase, has clearly explained certain opportunities and challenges of Supply Chain 4.0. Moreover, the supply chain 4.0 will create a competitive advantage illustrated in the availability of product offerings, the reduction of costs and also in the increase in market share (Swanson D., 2017). For (Büyüközkan F & Fethallah G.,2018), the digitization of the supply chain makes it possible to offer products and services through efficient processing of supply chain processes within companies. As well, the context of collaboration and interaction between companies will undergo considerable changes due to the implementation of the digitization of the supply chain, focused on smart technologies (Akter et al., 2016). According to (Tan et al., 2015) the adoption of digital technologies in logistics processes, allows creating new capacities and innovations in its last through new options of management and exploitation of big data.

The implementation of the DSC has also identified some impacts such as the integration of physical flows with digital technologies, improving the visibility of the supply chain, responsiveness, robustness and resilience while allowing the optimization of organizational performance (Gunasekaran et al, 2017). The DSC makes it possible to face the obstacles linked to traditional logistics chains in this case, the insufficiency in terms of competence, the lack of visibility, the dysfunction of the models, outdated technologies and also the length of the response times (Queiroz et al, 2019). While (Korpela et al., 2017) indicate that DSC brings speed to manual operations via digitalized information flows.

- **On organizational resilience:**

Faced with an increasingly turbulent and uncertain environment, the company must develop its resilience, its capacity for adaptation and its reactivity. In short, to become an agile company, able to face the vagaries of the market and to remain competitive. Digitization is now the royal road to such agility and a Gartner study conducted in 2017 already confirmed that digital is one of the major challenges for companies. Tools such as ERP, CRM, Business Intelligence or even RFID are becoming essential for efficient management. Far from a simple fad, it is a real

opportunity for growth and sustainability that opens up to companies open to digital transformation.

Exploiting the potential of digital tools is part of a global approach to overhaul existing processes in order to integrate customer expectations in terms of digitization, increase productivity, and create value. Contrary to popular belief, digital transformation is not just about having an e-commerce site or a presence in social networks. Carrying out a digital transformation of the company generally begins with the optimization of its resources and the structuring of its operation. In addition to tools, human resources are fundamental to a successful digital transformation of the company. Corporate culture must also evolve to support change and take ownership of the digital tool (Forbe A., 2018).

The Covid-19 crisis is thus testing the performance, agility, flexibility and resiliency of companies in the digital field. To resist it and seize the opportunities of the recovery, structures must accelerate their digital transformation more than ever. Thus, digital transformation will make it possible to meet the challenges of the covid-19 health crisis. Covid-19 has forced companies and employees to adapt their processes and operating methods in a very limited time. Teleworking was already on the rise before the covid crisis, now the trend has democratized and will continue to gradually settle in companies that can implement it. This change highlights certain innovations and digital tools necessary for its operation. The health crisis is thus disrupting all sectors of activity. It is also leading to a faster transition to the digital transformation of sectors that have remained very traditional. Such as health or education, the doubts that the structures had to face pushed economic players to adopt digital tools very quickly and thus put aside their reluctance to move forward in the current situation. (Kader K., 2019).

3. Research methodology

At a time when the Moroccan economy is opening more and more to international markets, thanks to economic partnerships, in particular with the European Union and free trade agreements with Arab countries, Moroccan companies are finding themselves faced with increasingly fierce competition, which will inevitably end in failure for some, survival for others, and success for those who will be able to take the already moving train of digital transformation.

The objective of this questionnaire is to define the essential capacities and skills for the success of a digital transformation.

The theoretical part of our thesis demonstrated the direct role of digital technologies in increasing the supply chain and resilience. However, little research has addressed the intermediary role of the digital supply chain between resilience and organizational resilience itself (Sheikh et al, 2018). It is in this approach that the contribution of our study fits.

A case study within Bontaz Center Morocco will be done in order to give a real example and to show the effect of the adoption of a digital supply chain strategy.

3.1. The design of the study

This study will adopt the descriptive statistical research method in order to understand what could be the essential capacities and skills to the success of the digitalization of companies, we carried out a quantitative survey on a random sample of companies as well as the professional network LinkedIn. we ask the following question:

- **What are the essential skills and capacities that allow the success of the digital transformation of Moroccan companies?**

In this regard, we have made the following hypotheses:

Hypothesis 1: The success of digital transformation depends on certain intrinsic skills and capacities.

Hypothesis 2: the company's capacity for innovation and collaboration are linked to a developed level of digital transformation.

The descriptive research approach is significant in describing the collection of data on a phenomenon and its characteristics that cannot be directly observed. Using this method will help to minimize errors and maximize time and efforts to complete the study.

3.2. Population and sample size

The target of the population of this study will focus on each company member that is concerned or have an idea about the digitalization within the company where he/she works. The sample size of this research will focus on a random sample of Moroccan companies. This study used nonprobability sampling.

More than 100 electronic questionnaires were sent, and 60 valid questionnaires were received.

3.3. Data collection Method

A questionnaire is one of the simplest and quickest method of getting information from many people. A questionnaire consists of a set of questions presented to a respondent in order to get answers. The respondent read the questions, interpret what is expected and then write down the answers. Because there are many ways to ask questions, the questionnaire is very flexible. (Joel A.J.W)

The analysis of this study will be based on the collection of primary data from participants through the use of structured questionnaire. It will be designed to obtain practical information about **the essential skills and capacities that allow the success of the digital transformation of Moroccan companies.** The primary data collection will focus on each company member that is concerned or have an idea about the digitalization within the company where he/she works. 100 questionnaire was sent to about 30 Moroccan company, we received 60 valid questionnaires back. it was prepared and a link was sent to various concerned respondent trough the professional LinkedIn and other networks.

4. Data analysis and discussion

4.1. Data analysis

The study will take descriptive analysis form to determine the frequencies distributions of mean, median, standard deviations, and percentages using a software package called Statistical Package for Social Sciences (SPSS).

Question 1

Table 1: Digital is present in the activities of your organization?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Agree	25	41,7	41,7	41,7
Valid	Strongly agree	35	58,3	58,3	100,0
	Total	60	100,0	100,0	
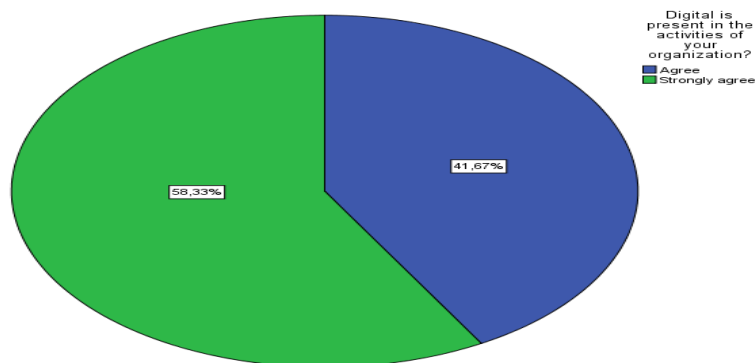
Figure 8: Digital is present in the activities of your organization?

Based on the table 1 and the figure 8, the results shows that 58.33% (35) of the respondents are strongly agreeing that digital is present in the activities of their organization. In overall, the results revealed that more respondent are agreeing the fact of integrating digital strategies in the activities of their organizations.

Question 2

Table 2: What do you think are the objectives of your organization's digital strategy?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Improve customer engagement and experience.	13	21,7	21,7	21,7
	Improve customer engagement and experience., Improves innovation., Increase efficiency (example: saving time and rapid access to information).	4	6,7	6,7	28,3
	Improve customer engagement and experience., Improves innovation., Increase efficiency (example: saving time and rapid access to information)., Helps me to be closer to my customers	1	1,7	1,7	30,0
	Improve customer engagement and experience., Increase efficiency (example: saving time and rapid access to information).	5	8,3	8,3	38,3
	Improves innovation.	2	3,3	3,3	41,7
	Improves innovation., Increase efficiency (example: saving time and rapid access to information).	1	1,7	1,7	43,3
	Increase efficiency (example: saving time and rapid access to information).	3	5,0	5,0	48,3
	Radically transforms business processes and / or business models.	18	30,0	30,0	78,3
	Radically transforms business processes and / or business models., Improve customer engagement and experience.	2	3,3	3,3	81,7
	Radically transforms business processes and / or business models., Improve customer engagement and experience., Improves innovation., Increase efficiency (example: saving time and rapid access to information).	1	1,7	1,7	83,3
	Radically transforms business processes and / or business models., Improve customer engagement and experience., Increase efficiency (example: saving time and rapid access to information).	1	1,7	1,7	85,0
	Radically transforms business processes and / or business models., Improves innovation.	1	1,7	1,7	86,7
	Radically transforms business processes and / or business models., Improves innovation., Increase efficiency (example: saving time and rapid access to information).	1	1,7	1,7	88,3
	Radically transforms business processes and / or business models., Increase efficiency (example: saving time and rapid access to information).	7	11,7	11,7	100,0
	Total	60	100,0	100,0	

In Table 2, the results show that 30% of respondents think that the objectives of their organization's digital strategy are to radically transforms business processes and / or business models, 21.7% said that the objectives are to improve customer engagement and experience,

while others have chosen more than one objective. That shows that most of respondents have a good level in understanding a digital transformation.

Question 3

Table 3: Digital technologies have the potential to fundamentally transform the way we work in an organization?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	17	28,3	28,3	28,3
	Neutral	2	3,3	3,3	31,7
	Strongly Agree	41	68,3	68,3	100,0
	Total	60	100,0	100,0	
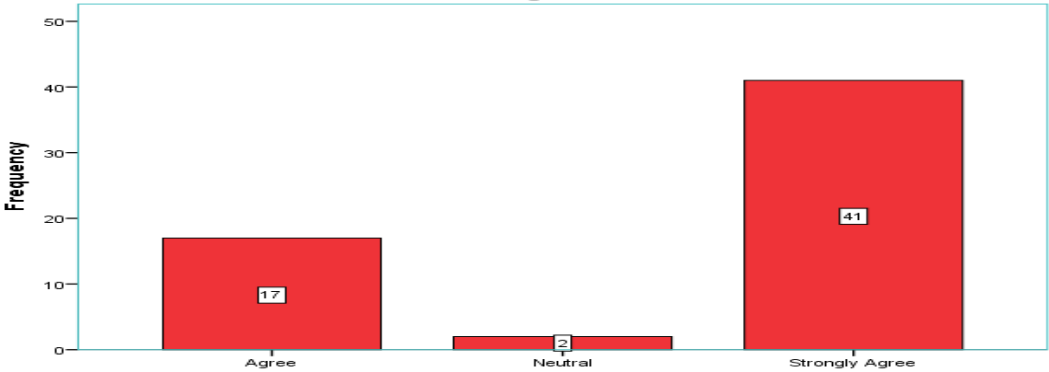
Figure 9: Digital technologies have the potential to fundamentally transform the way we work in an organization?

In table 3, figure 9, the results show that 68.3% (41) of respondent are strongly agreeing that digital have the potential to fundamentally transform the way we work in an organization, 28.3% (17) are agreeing too and 3.3% (2) are neutral.

Question 4
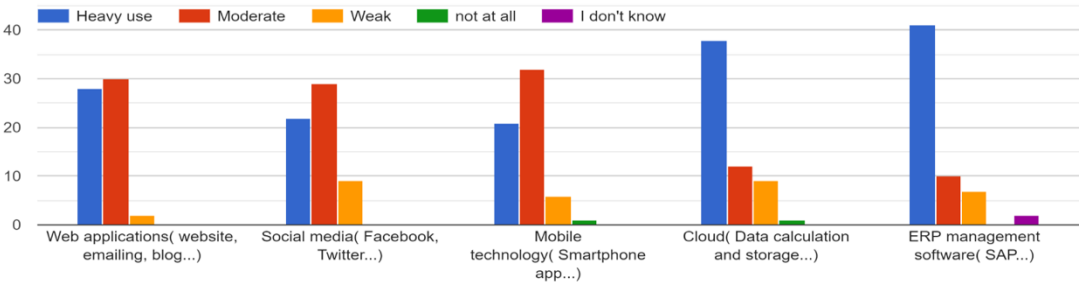
Figure 10: To what extent does your organization use the following digital technologies?

41

Based on figure 10, ERP management software was the most chosen by the respondents, Cloud comes in the second round, web applications, social media, and then mobile technology. We can notice from this figure that Moroccan companies are on their way in integrating digitalization thanks to the heavy use of digital technologies.

Question 5

Table 4: On a scale of 1 to 10, how would you rate your organization in its digital transformation strategy?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1	1,7	1,7	1,7
	4	2	3,3	3,3	5,0
	6	2	3,3	3,3	8,3
	7	6	10,0	10,0	18,3
	8	12	20,0	20,0	38,3
	9	26	43,3	43,3	81,7
	10	11	18,3	18,3	100,0
	Total	60	100,0	100,0	

Based on the table and the figure, 43.3% (26) of the respondent had given a rate of 9 to their organization's digital transformation strategy. The results showed us that Moroccan companies are referring to digital transformation which is a good sign to the development of the country.
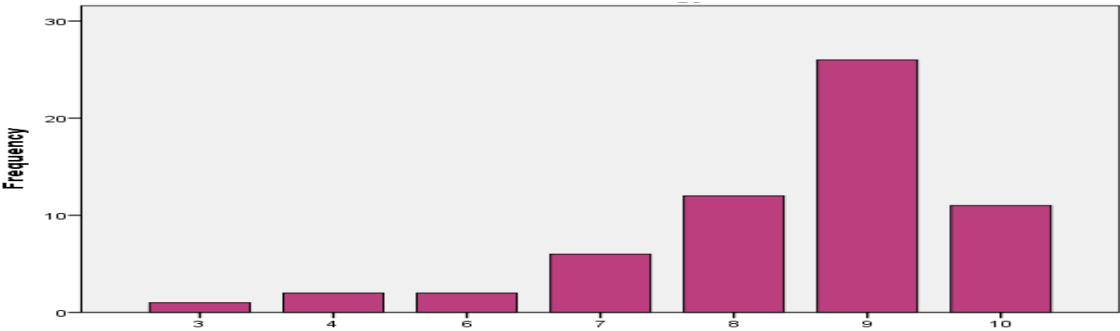
Figure 11: On a scale of 1 to 10, how would you rate your organization in its digital transformation strategy?
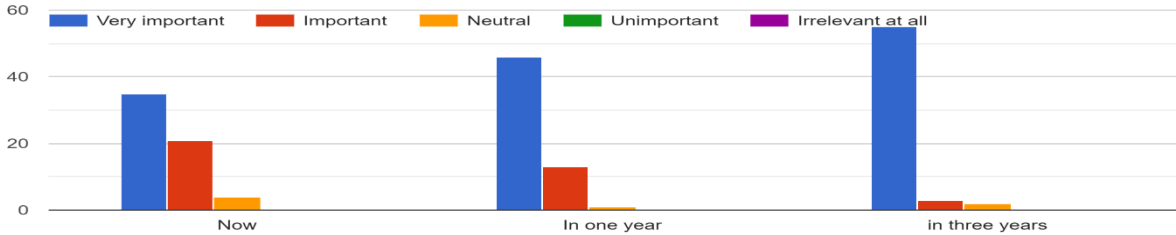
Question 6

Figure 12: How important are digital technologies from a point of view temporal in your organization?

The figure12 is demonstrating the importance of digital technologies year after year, like we can see 37 respondents are convinced that the implementation of these technologies is very important to their organization at the moment, 48 are agreeing its importance in one year and 55 of these respondents had seen that it will be more important within 3 years.

Question 7

Table 5: How big is the disruption of digital technologies in your industry or sector?

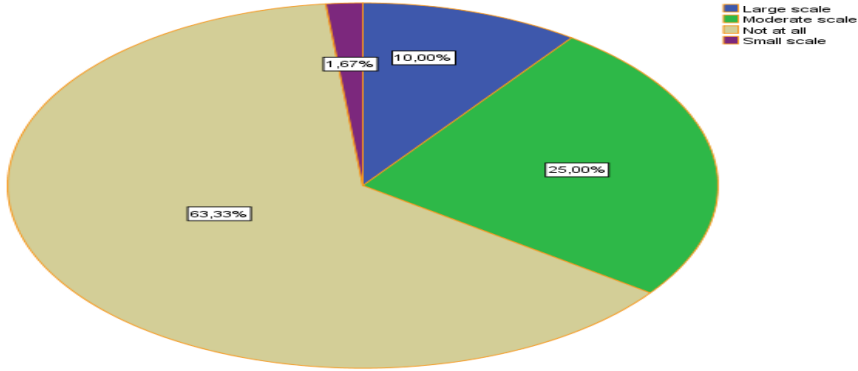|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Large scale	6	10,0	10,0	10,0
	Moderate scale	15	25,0	25,0	35,0
	Not at all	38	63,3	63,3	98,3
	Small scale	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

Figure 13: How big is the disruption of digital technologies in your industry or sector?

Based on the table 5 and figure 13, 63.3% (38) of respondents confirmed that there is no disruption following the adoption of digital technologies in their industry, 25% (15) of respondents are seeing that there is a moderate scale and 10% (6) of them admire that there is a large scale.

Question 8

Table 6: Does your organization see digital technologies as opportunities?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	18	30,0	30,0	30,0
	Strongly agree	42	70,0	70,0	100,0
	Total	60	100,0	100,0	

Figure 14: Does your organization see digital technologies as opportunities?

According to the table and figure all the respondents are agreeing that the digital technologies are an opportunity to their organization.

Question 9

Table 7: Does your organization see digital technologies as threats?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	6	10,0	10,0	10,0
	Disagree	22	36,7	36,7	46,7
	Neutral	3	5,0	5,0	51,7
	Strongly agree	6	10,0	10,0	61,7
	Strongly disagree	23	38,3	38,3	100,0
	Total	60	100,0	100,0	
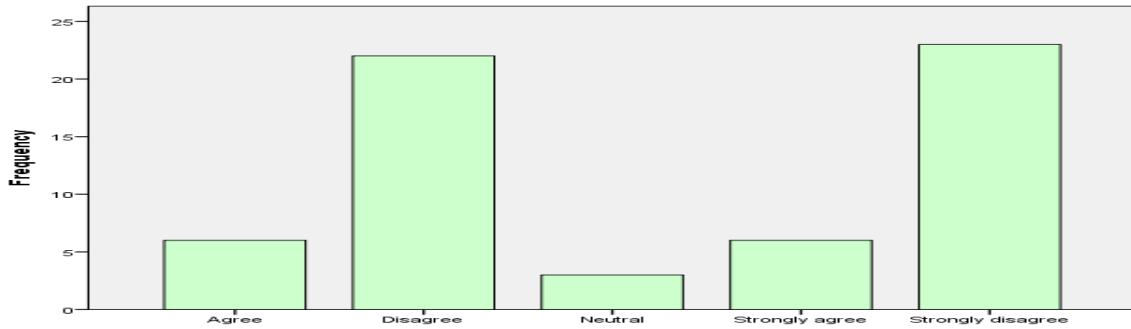
Figure 15: Does your organization see digital technologies as threats?

Based on the table 7 and the figure 15, the results show that 75% of respondents are not seeing digital technologies as threats, while 20% are confirming that it could represent a threat to their organization and 5% are neutral.

Question 10

Figure 16: Are you confident in your organization's willingness to respond to digital trends?

According to the figure 70% of the respondents showed their confidence in their organization's willingness to respond to digital trends.

Question 11

Figure 17: How would you qualify your organization?

Based on the figure17, most of the respondents are agreeing that their organization is innovative, collaborative and have the ability to respond quickly to threats and opportunities compared to their competitors.

Question 12

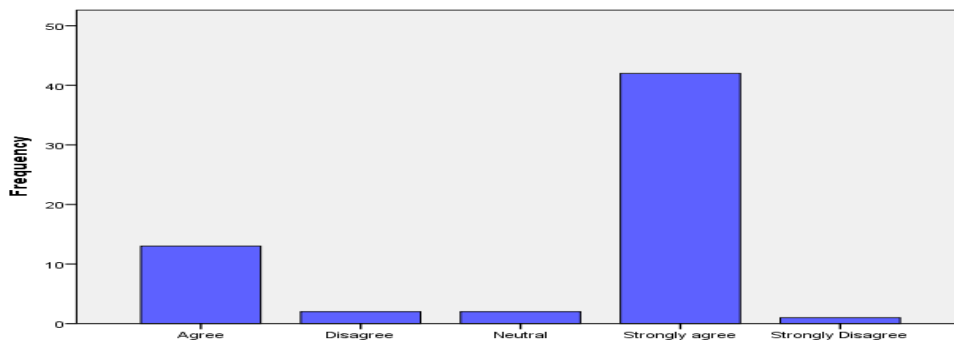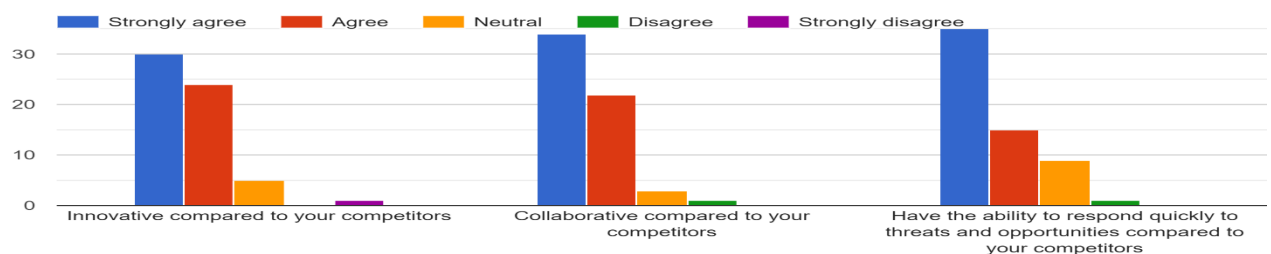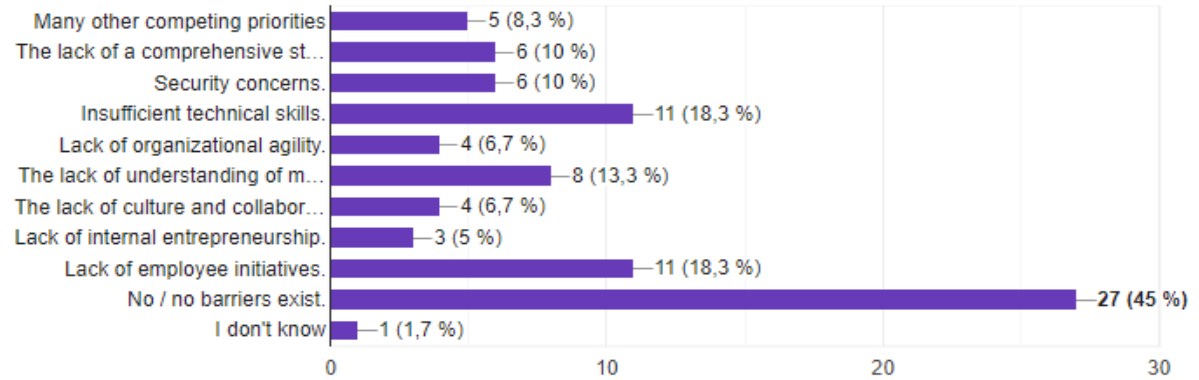*Figure 18: What are the obstacles preventing your organization from taking advantage of digital trends?*

Based on the figure's results, 45% of respondents confirmed that there are no barriers preventing their organization from taking advantage of digital trends, 18.3% said that obstacles may be the lack of employee initiatives and insufficient technical skills. 13.3% of them noticed that the lack of understanding of modern management could be an obstacle, for 10% security concerns and the lack of comprehensive strategy are the obstacles.

Question 13

Table 8: Is there a person or group in charge of overseeing your organization's digital strategy?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I don't know	1	1,7	1,7	1,7
	No.	4	6,7	6,7	8,3
	Yes.	55	91,7	91,7	100,0
	Total	60	100,0	100,0	
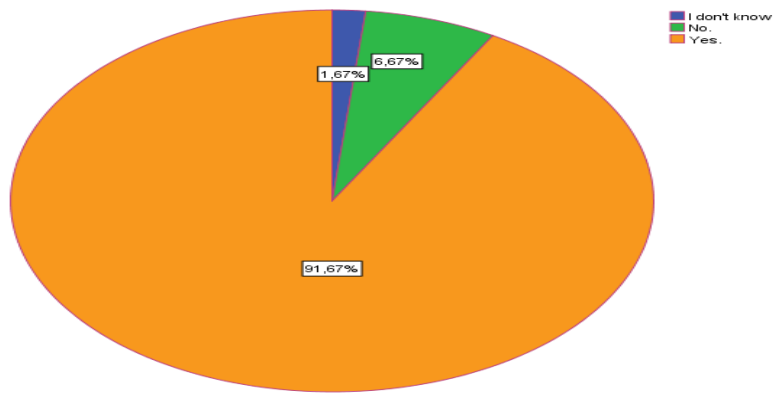
Figure 19: is there a person in charge of overseeing your organization's digital strategy?

Based on the table 8 and figure 19, 91.67% of the respondents are confirming that there is a person in charge of the digital strategy in their organization, while 6.67% said that there is no person.

Question 14

Table 9: What is the highest level whose job is to oversee / manage your organization's digital strategy?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CEO	7	11,7	11,7	11,7
	CEO, Director, Manager	1	1,7	1,7	13,3
	Director	13	21,7	21,7	35,0
	Director, Manager	2	3,3	3,3	38,3
	I don't know	2	3,3	3,3	41,7
	Manager	17	28,3	28,3	70,0
	Staff coordinator	9	15,0	15,0	85,0
	Vice-president or president of a unit	5	8,3	8,3	93,3
	Vice-president or president of a unit, Director	1	1,7	1,7	95,0
	Vice-president or president of a unit, Director, Manager	1	1,7	1,7	96,7
	Vice-president or president of a unit, Director, Manager, Staff coordinator	1	1,7	1,7	98,3
	Vice-president or president of a unit, Staff coordinator	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

Based on the table, 28.3% of respondent confirmed that the highest level whose job is to manage digitalization in the company is the Manager, 21.7% confirmed that it could be the Director and other answers show that it may be more than one level.
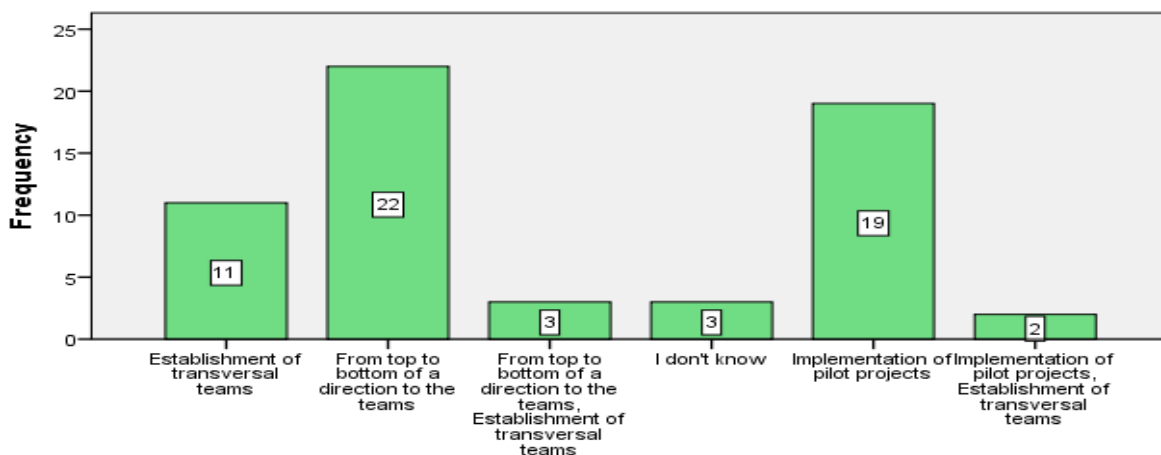
Question 15

Figure 20: How does your organization implement digital initiatives?

Based on figure 20, 22 respondent confirmed that their organization implement digital from top to bottom of a direction to the teams, for 19 it was the implementation of pilot projects, 11 chose the establishment of transversal teams, 3 respondents said it was from top to bottom of a direction to teams and the establishment of transversal teams, for 2 it was the implementation of pilot projects and the establishment of transversal teams and for 3 respondents they didn't know the digital initiatives taken by their organization.

Question 16

Table 10: Does your organization have enough leadership and experience to embark on a digital strategy?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Agree	13	21,7	21,7	21,7
	Disagree	2	3,3	3,3	25,0
Valid	Neutral	7	11,7	11,7	36,7
	Strongly agree	38	63,3	63,3	100,0
	Total	60	100,0	100,0	

According to the table 10, 85% of respondents agree that their organization have enough leadership and experience to embark on digital strategy, while 11.7% are neutral and 3.3% don't agree.

Question 17

Table 11: Do your employees and collaborators have enough skills and experience to execute the digital strategy?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Agree	17	28,3	28,3	28,3
	Disagree	2	3,3	3,3	31,7
Valid	Neutral	5	8,3	8,3	40,0
	Strongly agree	36	60,0	60,0	100,0
	Total	60	100,0	100,0	

According to table 11, 60% of respondents strongly agree that employees and collaborators in their organization have enough skills and experience to execute the digital strategy, 28.3 are agreeing, 8.3% are neutral and 3.3% disagree this fact.

Question 18

Table 12: How important is it to you to work in a leading digital company?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Important	8	13,3	13,3	13,3
	Neutral	1	1,7	1,7	15,0
Valid	Unimportant	1	1,7	1,7	16,7
	Very important	50	83,3	83,3	100,0
	Total	60	100,0	100,0	

Based on the table 12, 83.3% (50) of respondents saw that it is very important to work in a leading digital company,13.3% (8) said that it's important, for 1.7% it is not important and 1.7% are neutral.

The profile of your organization
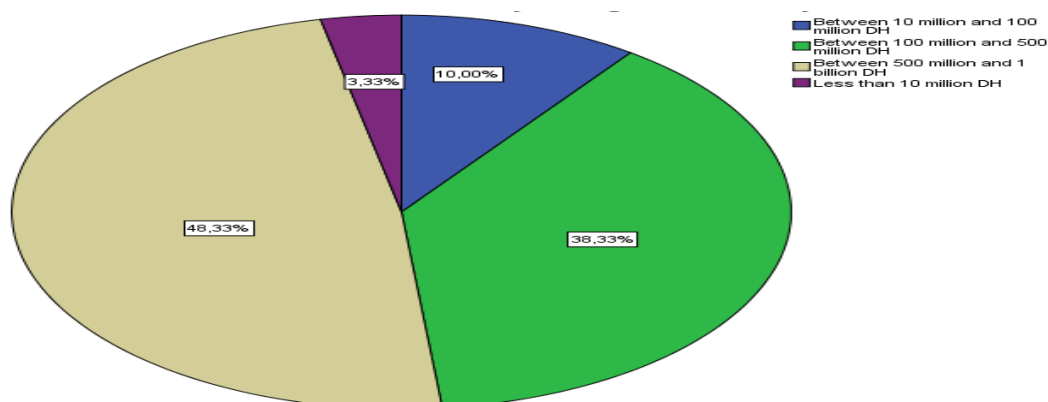
Question 19

Figure 21: what is the turnover of your organization last year?

According to the figure 21, 48.33% of respondents' organization's turnover was between 500 million and 1 billion DH, 38.33% of them was between 100 million and 500 million DH, 10% of them was between 10 million and 100 million DH and 3.33% was less than 10 million DH.

Question 20:

Table 13: What is the number of your employees?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Between 1 000 and 5 000	6	10,0	10,0	10,0
	Between 1 and 100	19	31,7	31,7	41,7
	Between 10 000 and 100 000	2	3,3	3,3	45,0
	Between 100 and 500	19	31,7	31,7	76,7
	Between 5 000 and 10 000	4	6,7	6,7	83,3
	Between 500 and 1 000	8	13,3	13,3	96,7
	Over 100 000	2	3,3	3,3	100,0
	Total	60	100,0	100,0	

As we can notice from the table 13 that, 31.7% of respondents confirmed that the number of their organization's employees is between 1 and 100, 31.7% said that it is between 100 and 500, for 13.3% of respondents they are between 500 and 1000, 10% said that it is between 1000 and 5000, 6.7% responded that it is between 5000 and 10000 and 3.3% confirmed that it is between 10000 and 100000 and also over 100000.
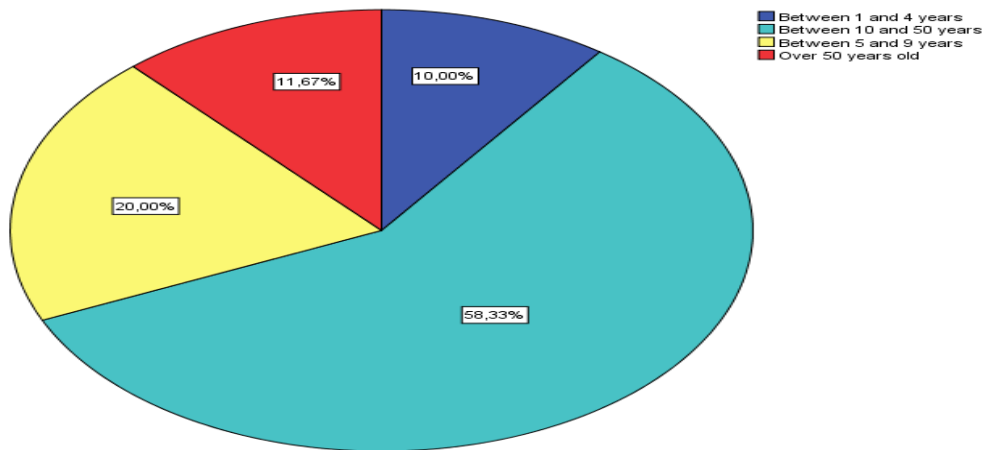
Question 21

Figure 22: how many years has your organization existed?

Based on the figure 22, 58.33% of respondents said that their organizations existed between 10 and 50 years, for 20% it was between 5 and 9 years, 11.67% confirmed that it has over 50 years old and 10% their organizations existence is between 1 and 4 years.
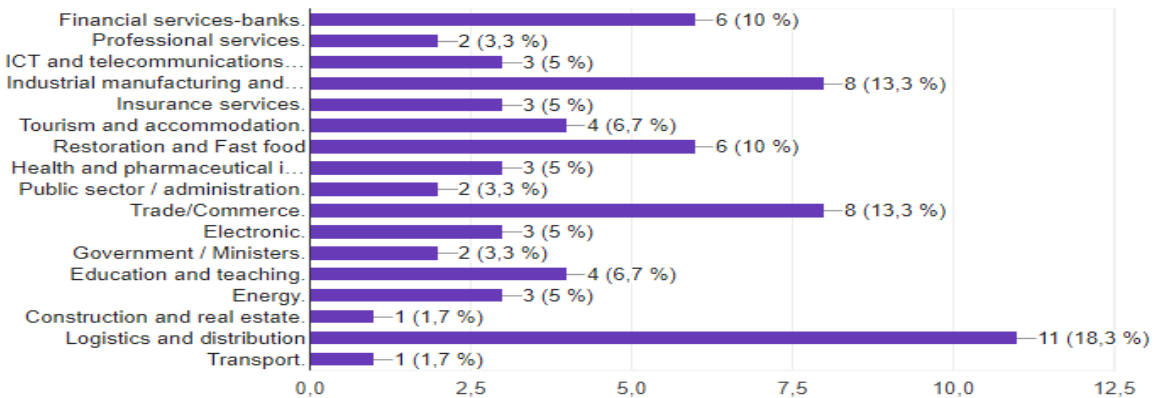
Question 22

Figure 23: What is your organization's primary industry?

Based on figure 23, 18.3% are logistics and distribution industry, 13.3% are trade/ commerce industry, 13.3% are industrial manufacturing and engineering, 20% are both financial services-banks and restoration/fast food, while other respondent's organizations have different primary industry.

Respondent profile

Question 23

Table 14: What is your primary function within your organization?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Commercial	5	8,3	8,3	8,3
	Executive management	15	25,0	25,0	33,3
	Finance	3	5,0	5,0	38,3
	HR	3	5,0	5,0	43,3
	IT	5	8,3	8,3	51,7
Valid	Logistics	11	18,3	18,3	70,0
	Marketing	4	6,7	6,7	76,7
	Operations	12	20,0	20,0	96,7
	QHSSE	1	1,7	1,7	98,3
	Teaching	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

Based on table 14, 25% of respondent's primary function within their organization is Executive management, 20% is Operations, 18.3% is Logistics, 8.3% is Commercial and IT, 6.7% is Marketing, 5% is HR and Finance and 1.7% is QHSSE and Teaching.
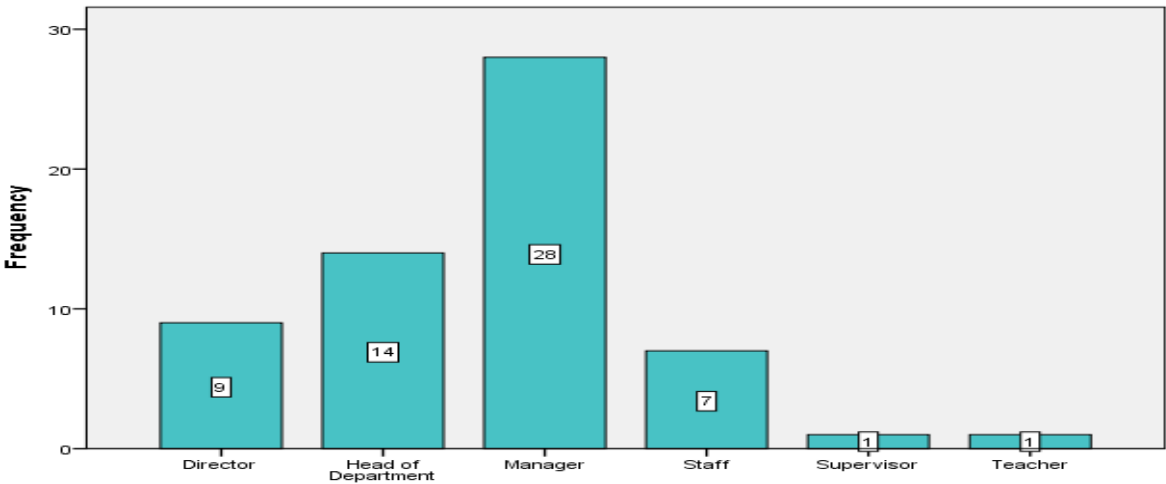
Question 24

Figure 24: What is your hierarchical position?

Based on figure 24, 28 respondents are Managers, 14 are Head of department, 9 are Directors, 7 are Staff, one Supervisor and one Teacher.

Question 27

Table 15: What is the degree of your mastery of new technologies?

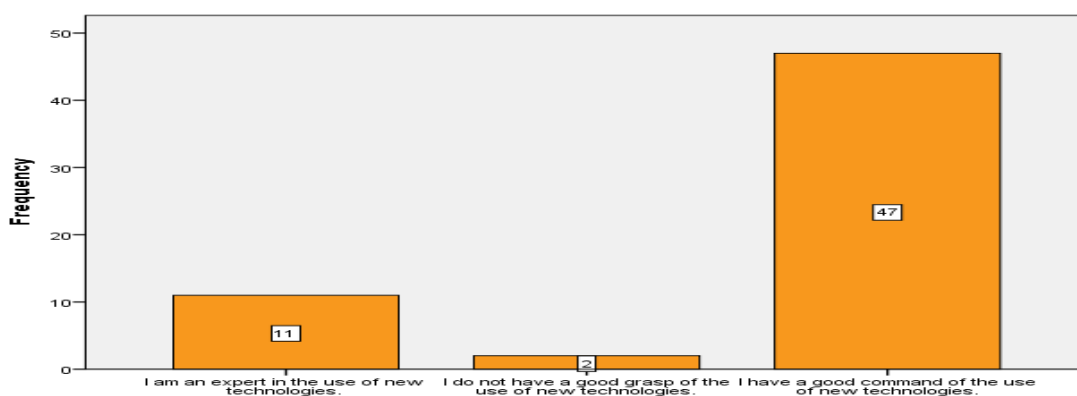|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I am an expert in the use of new technologies.	11	18,3	18,3	18,3
	I do not have a good grasp of the use of new technologies.	2	3,3	3,3	21,7
	I have a good command of the use of new technologies.	47	78,3	78,3	100,0
	Total	60	100,0	100,0	

Figure 25: What is the degree of your mastery of new technologies?

Based on table 15 and figure 25, 78.3% of respondents confirmed that they have a good command of the use of new technologies, 18.3% said that they are experts and 3.3% said that they do not have a good grasp of the use of new technologies.

Demographic information:

Question 25

Table 16: What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Between 20 and 30 years old	25	41,7	41,7	41,7
	Between 30 and 40 years old	27	45,0	45,0	86,7
	Between 40 and 50 years old	5	8,3	8,3	95,0
	Between 50 and 60 years old	3	5,0	5,0	100,0
	Total	60	100,0	100,0	

Question 26

Table 17: Your sexe?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Female	22	36,7	36,7	36,7
Valid	Male	38	63,3	63,3	100,0
	Total	60	100,0	100,0	

According to the table 16, 45% of the respondent's age is between 30 and 40 years old, 41.7% is between 20 and 30 years old, 8.3% is between 40 and 50 years old and 5% is between 50 and 60 years old. We noticed from table 17 that 63.3% of respondents are Male, while 36.7% are Female.

4.2. Discussion:

The results of this first study prove that companies that are ahead in their digital transformation have intrinsic capacities and skills that allow them to take advantage of digital technologies. This confirms our hypothesis H1.

The capacity for innovation and collaboration thanks to internal resources where external skills are levers allowing companies to reach a developed level of maturity. We therefore confirm our H2 hypothesis.

In light of the results of our survey, it seems obvious that it is the capacity for innovation and collaboration, as well as the strategic vision that are the levers of digital transformation. The integration of new skills and the creation of new business models are necessary conditions for this transformation. This innovation process can be developed in an organization by establishing a culture of innovation using a set of techniques and processes that will allow teams to act in an entrepreneurial manner (Rowles & Brown, 2017).

This capacity for innovation is the first skill to transform a company into a digital company (Uhl & Alexander, 2014). It translates into a clear and defined innovation process, partnerships, as well as the integration of consumers as co-creators.

Only companies that will succeed in their digital transformations will be able to generate real benefits in terms of cost and performance savings, which could undoubtedly provide them with

competitive advantages to survive in an economy increasingly impacted by digitization and globalization.

Digital technologies indeed represent real sources of competitiveness for Moroccan companies in order to improve their growth, thanks in particular to Moroccan consumers increasingly familiar with the use of digital devices. From a macroeconomic point of view, digital can be an accelerator for the creation of new jobs and new digital businesses that will participate in the diversification of the business fabric and the still weak growth of ICT in Morocco's GDP.

5. Case study

5.1. The SCM in "Bontaz center Morocco" and its digitalization

After the questionnaire analysis we are informed now about the essential skills and capacities that allow the success of digital transformation of Moroccan companies, we noticed that most of them have succeed their digital transformation.

This questionnaire helped us to analyze the digital transformation and in order to answer our principal research question clearly here is the example of the adopted digital supply chain strategy within Bntaz Center. This company was chosen because it responds to our research question, thanks to the adoption of digital technologies in the supply chain process which confirms its role in increasing the organizational resilience during the pandemic situation in Morocco.

5.1.1. Presentation of BCM

World leader in automotive hydraulic functions:

Regularly awarded and recognized for the quality and reliability of its products, Bontaz is part of the automotive market as the leading supplier in the production of automotive hydraulic subassemblies.

	1985	1995	2012	2015	2017
CA	5 M €	20 M €	130 M €	190 M €	275 M €

Figure 26: Turnover of Bontaz center Morocco (https://www.bontaz.com/fr/chiffres-cles-1169)

The Bontaz-Center group began in 1965 in a small artisan workshop in Marnaz and its industrial development has gone through 4 major periods. For more than 50 years, Bontaz has developed internationally to get closer to local markets. Installed at 11 sites around the world, Bontaz continuously deploys its activities to be the world leader in hydraulic systems.

The Bontaz group works with the largest automobile manufacturers and supports them in the development of intelligent sub-assemblies.

Logistics process:

Among one of its various trades, we find logistics: supply chain, customs, international management, operational logistics (warehouse keeper, manager, handler, etc.).

The purpose of this process is to manage the physical flows as well as the informative data of BCM, in order to make available the resources corresponding to the needs. And this while respecting the expected economic conditions and the expected level of service quality.

Procurement process:

Procurement is one of the important steps in the logistics process and BCM adopts a procedure at this level to define and monitor the flow of raw materials as well as the establishment of the procurement plan.

The procurement function aims to obtain appropriate materials (meeting quality standards) while ensuring that it arrives at the desired place at the right time.
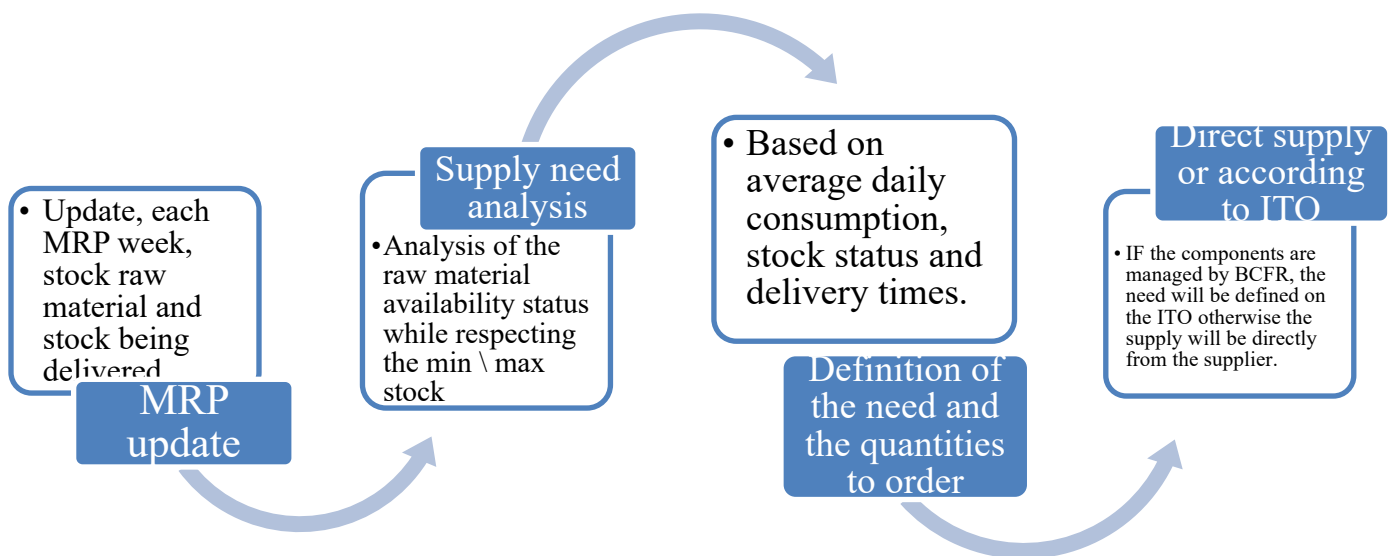

Figure 27: BCM procurement procedure (own made process)

5.1.2. Subject positioning

The project is taking place at the level of the logistics and purchasing department of Bontaz-Center Maroc and the objective of which is the adoption of logistics **Traceability** as a new technology towards the digitization of the supply chain.

Figure 28: Bontaz Center Morocco logistics service organization chart (Bontaz company)

What is Traceability?

The aim of logistics traceability is to ensure the quantitative monitoring of products, their location as well as their destination and origin through all links of the logistics chain from manufacture to consumption.

Figure 29: Traceability (https://logicams.com/tracabilite-des-flux-logistiques/)

Goals:

- Load control.
- The follow-up of orders and stocks.
- Receipt of goods.
- Goods tracking.
- Compliance with very strict regulations.
- Reduction of human errors.
-

Traceability of the supply chain within BCM:

in logistics, traceability refers to the possibilities to trace goods along a supply chain, using different types of identity numbers, such as lot numbers or different associated data.

Among the challenges of traceability within BCM, we find:

- The improvement of the performance and resilience of the company thanks to the better visibility on the operations brought by the traceability.
- Costs related to possible incidents.
- Insurance costs linked to the risk presented by the company.
- A degradation of the image in the event of an alert illness or which is not mastered.
- loss of competitiveness.

stock management traceability:

BCM have adopted stock management traceability which objective is to improve the efficiency of information flows concerning:

- Product availability;
- The location of each product;
- The traceability of each article, that is to say information including the name of the product, its designation, its batch number as well as its expiry date and price;
- The quantity remaining in stock for each product;
- Anticipate stockouts.

Why BCM decided to adopt the traceability?

- Plan supplies in anticipation of purchases.
- Increase reliability and automate replenishment.
- Best meet of customer demands.
- Avoid stock errors.
- Control internal physical flows in warehouses in order to increase productivity.
- Reduce logistics costs.

To achieve traceability, this company has chosen to use bar codes which allow the representation of the codification of information relating to a product. the latter is optimized so that it can be read by an optical reader (the laser reader).

Figure 30: Traceability within BCM (Bontaz company)

5.2. Changes and increases on organizational resilience

In the field of emergency management, resilience implies an adaptation of resources and skills in order to maintain a satisfactory level of functioning. It can also be approached as a complex set of adjustments within a system facing a situation that puts it in difficulty and from which it can thus emerge strengthened.

First of all, organizations that are resilient in the face of emergency situations are characterized by a strong culture of experimentation and risk, a high level of trust (Colquitt, LePine, Zapata & Wild, 2017), flexible and adapted leadership. to sources of expertise, procedures and precisely defined rules (Jahn, 2016). However, organizational culture, doctrine and routines can also become obstacles to resilience if actors fail to rapidly transform their practices when the situation does not allow procedures to be applied. The capacity for innovation is therefore a prerequisite for resilience.

The adoption of technologies in the field of the supply chain implies impacts on the latter, especially with the rapid emergence of cutting-edge tools that companies are striving to take advantage of, which has led to the emergence of the Digital Supply Chain or also Supply Chain 4.0. Moreover, the supply chain 4.0 will create a competitive advantage illustrated in the availability of product offerings, the reduction of costs and also in the increase in market share (Swanson, 2017). the digitization of the supply chain makes it possible to offer products and services through efficient processing of supply chain processes within companies.

As well, the context of collaboration and interaction between companies will undergo considerable changes due to the implementation of the digitization of the supply chain, focused on smart technologies. According to (Tan and al., 2015) the adoption of digital technologies in logistics processes, allows to create new capacities and innovations in its last through new options of management and exploitation of big data.

The implementation of the DSC has also identified some impacts such as the integration of physical flows with digital technologies, improving the visibility of the supply chain, responsiveness, robustness and resilience while allowing the optimization of organizational resilience and performance (Gunasekaran and al., 2017).

The DSC makes it possible to face the obstacles linked to traditional logistics chains (Queiroz et al., 2019a). While (Korpela et al., 2017) indicate that the DSC brings speed to manual operations via digitalized information flows

5.3. Discussion

As governments and healthcare organizations work to stop the spread of COVID 19 and treat those infected, several businesses around the world are struggling to deal with the growing impact of the coronavirus pandemic on their supply chains, to the point where several factories had to shut down or significantly reduced their production.

With extended quarantine periods, businesses face labor shortages and the challenge of operating with significant labor disruption; Bontaz Center Morocco was one of the Moroccan companies that had to reduce its labor.

At this stage, and since the role of laborers within BCM is important. To remain resilient, the solution adopted was the digitalization of its supply chain process by implementing new way of working so that the luck of the workforce wouldn't affect its productivity.

Traceability management through the supply chain involves the integration of information flow and physical flow of traceable items, each factor must perform its own role properly in order to make the whole chain functional and meet the certain traceability requirement.

In order to implement traceability within BCM from the concept into action, it must be managed by setting up a traceability system. The bar code was the solution to deal with the need to reduce the workforce. Bar codes provide a rapid, accurate, and low-cost approach to encode information which can be easily read by inexpensive electronic readers. The

emergence of bar code has improved the efficiency of handling process along the supply chain and made great contribution to traceability. This automatic, high reading speed, precise technology provides simpler, more economical, and accurate traceability systems.

The case study answered our research question clearly, by showing how Bontaz Center Morocco had implemented new digital technology to remain resilient and to continue its activity during the pandemic situation with a small number of employees,

The coronavirus is therefore teaching us that we need more resilient supply chains.

6. Conclusions and recommendations

Organizational resilience following an event major supposes two dimensions which are the capacity to resist or limit the incident, and the ability to resolve the impact. In the context of a supply chain, this definition assumes that physical and information flows regain continuity after a break, but also that a better capacity for resilience might have made it possible to avoid this break. The development of this capacity is obtained through learning phenomena shared by the partners in the chain that allow them to adapt by making decisions that will have the vocation of reducing the impacts of crises and managing them more effectively.

The objective of such a system is to analyze all the modifications of the strategic parameters relating to each actor and, by the real-time transmission of this information, to allow a dynamic adjustment of the organization and therefore to increase its capacity of resilience.

The crisis seen as an opportunity leads to more collaborative approaches based on collective decision-making processes. From an organizational standpoint, the logistics chain can then be considered as a vector of both technological and inter-organizational innovations. The key resilience factors of communication, piloting skills and people could then provide the basis for a distinctive sustainable skill and lead us to rethink organizational models based on speed and acceleration.

Companies continually review their supply chain management practices to optimize performance. While the current focus is on managing the immediate needs arising from the crisis, the COVID-19 pandemic has revealed some weaknesses in global supply chains. Once the crisis is over, this experience may lead companies to pay more attention to the following factors:

- **Digital solutions:** It is becoming increasingly relevant to opt for telecommuting, to remotely manage supplier relationships, and to verify data and contracts digitally. While some companies can automate their supply chain management systems, others still rely heavily on manual management for onboarding, quality assurance, preparation of bills of lading ... While replacing existing systems can be costly, the relevance of digital solutions will likely be reconsidered after the COVID-19 crisis. As a result, the issues of data privacy and security will become more important than ever, as digitization increases the risk of fraud and cyberattacks. Blockchain technology, which includes a digital ledger to securely verify and validate data, could then offer some protection.

- **Supplier listing and diversification:** The extent of the disruption in supply chains - which is likely to continue for some time to come - has revealed how important it is to be able to quickly find replacement suppliers, shift production to other facilities, and integrate new suppliers. It remains to be seen whether global supply chains will challenge their dependence on China as a manufacturing hub.

- **Supply contracts:** As suppliers struggle to meet their contractual obligations due to containment, mandatory business closures, labor shortages and trade restrictions, companies are scrutinizing contractual terms and responsibilities more carefully. Major force clauses generally stipulate the conditions under which a company's poor performance can be excused. Determining whether major force clauses apply to COVID-19 will require checking the exact wording of the contracts, which can vary widely.

- **Workforce Management:** The ability of companies to overcome current challenges is closely linked to the quality of their management and the effectiveness of their operations maintenance, risk management and workforce management protocols. The ongoing pandemic reveals how companies manage the health and safety of their employees, their work practices and standards, and their ability to operate despite restrictions affecting their workforce. These issues will remain important during and after the pandemic.

References

1. Erik Hofmann, Henrik Sternberg, Haozhe Chen, Alexander Pflaum, Günter Prockl (2019) Supply chain management and Industry 4.0. International Journal of Physical Distribution and Logistics Management.

2. Barbara LYONNET, Marie-Pascale SENKEL, Sylvie CLAMENS (2019). Supply Chain Management: Evolution, perspective, and risks.

3. David L. Anderson, Frank F. Britt, and Donavon J. Favre, "The Seven Principles of Supply Chain Management, Supply Chain Management Review, (1997).

4. Prachi Juneja, Reviewed by Management Study Guide Content Team. MSG Content Team comprises experienced Faculty Member, Professionals and Subject Matter Experts.ISO 2001:2015 Certified Education Provider. https://www.managementstudyguide.com/logistics-and-supply-chain-management.htm.

5. Okano, M.T. IOT and industry 4.0: The industrial new revolution. In Proceedings of the International Conference on Management and Information Systems September, Istanbul, Turkey, 17–20 October 2017.

6. Queiroz, M.M., Telles, R. & Bonilla, S.H. (2019), "Blockchain and supply chain management integration: a systematic review of the literature", Supply Chain Management: An International Journal, doi: 10.1108/SCM-03-2018-0143.

7. Ambulkar, S., J. Blackhurst, S. Grawe (2015). Firm's resilience to supply chain disruptions: Scale development and empirical examination. Journal of Operations Management, 33(34), 111–122.

8. Ambulkar, S., J. Blackhurst, S. Grawe (2015). Firm's resilience to supply chain disruptions: Scale development and empirical examination. Journal of Operations Management, 33(34), 111–122.

9. Ben-Daya, M., Hassini E., & Bahroun Z. (2018). Internet of things and supply chain management: a literature review. International Journal of Production Research, DOI: 10.1080/00207543.2017.1402140.

10. Ivanov, D., Dolgui A., Das A., Sokolov B. (2019). Digital supply chain twins: Managing the Ripple effect, resilience and disruption risks by data-driven optimization, simulation, and visibility, in Ivanov D. et al. (Eds.) Handbook of Ripple Effects in the Supply Chain. Springer, New York, pp. 309-332.

11. Dubey R., Gunasekaran A., Childe, S. J. Wamba S.F., Roubaud D., Foropon C. (2019). Empirical Investigation of Data Analytics Capability and Organizational Flexibility as Complements to Supply Chain Resilience. International Journal of Production Research, https://doi.org/10.1080/00207543.2019.1582820.

12. Catherine Philonenko, Industry 4.0 or Factory of the Future, 2020.

13. Ali, A., A. Mahfouz, & A. Arisha. 2017. "Analysing Supply Chain Resilience: Integrating the Constructs in a Concept Mapping Framework via a Systematic Literature Review." Supply Chain Management: An International Journal 22 (1): 16–39.

14. Swan, M. (2017). Anticipating the economic benefits of blockchain. Technology Innovation Management Review, 7(10), 6–13.

15. Queiroz, M. M., D. Ivanov, A. Dolgui, & S. F. Wamba. 2020. "Impacts of Epidemic Outbreaks on Supply Chains: Mapping a Research Agenda Amid the COVID-19 Pandemic Through a Structured Literature Review." Annals of Operations Research. https://doi.org/10.1007/s10479-020-03685-7.

16. A. Belhadi, S. Kamble, C.J.C. Jabbour, A. Gunasekaran, N.O. Ndubisi, M. VenkateshManufacturing and service supply chain resilience to the COVID-19 outbreak: lessons learned from the automobile and airline industries Technol. Forecast. Soc. Change, 163 (May 2020) (2021), Article 120447.

17. Mathieu J.-P. (1991), *Dictionnaire de physique*, Paris, Masson, 567 p.

18. Logistics Management Magazine, H.Coleman, 2017.

19. H.Ambre, evolution of the concept of SCM, 2019.

20. Luc Perrin, Supply chain: digitize to remain competitive, 2019.

21. Mark Sen Gupta, industry trends, 2020.

22. Coutu P. (2002) 'How Resilience Works', *Harvard Business Review.* 80(5), pp. 46–50.

23. Mark Sen Gupta, industry trends, 2020.

24. Jack Grimshaw, Digitization Vs Digitalization: differences and examples 2018.

25. BÜYÜKÖZKAN FEYZİOĞLU & Gocer, 2018. Digital supply chain.

26. Ehie & Ferreira, 2019. Conceptual development of supply chain digitalization.

27. Hofmann & Rüsch, 2017. Industry 4.0 and the future prospects on logistics.

28. Wamba et al., 2015.How big data can make big impact, international journal of production and economics 165-246.

29. Madni A, Jackson S (2009). Towards a conceptual framework for resilience engineering. IEEE Systems Journal, 3 (2), p. 181-191.

30. Wamba, S. F., Queiroz, M. M., Roscoe, S., Phillips, W., & Kapletia, D. (2021). Guest editorial Emerging technologies in emergency situations. International Journal of Operations & Production Management, 41(9), 1405-1416. https://doi.org/10.1108/IJOPM-09-2021-904

31. Kache & Seuring, 2017.Challenges and opportunities of digital information: Big data and SCM.

32. Alter et al., 2016; Dubey et al., 2020; Wamba et al., 2017.Big data analytics and artificial intelligence.

33. Wamba-Taguimdje et al, 2020.The special issue on artificial intelligence.

34. Okano, 2017. Industry 4.0: the industrial new revolution 75-82.

35. Al-Saqaf & Seidler, 2017. Blockchain technology for social impact.

36. Queiroz et al, 2019. Industry 4.0: Digital supply chain capabilities.

37. Culot, G., Nassimbeni, G., Podrecca, M., & Sartor, M. (2019). The ISO/IEC 27001 information security management standard: literature review and theory-based research agenda. The TQM Journal, 33(7), 76-105. https://doi.org/10.1108/TQM-09-2020-0202

38. Madni & Jackson (2018). The four axes of organizational resilience.

Appendices

Appendix 1: Questionnaire on "Skills and essential capacities for a successful digital transformation in Moroccan companies "

As part of an academic research on the impact of the digital transformation of Moroccan companies, we invite you to take 5 minutes of your time to answer our anonymous questionnaire.

By digital transformation we mean the integration of digital tools in improving customer relations, offering digital products and services, and digitizing internal processes.

*Obligatory

1.   Digital is present in the activities of your organization? *
Example: Your organization has a dynamic website, where your customers get information and contact you. You are present in social networks.

- ⭕ Strongly agree
- ⭕ Agree
- ⭕ Neutral
- ⭕ Disagree
- ⭕ Strongly Disagree

2.   What do you think are the objectives of your organization's digital strategy? *

- ☐ Radically transforms business processes and / or business models.
- ☐ Improve customer engagement and experience.
- ☐ Improves innovation.
- ☐ Increase efficiency (example: saving time and rapid access to information).

3.   Digital technologies have the potential to fundamentally transform the way we work in an organization? *

- ⭕ Strongly Agree
- ⭕ Agree
- ⭕ Neutral
- ⭕ Disagree
- ⭕ Strongly Disagree

4. To what extent does your organization use the following digital technologies? *

	Heavy use	Moderate	Weak	not at all	I don't know
Web applications(website, emailing, blog...)	◯	◯	◯	◯	◯
Social media(Facebook, Twitter...)	◯	◯	◯	◯	◯
Mobile technology(Smartphone app...)	◯	◯	◯	◯	◯
Cloud(Data calculation and storage...)	◯	◯	◯	◯	◯
ERP management software(SAP...)	◯	◯	◯	◯	◯

5. On a scale of 1 to 10, how would you rate your organization in its digital transformation strategy? *

	1	2	3	4	5	6	7	8	9	10	
Minimum score	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	Maximum score

6. How important are digital technologies from a point of view temporal in your organization? *

	Very important	Important	Neutral	Unimportant	Irrelevant at all
Now	◯	◯	◯	◯	◯
In one year	◯	◯	◯	◯	◯
in three years	◯	◯	◯	◯	◯

7. How big is the disruption of digital technologies in your industry or sector? *

◯ Large scale

◯ Moderate scale

◯ Small scale

◯ Not at all

◯ I don't know

8. Does your organization see digital technologies as opportunities? *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly Disagree

9. Does your organization see digital technologies as threats? *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

10. Are you confident in your organization's willingness to respond to digital trends? *

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly Disagree

11. How would you qualify your organization? *

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Innovative compared to your competitors	◯	◯	◯	◯	◯
Collaborative compared to your competitors	◯	◯	◯	◯	◯
Have the ability to respond quickly to threats and opportunities compared to your competitors	◯	◯	◯	◯	◯

12. What are the obstacles preventing your organization from taking advantage of digital trends? *
(Select up to three)

- [ ] Many other competing priorities
- [ ] The lack of a comprehensive strategy.
- [ ] Security concerns.
- [ ] Insufficient technical skills.
- [ ] Lack of organizational agility.
- [ ] The lack of understanding of modern management.
- [ ] The lack of culture and collaborative sharing between functions and units.
- [ ] Lack of internal entrepreneurship.
- [ ] Lack of employee initiatives.
- [ ] No / no barriers exist.
- [ ] I don't know
- [ ]

13.   Is there a person or group in charge of overseeing your organization's digital strategy? *

- ( ) Yes.
- ( ) No.
- ( ) I don't know

14.   What is the highest level whose job is to oversee / manage your organization's digital strategy? *

- [ ] CEO
- [ ] Vice-president or president of a unit
- [ ] Director
- [ ] Manager
- [ ] Staff coordinator
- [ ] I   don't know

15.   How does your organization implement digital initiatives? *

- [ ] From top to bottom of a direction to the teams
- [ ] Implementation of pilot projects
- [ ] Establishment of transversal teams
- [ ] I   don't know

16.   Does your organization have enough leadership and experience to embark on a digital strategy? *

- ( ) Strongly agree
- ( ) Agree
- ( ) Neutral
- ( ) Disagree
- ( ) Strongly Disagree

17. Do your employees and collaborators have enough skills and experience to execute the digital strategy? *

- ( ) Strongly agree
- ( ) Agree
- ( ) Neutral
- ( ) Disagree
- ( ) Strongly Disagree

18. How important is it to you to work in a leading digital company? *

- ( ) Very important
- ( ) Important
- ( ) Neutral
- ( ) Unimportant
- ( ) Irrelevant at all

The profile of your organization

19. What was the turnover of your organization last year? *

- ( ) Between 500 million and 1 billion DH
- ( ) Between 100 million and 500 million DH
- ( ) Between 10 million and 100 million DH
- ( ) Less than 10 million DH

20. What is the number of your employees? *

○ Over 100 000

○ Between 10 000 and 100 000

○ Between 5 000 and 10 000

○ Between 1 000 and 5 000

○ Between 500 and 1 000

○ Between 100 and 500

○ Between 1 and 100

○

21. How many years has your organization existed? *

○ Over 50 years old

○ Between 10 and 50 years

○ Between 5 and 9 years

○ Between 1 and 4 years

○ Less than 1 year

22. What is your organization's primary industry? *

☐ Financial services-banks.

☐ Professional services.

☐ ICT and telecommunications sector.

☐ Industrial manufacturing and engineering.

☐ Insurance services.

☐ Tourism and accommodation.

☐ Restoration and Fast-food Health and

☐ pharmaceutical industry.

Public ☐ sector / administration.

☐ Trade/Commerce.

☐ Electronic.

☐ Government / Ministers.

☐ Education and teaching.

☐ Energy.

☐ Transport

☐ Construction and real estate.

☐ Logistics and distribution

Respondent profile

23. What is your primary function within your organization? *

    ⚪ Executive management

    ⚪ IT

    ⚪ Marketing

    ⚪ Operations

    ⚪ HR

    ⚪ Finance

    ⚪ Commercial

    ⚪ Logistics

    ⚪ Other:

24. What is your hierarchical position? *

    ⚪ Director

    ⚪ Manager

    ⚪ Head of Department

    ⚪ Staff

    ⚪ Other:

25. What is your age? *

    ⚪ Over 60 years

    ⚪ Between 50 and 60 years old

    ⚪ Between 40 and 50 years old

    ⚪ Between 30 and 40 years old

    ⚪ Between 20 and 30 years old

26. Your sexe *

    ⚪ Female

    ⚪ Male

27. What is the degree of your mastery of new technologies? *

    ⚪ I do not have a good grasp of the use of new technologies.

    ⚪ I have a good command of the use of new technologies.

    ⚪ I am an expert in the use of new technologies.

Annex

Student DECLARATION

on authenticity and public assess of final master's thesis

Student's name: __Ghizlane SBAIHI___

Student's Neptun ID: ___CUXMGD_____

Title of the document: The role of supply chain digitalization in organizational resilience

Year of publication: ____2023_____

Department: Agricultural Logistics, Trade and Marketing

I declare that the submitted final thesis is my own, original individual creation. Any parts taken from another author's work are clearly marked, and listed in the table of contents.

If the statements above are not true, I acknowledge that the Final examination board excludes me from participation in the final exam, and I am only allowed to take final exam if I submit another final thesis.

Viewing and printing my submitted work in a PDF format is permitted. However, the modification of my submitted work shall not be permitted.

I acknowledge that the rules on Intellectual Property Management of Hungarian University of Agriculture and Life Sciences shall apply to my work as an intellectual property.

I acknowledge that the electric version of my work is uploaded to the repository system of the Hungarian University of Agriculture and Life Sciences.

Place and date: Gödöllő, 2023 year April month 29 day

Student's signature

Annex No. 2

STATEMENT ON CONSULTATION PRACTICES

As a supervisor of _Ghizlane SBAIHI____ (Student's name) _CUXMGD__ (Student's NEPTUN ID), I here declare that the final thesis has been reviewed by me, the student was informed about the requirements of literary sources management and its legal and ethical rules.

<u>I recommend</u>/don't recommend the final thesis to be defended in a final exam.

The document contains state secrets or professional secrets: yes   <u>no</u>*

Place and date: Gödöllő, 2023 year April month 29 day

_____
Internal supervisor