The impact of artificial intelligence on the automation of distribution channels in industry 5.0

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Abstract

In the distribution channel, technological advances have helped companies create competitive advantages by helping their supply chain and saving costs, with Artificial Intelligence and how companies have taken these competitive advantages to the next level.

The following article we seek show the impact of new technologies in distribution channels, such as artificial intelligence, made a change in the work system inthe supply chains, facilitating relocation of the products from the manufacturer to the end consumer.

Keywords: Supply Chain, Artifiial Intelligence, Logistic, Machine Learning.

1. INTRODUCTION

The distribution in the modern industry has always been a method to facilitate the chainsupply, from ordering and receiving grocery purchases, electronic stores and food services at the door of the house, growing the market factor of companies, thus knowing the behavior of end users.

The distribution channels with the help of artificial intelligence have facilitated the criteria of the current industry such as effective demand, availability productibility, the decrease in operating costs, risk reduction, the quality control, and in addition to improve their distribution policies in such a way that the industries generate added value such as: the usefulness of time, the availability of products, information on order sizes and the improvement of delivery conditions.

This document seeks to provide information on how distribution logistics has evolved in recent years thanks to artificial intelligence (AI), which is one of the most used tools today. On this form seeks to spread knowledge or technologies on the distribution channel that help improve shipping methods and profitability of organizations.

The importance of a good distribution channel is due to the fact that customers want punctuality in the deliveries of their products or services, some companies dedicated to production must be oriented to forming their channels since it is useless to have a competitive advantage if I know has an inappropriate distribution channel, this generates a competitive advantage that allows you to react quickly to technological changes and provide a personalized, fast and lower-cost customer service.

2. BEGINNINGS OF LOGISTICS

The need to get the provisions, in the shortest time possible and with the best conditions, it has been present since ancient times. Therefore, it is important to know the role that distribution plays in the field of marketing, distinguishing its structure and characteristics.

Logistics was born since the human being was primitive and began to store provisions (food, tools, materials) in caves to have food in snowy season in the long winter, food inadvertently it started in the use of inventory management and the procurement process.

At that time humans did not have means of transport, so they were forced to live in the place where they stored their supplies, with this they subsisted until winter passed or while they had food, thus increasing their life time.

In Roman times this term was expanded with wars, many associated it with military tasks such as:

- Mobilization of troops
- Conveyance.
- Shipment of supplies.
- Accommodations

In epochs war the need to transport provisions was transcendental that food, weapons, soldiers and materials arrived in a timely manner since the victory or defeat of the opponents depended on it, that was how important logistics were in the Roman Empire.

With the appearance of trade and the exchange of products, war logistics jumped into trade and it became essential since with the beginning of trade there also appeared endless problems in which logistics demonstrated how important and essential the process was, for the good development of new commercial activity.

Some processes in which logistics was used are:

- Bad production line.
- Lack of supply of raw materials.
- Bad product storage.
- Its distribution.
- Lack of transportation routes.
- Lack of means of transportation.

2.1. INDUSTRY GROWTH AND THE USE OF TECHNOLOGIES.

With the end of the Second World War, logistics processes emerged as a new method in the industry, since companies began to create their own logistics chain to be able to comply essential objectives in companies to be able to do it in the most efficient way.

The Companies that adapted to the change in the logistics of their production chain positioned themselves as economic and industrial leaders, having great competitive advantages.

With the growth of the industry, the use of automation was better implemented in this case with technologies for the control and monitoring of industrial or distribution processes, which in this way facilitate work or to some extent create repetitive functions by making automatic processes reducing the human intervention.

2.2 APPLICATION OF ARTIFICIAL INTELLIGENCE IN LOGISTICS PROCESSES.

The application in the processes of Today's logistics has created a forced change in the way the supply chain works.

"Intelligence is not a single dimension, but rather a profusely structured space of diverse capacities to process information. Similarly, AI uses many different techniques to solve a wide variety of tasks. "(Bonden, 2017)

Thanks to artificial intelligence, companies have changed their models or scheme where logistics operations readapted to variations in supply and demand, to a proactive one where market behavior is studied and facilitated the acquisition of the raw material to satisfy demand for customers, so artificial intelligence is very necessary for any type of decision making.
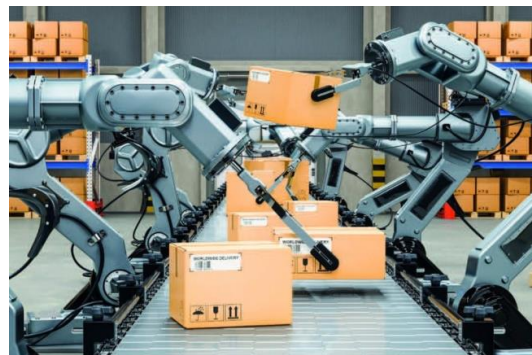

Figure 1. Robots with Artificial Intelligence in production.

"Shipping, handling and quality control robots are becoming essential for most retailers and logistics companies. Because our packets are now expected to arrive at breakneck speeds, logistics companies employ robots in warehouses, and even on the road, to help maximize time efficiency "(Adamssen, 2020).

2.3. DISTRIBUTION CHANNELS

The distribution channel "It is the process of supplying manufacturing with raw materials and supplies and other components. It is called inbound logistics in international literature. A supply chain is made up of commercial logistics distribution channels, which are groups of interdependent organizations involved in the customer shipping process " (SARMIENTO, 2017)

AI has taken a competitive edge in the distribution channel taking advantage of big data since with this it automates, predicts and even personalizes the sales or retail sectors, thus implementing these technologies, gaining competitive advantages with end users.

Virtual assistants or chatbots, create a direct link between users to purchase products or up to give a recommendation this can create a sales channel. These are great It helps since it allows both retailers and wholesalers, the use of data, these models require short cycles and lead to optimizing your channel of distribution since the faster they generate delivery times to customers grow your competitive advantage.

2.4. SMART LOGISTICS

Industry 5.0 be focused on helping everything in our environment for something they say robots at the service of humans.

"We left Industry 4.0 behind to usher in the new industrial revolution: one that combines human workforce with cognitive robotics for globalized and mass custom production. The pressure of consumers on the instantaneity and personalization of production forces the industry to have the necessary inputs to respond. Thus, transport must be as efficient and intelligent as production itself. "

In this way, the leading companies in their branches how Amazon and IBM opted for innovation for their short channel of distribution aided with smart transportation:

2.5 HOW AMAZON PRIME AIR WORKS:

The service began in areas of low population density, rural zones and residential areas on the outskirts of big cities, It is limited to packages under 2.7 kg (most Amazon deliveries).

Its operation is known from previous tests. A customer presses the buy button, a human manages it and prepares the package that through a conveyor belt reaches the position of the drone. This picks it up and flies to the customer's home. The drone delivers the order and returns to the warehouse automatically with its GPS and camera system.

Amazon promises to deliver orders in less than 30 minutes from purchase within a maximum range of 10 miles from the company's warehouse. "(Ranchal, 2020)

Figure 2. Shipped from Amazon Prime Air.

With this implementation, Amazon expects a worldwide distribution with drones, thus perfecting this intelligent transport method for its shipments to its customers in order to reduce operating expenses.

The Japanese company Robot Taxi began to circulate taxis without a driver for residents where They can request one of the Taxi Robot cars through their smartphones to go to the supermarket and later be returned to their homes,It is expected to be of great help during the 2021 Olympics to transport guests, athletes and the general public, This type of innovation is achieved with the help of dynamic applications.

Figure 3. Robot Taxi.

One of the greatest exponents of artificial intelligence in logistics is automated warehouses. These combine two types of systems: robotics applied to warehouses and management or control software. Together they carry out transport and product placement operations autonomously because it is easier to make decisions when doing tasks.

"For this reason, artificial intelligence can improve the precision in the forecast of shipments, being an aspect that companies gradually see as something that can help them streamline their processes and equipment, with the aim of continuing to compete with platforms current such as Amazon and other e-commerce giants.

In this way, it is recommended that parcel companies use this tool to have more dynamic installations, as well as it is also advised that they make a 60/40 approximation between fixed and variable cost."(Logistics Blog, 2019)
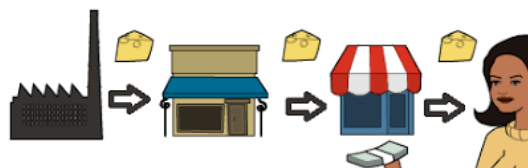

Figure 4. Short distribution channel.

This shared work creates patterns over time that are continuously analyzed and learned, with this you can see the ease of a task and its complexity. In this way, artificial intelligence helps them to assign roles to each of the tasks that arise, as well as to adapt their movements in case of variations in the circuit, problems caused by a human.

2.6 FUTURE TRENDS.

It is possible to think of creating a data network that corresponds to our personal vehicles, and therefore weave an even greater network of mobility data that will allow certain improvements in aspects such as congestion vehicular, is possible to have more pollution, lower travel speed and more economic spending, to examine the technologies that can help people and to the goods to reach their destination in the fastest, most efficient and environmentally friendly way.

This would be achieved through the type of shipment of said goods and people between one mode of transport and another or between some routes and others. It seems somewhat complex, in the future it may betake the products of the companies from their warehouses to the client, and that along the way, the route and the

means of transport can be automatically varied by artificial intelligence to reach the destination in the shortest possible time and in the most efficient way.

This advance will bring the industry to a point because we always know how to start with technology until we reach a point where a human no longer needs contact from production to shipment of the product, such as thinking about an aerial warehouse and thus by drones. Get your orders shipped everywhere and AI can leverage the fleet's sensor networks to forecast demand and optimally organize shipments while ensuring accurate delivery times.

Figure 5. Ar shuttle system for compact semi-automatic storage.

The smart industry (insdutria5.0) has an enormously promising future in the industry sector today are the improvements applied in this field, these innovations will produce important changes in terms of the jobs needed in the new smart factories, some of the most important are:

- Quality control and data analysis.
- Robot-assistedproduction.
- Automatic shipment of products.
- Self-driving vehicle logistics.
- Predictive maintenance of machines.
- Reduce operational costs.
- Automatic decision making.
- Predictive customer analysis.
- Capitalize processes.
- Creation of distribution channels.
- Facilitate stock management.

The automation of processes Improved logistics with the presence of artificial intelligence opens the opportunity to have control over the maintenance of inventories in real time, the issuance of instant supply orders or the precise follow-up of orders.

3. CONCLUSION.

This fifth industrial revolution has brought a different approach to logistics processes that seeks to optimize as much as possible both costs and productivity, distribution channel and business models of a company. There

are still many challenges to ensuring a smooth transition that we will see evolve over the next few years as one of the most promising developments.

As time goes by, new technological tools will appear to apply and new sectors in the industry for the development of intelligent logistics, in fact, in this year 2020 it is estimated to already have an investment in this field of research and work with implementation of artificial intelligence, as in this case Amazon and IBM, have bet.

Although many companies in the world already understand the enormous advantages of using this type of technology in their businesses, unfortunately in Mexico the interest is not noticeable, due to cheap labor "An investment of this size is evaluated by means of a scheme of cost-benefit. If it is cheaper to pay for labor than machinery, including the productivity effect, companies will prefer labor "(Portella, 2018)

There are also other factors that the country only in the northern part has some factories with robots in such a way these companies do not know the importance of automation in their logistics optimizing work.

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