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The IoT –*Internet of Things*-in the purchasing and supplies sector in a logistics company –control of inputs and outputs of supplies in the warehouse[1]

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SUMMARY
The implementation of the Internet of Things (IoT) has revolutionized the logistics sector, providing greater efficiency, control and transparency in operations. IoT enables real-time monitoring of supplies, tracking products from production to delivery, identifying bottlenecks and process failures, and making more informed and strategic decisions. Furthermore, the use of smart devices, tracking and data analysis systems, and artificial intelligence are some of the main technologies available to achieve these goals. Keywords: IoT, logistics, supply chain, technologies, monitoring, efficiency.

ABSTRACT

The implementation of the Internet of Things (IoT) has revolutionized the logistics sector, providing greater efficiency, control, and transparency in operations. IoT allows real-time monitoring of supplies, tracking products from production to delivery, identifying bottlenecks and flaws in processes, and making more informed and strategic decisions. Additionally, the use of smart devices, tracking systems, data analysis, and artificial intelligence are some of the key technologies available to achieve these objectives.
Keywords: IoT, logistics, supply chain, technologies, monitoring, efficiency.

1 INTRODUCTION

The integration of technologies is expanding more and more, increasing their scope and application possibilities. As a result, technologies have an increasing power to transform the business world, where innovation is shaping the way large companies operate. Companies are injecting ideas, possibilities and real solutions into the massive connection of devices that is emerging.

The application of new technologies in the logistics sector has caused a true revolution, interfering with the economy, competitiveness and market efficiency and bringing modernization to management. The technology applied to control the entry and exit of supplies in a warehouse allows consumption control and presents itself as a tool for efficient management, enabling adequate purchasing planning and avoiding waste due to lack of planning.

Therefore, the implementation of IoT technology as an instrument for resource management, both in the public and private sectors, would give rise to more transparent management and optimization of finances. These innovations are also necessary in the areas of logistics, making them more integrated into the value chain and can be activated when necessary.

Furthermore, the use of IoT in the operations area can bring great benefits to the supply chain, allowing the tracking and monitoring of products from production to delivery to the end customer. With IoT, companies can obtain a more accurate and real-time view of their operations, allowing the identification of bottlenecks and the adoption of measures to optimize processes (SANTOS, 2018).

IoT can also be applied to the monitoring of industrial equipment, allowing the collection of real-time data on the performance of this equipment, which can lead to a reduction in maintenance costs and downtime (FABRICIO, 2018). Furthermore, IoT can be used to generate ncement of spindles in operation, allowing better monitoring and control of this equipment (BACHIM et al., 2020).

However, implementing IoT presents challenges regarding the security of devices and collected data. It is necessary to ensure that the data collected is accurate and reliable, avoiding decision-making based on incorrect information (STOYANOVA et al., 2020). Furthermore, it is necessary to ensure the protection of data against external threats such as hackers, which requires a multidisciplinary approach

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involving engineering, computer science and law.

Integrating IoT with companies' existing legacy systems can also be a challenge, as these systems are often not compatible with IoT. It is important that companies carefully plan the integration of IoT into their operational processes, ensuring that the technology is implemented efficiently and without compromising current operations (SINCLAIR, 2018).

Finally, it is important to highlight that the implementation of IoT in the operations area must be seen as a continuous and collaborative process, involving several areas of the company, such as engineering, information technology, operations and management (SHAFIQUE et al., 2020). This way, companies can obtain maximum benefit from technology and remain competitive in the market.

To maximize the benefits of IoT in the area of operations, it is important that companies invest in appropriate technologies and qualified professionals to manage and maintain IoT systems (SANTOS, 2018). Furthermore, implementing IoT requires careful planning and a clear strategy, defining objectives and evaluating the feasibility of implementing IoT in your production processes (SINCLAIR, 2018).

IoT also requires the use of analytics and artificial intelligence systems to analyze and interpret the data collected, allowing companies to obtain valuable insights into their operations and, consequently, be able to make more informed and effective decisions (SHAFIQUE et al., 2020).

We have the following research problem: How would this impact supply chains? Supply chain management, also known as supply chain, encompasses a large number of steps and diverse geographic locations, which can make tracking items a challenge for many companies. However, the implementation of IoT can allow more efficient control of incoming and outgoing supplies, enabling instant and reliable monitoring of supply and stock control. With IoT, it is possible to have a real-time view of stock, which facilitates management and decision-making regarding supplies.

a) And when it comes to suppliers and buyers, how would this facilitate these relationships?

When dealing with suppliers and buyers, it would facilitate the assessment of the efficiency of these companies, whether they are meeting delivery deadlines, expected payment deadlines, whether supplies are being delivered in the amounts and quality required in a more reliable way, verifying and validating the real origin of products and services purchased, so that the price paid for such products and services reflects the real cost of production.

b) How to implement IoT in supply chain management?

There are several ways to implement IoT in logistics companies. One option is to outsource the implementation to a company that already has software developed for inventory control, which can be a more practical and economical solution. Another option is to develop your own software according to the company's specific needs, which can provide greater control and customization of the system. Regardless of the option chosen, it is important to ensure that the responsible team is capable of dealing with new technologies and that the systems are efficiently integrated with other existing systems in the company.

c) What are the benefits of implementing this technology?

The Internet of Things (IoT) has been widely adopted as a strategic technology for companies in different sectors, including logistics. Its use in supply chain management brings a series of benefits that positively impact the quality of services provided and the productivity of the company as a whole. IoT allows the collection, processing and analysis of data in real time, making it possible to make more accurate and effective decisions.

By employing IoT in supply chain management, companies can obtain greater control and visibility over operations, allowing them to identify bottlenecks and failures in processes and adopt measures to optimize them. Furthermore, IoT makes it possible to monitor products and goods in real time, from production until delivery to the end customer, making traceability possible and ensuring the safety of operations.

The implementation of IoT in the supply chain also enables interaction and sharing of critical information between employees and managers, promoting greater collaboration and efficiency in teamwork. This allows for greater integration and synchronization of processes and systems, enabling more efficient and optimized management of the supply chain.

Another important benefit of using IoT in the supply chain is cost reduction. With real-time monitoring and identification of bottlenecks and process failures, companies can adopt

measures to reduce production and transport costs, as well as minimize downtime and increase process efficiency.

Among the IoT technologies that can influence the supply chain in a logistics company, sensors and smart devices stand out, which allow the collection and transmission of data in real time; product tracking and monitoring systems, which allow the location and monitoring of products throughout the supply chain; and data analysis and artificial intelligence platforms, which allow the identification of patterns and insights for strategic decision-making.

Using IoT in supply chain management brings a series of benefits to logistics companies, including greater control and visibility over operations, cost reduction, improved process efficiency, interaction and sharing of critical information, and security in operations.

In this way, how can the implementation of IoT technologies improve operational performance in a logistics company's supply chain and what are the main technologies available to achieve this objective?

According to what has been demonstrated, companies in the logistics sector are constantly searching for solutions that can guarantee quality in operational processes. In this context, this work aims to evaluate inventory control and management using a radio frequency identification system (RFID) for items, aiming for internal improvements in the services offered in the supply chain.

Through the theme “IoT in supplies”, the aim is to propose a technical solution based on IoT technology using a radio frequency identification system (RFID) to control purchases and supplies in the logistics company, capable of providing relevant information for the decision making. It is important to highlight that, as new technologies appear on the market to facilitate the development of logistics activities and other areas, they must be considered to enable greater management control.

IoT applied to supply management is a tool with great importance in stock control, however, the software used must be adapted to the reality of each company, guaranteeing the reliability of the information. Only in this way will the application of technology achieve the intended objective and provide more efficient management. It is essential that the responsible team is trained to deal with new technologies and that there is an efficient integration of IoT systems with other existing systems in the company.

The specific objectives are: Analyze the logistics company’s main supply indicators; Ensure control of entry and exit of supplies in the logistics company; Provide accurate and reliable information in real time to the logistics company manager; Allow the classification of the output of supplies according to their expiration date, prioritizing the output of goods with the closest expiration date;Prevent losses, theft and stock errors, reduce waste.

The specific objectives of this study are fundamental to achieving the general objective of proposing a technological solution based on IoT to control the entry and exit of supplies in the logistics company, in order to guarantee the control, precision and efficiency of activities related to supply management .

Initially, a check will be carried out on the main processes related to the use of technology in supplies in the logistics company. This analysis will allow us to understand the current scenario and identify possible bottlenecks that can be resolved with the use of IoT. Furthermore, the organizational structure of the logistics company will be evaluated in order to identify how the technology can be implemented efficiently and integrated into existing processes.

Analysis of the logistics company's main supply indicators is also essential to understand how technology can contribute to increasing efficiency and reducing costs.

2 THEORETICAL FRAMEWORK

2.1 Conceptualization of logistics

The word logistics originates from the French*loger*, which means to lodge. Currently, this term covers the administrative field involving inventory management, storage and movement. According to *Council of Supply Chain Management Professionals*–CSCMP (2011) defines logistics as:

> Logistics is the part of Supply Chain Management that includes the processes of planning, implementing and controlling efficiently and effectively the flow and storage of products, as well as associated services and information, covering from the point of origin to the point of consumption, with

the objective of meeting consumer requirements.

Reverse logistics is an area of business logistics that has the function of planning and controlling information in relation to after-sales, that is, it is responsible for customer satisfaction, where the life of the product goes beyond its delivery. , so that damaged products can be correctly discarded, repaired or reused. It can be defined as the set of activities of a company from the purchase of raw materials to final consumption.

It is noteworthy that major changes are occurring in relation to productivity, resulting in a demand for professionals who adapt and follow this transformation. As Pochmann (1999, p. 35-36) points out:

> Change in production organization (just in time, lay out, logistics, reduction in plant size, outsourcing and partnerships with suppliers), which implies a reduction in employment in quality control, maintenance, administration and inventory control, among others; change in the internal organization of work: there is a reduction in hierarchy, work in islands, more qualified work in secondary activities, which implies a reduction in employment in administrative and supervisory segments and greater training of employees, eventual stability and change in working hours, computerization of work in secondary positions and the reduction of regular employment in secondary activities (security, food, transport, cleaning, among others).

As a result, business logistics feels this change a lot, as it mainly involves administration. traction and control of stock and movement of products. The primary activities of business logistics are inventory management, ensuring that the product is available according to the needs of the company and the consumer; Transport management arranging the product at the necessary location; Information management with the function of collecting, processing and transmitting requests from internal and external customers regarding their production and dispatch. This work will be focused on inventory management.

For an organization to make a profit, it needs to achieve the “five performance objectives” which, as Slack (1996, p.103) explains, are:

- **Speed**–In today's commercial environment, speed of response is needed to satisfy the customer.
- **Flexibility**–It is the ability to change the operation in some way. If there is the possibility of changing the operation, that is, you can change what the operation does, how it does it or when it does it.
- **Reliability**–It is the ability to carry out things on time, ensuring that the customer receives services when promised.
- **Costs**–The unit costs of the various services provided by the company must be known and compared with standard costs to determine whether the services provide satisfactory profits.
- **Quality**–Quality is the satisfaction of consumers' needs, and can be expressed when the consumer requests a tailored service, with the company having the task of detecting it through market research.

For a company to be able to maintain itself and compete in the market, it is necessary to use tools that result in better quality, lower cost and shorter execution time. The JIT (Just in Time) philosophy is based on doing simple things well and eliminating waste at each step of the process, optimizing production. Kaizen philosophy is a Japanese word that means continuous process, aiming for continuous improvement.

For Chaves (2005), continuous improvement is a system that aims to promote work and enable human growth through a constant exchange of ideas and knowledge between its components.

It is mentioned that strategic planning aims to integrate manufacturing with other functions within the organization and determines how the company intends to compete in the market, seeking to create conditions for efforts to be focused, ensuring that the company achieves better performance. However, if planning is not well executed it can generate disadvantages for the organization where activities important to the success of the organization may be neglected.

The global service operates when the consumer receives the product through activities designed and ordered in an optimized way. Dias (1993, p. 41) lists the objectives of the logistics service:

> Service improvement: A company's profits grow as the quality of the logistics service increases; Reduction of tied up capital: The level of logistics service must be obtained by minimizing invested capital; Reduction in operational costs: Customers highly appreciate the quality of the logistics service, but ignore the costs of the process. When reducing operational costs, it is necessary to analyze the extent to which stock levels are viable in relation to cost and benefit.

It is noteworthy that in the logistics service some factors must be considered to result in a competitive advantage from an efficient distribution of services and goods, these are those that have operational benefits at the lowest possible cost. In logistics services, transport is of great importance in terms of quality as it has a direct impact on delivery time, reliability and product safety.

Logistics services must be understood as an important component, if not the most important component of the global services offered by the company, being valuable for the success of operations in supply chains. (BALLOU, 2006).

As there is difficulty in developing competitive advantages for the company, companies are starting to sell logistics processes and not just products. Doctker (2000, p. 51) defines logistics service as: "the integral process of fulfilling the order, encompassing elements from receipt of the order to the provision of services to the user and the returns program".

It is noteworthy that the logistics service is multidimensional, since each market segment, according to its product or service, defines the importance that each variable has, but each attribute that may be valuable to the supplier, in the customer's view, does not have so much relevance.

2.2 Logistics cost

Logistics costs are generated through planning, implementation and control of the company's logistics activities, where according to Dornier (2000) the quality and speed of capturing, processing and transmitting information in the logistics system guarantees a rationalized decision-making process, developing efficient activities, a management of logistics channels not predisposed to partial optimizations and a satisfactory level of internal and external communication.

The information system favors the understanding, processing, storage and retrieval of company information, therefore requiring planning regarding the disposal, demand and accuracy of material.

Management control works by comparing actual and expected values regarding the level of service formed and the calculated logistics costs.

Logistics costs are then defined as profit from customer issues, service, ratification and dispatch of information for the relationship between the various business functions; ideation, support and practice of methods for forecasting, planning and diagnosing values, information and results; mastery and compliance with corrective actions; organization and administration of the logistics system evaluated as a whole; personnel and computer systems; reduction and restriction of equipment and technical infrastructure.

The logistical costs associated with inventory management have the function of determining which products and materials can be stored, as well as their disposal, with logistical costs being the financial cost of possessing the stock, storage cost, cost arising from risks, cost of lack of materials and products, placing the order for resupply, cost of lack of materials or products in terms of not meeting demand due to lack of stocked item, acquisition cost.

The logistical costs associated with supply and purchases are more adopted by more competitive companies, as stated by Novaes (2001, p. 23):

> The global logistics approach, today adopted by the most competitive companies, corresponds to the vision that the flow of materials between companies must be planned in an integral and joint manner, which leads these companies to consider their suppliers as an integral part of their own process. manufacturing and marketing.

Logistics costs associated with transport have a greater share in the final logistical value according to the means and mode of transport selected, influenced by the type of product. These transport costs have the function of defining routes and route selection, load composition and vehicle operation.

The calculation of logistics costs requires a mapping of all costs related to all

the company's activities from distribution to after-sales.

2.3 SUPPLY CHAIN MANAGEMENT

The concept of supply chain is linked to the concept of logistics, which is a broad term that involves several activities. According to Bowersox and Closs (2001), logistics includes all activities related to the movement of products and the transfer of information from participants in a supply chain. The supply chain, in turn, is constituted as a logistical structure that allows working together with the aim of taking products, services and information efficiently to the end consumer.

It can be said, based on Chopra and Meindl (2003), that the supply chain involves everything from service to delivery of a customer's order. For Pires et. al (2001) supply chain consists of "a network of companies effectively responsible for obtaining, manufacturing and making available any product or service to the final link, that is, the customer".

Therefore, in general terms, it is possible to say that the supply chain is a network that involves different processes and activities aimed at satisfying customer needs, both in their products and services.

According to Rodrigues and Santin (2004, p. 98) the supply chain aims to:

> Integrate all processes from manufacturing to product distribution, with the aim of optimizing costs for the manufacturer and adding greater value to the end consumer, through functions that meet their needs. All of this must happen with a quick response, from order fulfillment to product delivery.

For Lambert et. al. (1998) for the supply chain to be successful it is extremely important that it is analyzed, to this end the configuration of the supply chain must be known, the first step being to define its links. Such links can be divided into primary or support. The primary links are companies or strategic businesses responsible for developing operational or management activities in the business processes necessary to produce a product or service for a customer or for a specific market and support. Support links are companies that only offer resources, knowledge, utilities or assets to primary links. (LAMBERT et. al., 1998).

According to Chopra and Meindl (2003), to design the configuration of a supply chain, five primary links are identified, which are: Raw material suppliers at various levels; Manufacturers; Wholesalers/ Distributors (or Distribution Centers); Retailers; Customers.

However, it is worth noting that it is not necessary for the supply chain to consider all the links mentioned, depending on the specificity of each supply chain, and must focus on customer needs and the links necessary to meet them.

2.4 Strategic alignment

It can be said, based on Di Pietro (2006), that strategic alignment is a process that aims to adjust the external organization in relation to its operating environment through the formulation of a strategy, and internally seek coherence between strategy, resources and management processes.

Thus, strategic alignment aims to ensure the organization and logical integration of a set of structured activities with the aim of aligning them, at the same time as ensuring the flexibility of strategy implementation, enabling strategic changes to be carried out and incorporated The this process.

According to Chopra and Mendl (2003), strategic alignment has the purpose of reconciling corporate and competitive business strategies with those of the supply chain, three major phases being necessary for its implementation, which are: 1st) Understanding the customer or the market ; 2nd) Understand the supply chain; 3rd) Carry out strategic alignment.

The first phase to be carried out to achieve strategic alignment is to identify how customers behave and the market to be reached, and to do so, data must be obtained that measures the batch size and response time that meets customer needs. , the variety of products required, the

service level, price, demand, in short, all aspects that describe the behavior of the customer and the target market.

The second phase aims to understand the best way for the supply chain to operate. products in the target market, taking into account the definitions of the first phase, and must be in accordance with the product scope strategy as functional or innovative.

The third phase of the strategic alignment process is configured by combining the first two phases, so that supply chain management can be supported by the value chain. Strategic alignment in its third phase can be traced according to the degree of uncertainty in the necessary product demand and the positioning of the chain considering the need for responsiveness and efficiency, as well as what should be pulled and what should be pushed in the supply chain. The completed third phase also characterizes the end of the strategic alignment process, with such completion occurring as soon as the phases are well designed to adapt to what the supply chain strategies require. At this point, it is necessary to design the best operations, supplier and logistics strategy.

It is worth mentioning that the scenario involving strategic alignment must be dynamic, given that business evolution, market share, and product life cycle change over time. Therefore, the need to review the phases of strategic alignment must be carried out constantly, and the policies adopted must be constantly mapped.

2.5 Supply chain management

The term supply chain management (GCS) comes from the English*supply chain management*(SCM). It emerged around the 80s and 90s from the need to integrate companies' internal departments. (PIRES, 2004).

In this way, supply chain management is an integration of all logistics processes. tics, highlighting that conflicts may occur during the process as centralization occurs, where activities occur in an interpolated manner according to the need for their development. (RUSSEL, 1998).

As a definition, Pires (2004, p. 70) states that it is:

> A management model that seeks to achieve synergies through the integration of key business processes throughout the supply chain. The main objective is to serve the end consumer and other stakeholders in the most effective and efficient way possible, that is, with products and/or services with the highest value perceived by the end customer and obtained at the lowest possible cost.

Thus, the main objective of supply chain management is to focus on the end customer, where the aim is to maximize the overall value generated, that is, the financial amount that will be received for the products and services offered by the company, making it profitable. (CHOPRA; MEINDL, 2003). Complementing the observation by Chopra and Meindl (2003, p. 121) they state:

> "Overall value generated" is understood as the difference between the value of the final product perceived by the customer, reflected in the price he is willing to pay, and the effort made by the chain to fulfill his order, that is, how much each stage was responsible for the increase in the final value.

Therefore, it is necessary to check which activities generate added value for the company and also check what is the most appropriate division of the global value generated in the chain. Thus, the success of a supply chain depends on the total profitability that must be divided between all stages of the chain and what is done to attract the end customer. (PIRES, 2004).

The usual supply chain nomenclature for the systematics and practices of customer relationship management is Customer Relationship Management (CRM), which***It is considered as a strategy to facilitate knowledge management and decision making, with the aim of anticipating and satisfying customer expectations.***

It is important to highlight that it is not a question of choosing clients, but rather of determining which ones will be focused on in order to establish actions aimed at a deeper integration of information systems and performance evaluation. A key client is basically identified by the volumes traded and its strategic potential.

The use of information technology, the integration of people and processes and management strategy

business through customer relationships allows for greater profitability and gains in competitive advantage.

> CRM should not be understood only as an information technology tool, as its philosophy emphasizes customer service at all stages, from the first contact (by telephone, for example), through negotiation, to after-sales. . Its main objective is to optimize the management of all relationships, including consumers and distribution channels. (BULLER, 2012 p. 60).

CRM from a traditional point of view can be divided into operational, while it aims to create communication channels with the customer; analytical, when information obtained from customers allows the optimization of ongoing business and the generation of new business; and collaborative, when knowledge applicable to creating value for the customer and new potential customers is created.

In customer management, there are many challengessand one of them is to establish continuous communication, which allows the real-time identification of changes in needs, allowing the rapid adaptation of service processes, starting from the process of building loyalty among existing customers to gaining new customers.

There is no doubt that IT (Information Technology) tools are important and must be intensely used due to the large flow of information pertinent to the management of the customer service process, but the understanding that it is limited to tools, techniques and systems should be avoided, so as not to lose the essence of the personalized solution, which is the purpose of CRM with customers.

It is known that, although customer management is important for the results of operations in supply chains, there is still difficulty in creating performance evaluation systems in which customers are evaluated with the same intensity as suppliers.

It is understood that the process of restructuring the supplier base basically consists of reducing the number of suppliers, with which strategic alignment and direct and agile communication must be maintained.

Therefore, it is necessary and opportune to identify the skills that can bring differentiation to the competition and customers. The chains are adjusted according to their market focus and suppliers are selected observing the adherence of their core business to this focus. It is important to know that Core business means the organization's central or main business and the focus given to it. (BULLER, 2012).

It is worth noting that core competencies are also important for the decision, which must be carefully considered.

strategic and not just based on costs, since the selection of suppliers often involves the decision to outsource activities or processes.

Observation of centrality and switching costs will determine the relationship to be established with suppliers. It is observed that supplier centrality will be higher the greater the differentiation of its product and the greater the value created and perceived by the customer.

It should be noted that the reduction in suppliers associated with globalization leads many organizations to select global suppliers (*global sourcing*) for all its business units around the world (*follow sourcing*). This reduction can lead to the establishment of a single source of supply.

It is worth noting that a single source does not mean exclusivity, as there may be more than one qualified supplier and the process manager may decide to supply only one of them due to negotiation volumes and the influence of decisions established in contracts for global supply.

For the partnership to be economically viable, dedication from the parties involved is necessary, assuming a large volume of joint activities. It is important to know that it is not usual for an organization to consider all of its suppliers at this level of relationship. It follows that a partnership must be cultivated, evaluated and reevaluated continuously between the members of a supply chain.

2.6 IOT and4TH INDUSTRIAL REVOLUTION

Initially, there was the emergence of the steam engine, beginning the mechanization of production, followed by electricity and Fordism, with mass production (BERGER, 2014, p. 23).

As production levels grew, the economic performance of countries also increased and thus the level of demand from populations rose. As a consequence, the pace of life is increasingly accelerated, and one of the factors influencing this accelerated increase is the impact of new technologies. To adapt to this reality, businesses had to adapt to the demands, mainly from consumers, who at every moment want new and different products, in addition to the environment being increasingly

increasingly competitive. (BERGER, 2014, p. 41).

Thus, the technological conditions for innovations were established, which had never been thought of or possible and "which gave rise to cyber-physical systems, the Internet of Things and the Internet of Services. The 4th Industrial Revolution was underway" (BERGER, 2014, p. 41).

Internet of Things is a paradigm that aims to connect everything that can be connected to the Internet, where this "everything" refers to people, processes, things (cars, televisions, cameras, refrigerators, airports, cities, among countless other possibilities) and their respective data.

Therefore, IoT solutions have been widely promoted in various sectors, due to their enormous market prospects and associated benefits, this paradigm has received a lot of attention from governments, companies and universities around the world. Playing an important role and aiming to facilitate the integration of sensor networks through mobile communications, private networks or the Internet, for the management and control of processes and data, normally correlated to Return on Investment (ROI) calculations.

For any IoT solution, it is necessary to apply the knowledge and processes of the segment to obtain crucial data, for example: For an IoT solution in the automotive sector or a "connected car", it is necessary to understand traffic and its regulations, the vehicle, its components and onboard technologies, passengers and cargo. Now, for an IoT solution at the airport, it is necessary to know about flight operations, airlines, how long it takes for a passenger to board, logistical process for baggage and aircraft, security-related procedures, services offered, among others. All this information can help the user to be in the right place, at the right time and with the tools or information available for a specific action.

So, IoT is not just about connectivity, but how to use data obtained through devices within a context that helps a process, a decision or automates a command. The real importance of the solution is directly linked to how the data obtained can provide value to products, services or processes.

IoT solutions can include several technological components, as there are numerous solution variables for numerous segments. However, the author listed, according to his view, that the components that must be present in most IoT solutions are: Power Source, Sensors, Networks, Cloud and Big Data.

According to STANKOVIC, the Internet of Things should not be seen as a simple automation or an individual autonomous system, but as a globally integrated infrastructure with many applications and services.

The financial movement generated by the adoption of IoT can vary drastically. As for incremental revenue from the Internet of Things, estimates vary drastically. Gartner projects that IoT product vendors will generate incremental revenue of $60 billion in 2020; IoT service providers are projected to generate an additional $250 billion in revenue by the end of this decade. Gartner defines added value as anything that increases revenue or decreases costs. To put this into perspective, the size of the total US economy is currently $15.5 trillion.

According to a recent Cisco study (J. Bradley, J. Barbier, D. Handler) IoT is projected to create $14 Trillion, through a combination of increased revenue and reduced costs, for the private sector from 2013 to 2022

Regarding protocols for implementation, standards such as MQTT and CoAP have evolved and are more suitable for restricted environments than the standard HTTP web protocol since messages are lighter so that sensors and small mobile devices can be optimized for networks. Unreliable or high-latency TCP/IP.

It is thus reiterated that with industry 4.0, object simulation becomes increasingly common. Virtual reality is no longer just used for video games or entertainment. The concept can be directed to many other areas, from military applications, healthcare, education, tourism, architecture, sales and marketing and industry. Virtual environments can be used at every moment of the industrial process, whether to plan, design, manufacture, provide services and maintenance, test products or carry out quality control (BERGER, 2014).

In essence, the main new feature for the business environment is connectivity. From the digital With this process, the entire factory will be connected, from production to the logistics system and the marketing and sales departments. Machines will talk to machines and also to parts, to tools and to beings

humans. All this through cyber-physical systems that send information from one device to another (STONER, 1992, p. 5).

Industrialization began with the introduction of mechanical manufacturing at the end of the 18th century, known as the first industrial revolution, causing a revolution in the way products were manufactured.

An example of its use is the mechanical loom machine, which provided an increase in production. activity. Soon after, there was the second industrial revolution, which involved the use of electrical energy and the division of labor. Soon after, came the third revolution, characterized by the use of ICTs. Finally, the fourth industrial revolution, known as "industry 4.0". This is centered on the use of information resources and communication technology (KAGERMANN, 2013).

Thus, it is reiterated that this aims to optimize the use of ICTs, taking advantage of the technological issue, which contributes to the advancement of economic potential. In this sense, if this internet revolution leaves us more connected every day with virtual friends, and away from real friends, in business, industry 4.0 provides a revolution in processes, mechanisms, and even in habits and ways of consuming.

CONCLUSION

In this study, we sought to verify how the management of the supply chain and the logistics process, demonstrating two configurations, peculiarities, as well as the importance of this process for its good progress,

The logistics process and supply chain management are demonstrated as complementary and fundamental, presenting them as fundamental processes to avoid waste.

It is understood, therefore, that the proposed objectives were achieved and it is highlighted that this subject does not intend to be exhausted here, as we sought to succinctly explain the topic addressed. Those who wish to delve deeper can search for the authors and works cited in the bibliographic references.

At the end of the study, one can see the importance of supply chain management and distribution logistics as part of the logistical process, which is essential so that there are no complications during its execution, whether due to excess material acquired, which sometimes ends up being wasted and impacting the environment, whether due to the lack of material causing delays.

While distribution logistics allows materials to reach different levels from different equipment that must be chosen according to need, all steps and procedures necessary for the process must be analyzed.

It is suggested that the acquisition of materials and the logistical distribution process be planned from the project onwards, with schedules being drawn up to help make decisions for the acquisition, stock and distribution of supplies.

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