

STUDY OF NEW TECHNOLOGICAL INNOVATIONS AND THEIR POSSIBLE
STRATEGICAL AND OPERATIONAL EFFECTS ON AMAZON'S SUPPLY CHAIN

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Introduction

Nowadays we are in the technological era, where the cell phone is no longer a privilege and the Internet is fundamental in our lives. Technology has ceased to be luxury or privileged throughout the world, and its use has become a basic element in the personal but also business field.

In such an active and globalized world, where competence is getting stronger and both supply and demand are increasing exponentially, the use of technology is not only inevitable for companies, but it can mean an important competitive advantage. Becoming technologically obsolete can mean staying out of the market. That is why companies must deal every day with technological advances and adapt to them, in order to accelerate their processes and maintain competitiveness in the market.

The main companies are trying to develop and implement their own technological advances in order to overcome their rivals. These new technologies provide a number of services that help companies to establish more direct relationships with their customers and suppliers, increase revenues, improve processes, create new strategies for the development of the company... What used to take weeks or even months, nowadays it is possible to be finished in few minutes.

In this paper, an analytical study of Amazon's technology use will be carried out. It will try to reveal what new technologies Amazon uses and what competitive, logistical and operational advantage it brings.

There will be also made a study of the impact that the use of technology has had in Amazon's market situation. Finally, a comparative analysis between Amazon and its main competitors will be carried out in order to discover what is the key to Amazon's success.

The relationship between technological innovation and use and business success has already been demonstrated. This study wants to discover what are the key technological innovations that can change the logistics world, and what impact each one has on the strategic, operational and market conditions.

Likewise, an attempt will be made trying to figure out how Amazon could implement and establish these new technologies, and to reveal future Amazon's technological and strategical improvements.

Role of technology in Supply Chain [1]

Nowadays, Supply Chains around the world are evolving rapidly, taking into account the multiple challenges that each industry presents. For this, organizations have positioned technologies in a leading role to achieve more optimized, accessible, profitable and sustainable networks over time. However, it is not something new. For years, companies have been trying to develop and incorporate technological advances into their business structure and, specifically, into their supply chain. Thus, achieving a competitive advantage over their rivals, or a substantial increase in profits normally due to a reduction in costs.

In 1888, Richard Sears first used a printed mailer to advertise watches and jewelry. He proudly included testimonials from satisfied customers and made every effort to assure the reader that *Sears* had the lowest prices and best values. This catalog expanded from watches and jewelry, offering merchandise such as sewing machines, sporting goods, musical instruments, saddles, firearms, buggies, bicycles, baby carriages, and men's and children's clothing.

Sears business strategy was not very different than *Amazon's* strategy: bringing you the opportunity to have a look at their products, order the stuff you desire and receive it in your home, all that at a lower price. The main difference between these two companies is the technology. While *Sears* used the Postal Service to both receive the orders and to send the package, *Amazon* has a very big and sophisticated technological net that allows them to offer the same service much more efficiently and adding other services such as free items returning.

So, the technological progress has had a direct impact on the evolution of the Supply Chain. However, companies have undergone enormous strategic, structural and dimensional changes. Over the years, there was a change from a small local market to a big national market. While increasing the niche market and customers, the complexity of the company's management increased and, of course, the supply chain became also much more convoluted. Just the new technology allowed the companies to manage the huge increasing amount of data that big companies generated.

Supply Chains moved from a short, simple and direct chain to a big, complex, diverse and reticular net. Due to this structural entanglement appeared the need to share information between the whole company departments. New technological systems facilitated the information sharing between not only between the stratum and departments of the companies but also with their customers and suppliers.

This complex business structures also leads to a significant decrease in companies' efficiency. Technology allowed the implementation of *Just-In-Time* methodologies in order to reduce costs, reduce lead times and increase productivity and quality assurance.

With the emergence of the Internet, the business world gave a total turn. We passed to a huge global market where both business competitiveness and business opportunity shot up exponentially. Companies entered in a new era where the use of technology was not only inevitable, but it could mean an important competitive advantage. Becoming technologically obsolete would probably mean stayed out of the market. That is why companies had to deal every day with technological advances and adapt to them, in order to accelerate their processes and maintain competitiveness in the market.

Throughout the last decades, a large part of the business software and technology developments for industrial applications focus, from one or another perspective, on facilitating, centralizing and dynamizing the data collection, processing and storage of information and the improvement and optimization of business operations. Two clear tendencies of technology can be identified. On the one hand, the accounting and financial management of the organizations. On the other hand, there have been developed technologies that focus on the management, monitoring, control and optimization of the operations, including logistics, inventory management, product and asset traceability, manufacturing and maintenance, etc.

Nowadays it is possible to monitor the performance of distribution networks, to know in real time levels of inventories and movements of products, and to reconfigure the operations of large production systems, of resources and distribution of products automatically and in response to changes that occur unexpectedly.

The tendency of technology solution providers is to develop new products and solutions that are able to cover more situations and needs of companies and that are able to communicate with other systems with ease to share and integrate information and enable companies to easily and in real-time make use of information and decision-making that derives from it. Now most systems are connected to mobile devices, enabling the analysis, decision-making and transmission of operational instructions from the pocket of any user anywhere in the world.

With regard to the study of changes in the Supply Chain, in 1998 *Charles H. Fine* published a book called *Clock Speed* . It offers a very peculiar, and at the same time useful, point of view of these evolutions and that in the world of continuous changes in which we live today, is still full of topicality.

The book begins with a curious analogy between biology and Supply Chains. It says: "In 1995 three scientists won the Nobel Prize in Medicine for their research on the process by which complex adult embryos are developed from a single cell. To carry out this project, they patiently and for years examined the mutations that took place in thousands of fruit flies (*Drosophila*).” The book explains that the reasons why biologists use this type of flies are because their genetic structure is quite similar to that of humans, because hundreds of them fit in a bottle, and because, despite its genetic complexity, this type of insect evolves very quickly, going from birth, to maturity and death in about two weeks. For all these reasons, the fruit flies, allow to increase the productivity of the research and facilitate biologists to study for a decade, the changes produced in hundreds of generations of flies.

Continuing with this biological model, it can be said that fruit flies belong to an animal species of clock-very fast, that is, they have an extremely fast life cycle. On the other hand, elephants, humans and mammals in general, have slower clock speeds: they measure their lives in years, not in days. Even more extreme are the turtles, which can live hundreds of years. So, we can say that there are animal species with a very slow clock.

Charles H. Fine proposes us to use this biological analogy to the Supply Chains of companies and their products. We can say that there are certain companies that are like *Drosophila*, they are governed by a clock-very fast. For example, *Intel* sells its chips to computer manufacturers. That are products that become obsolete within a few months of its release. Therefore, we can say that this Supply Chain has a very fast clock. At the other extreme are the companies that design and build aircrafts like Boeing or Airbus. They move their Supply Chains with a very slow clock: a Boeing Jumbo 747 is still basically the same product thirty years after its launch.

In conclusion, we could say that each industry and its Supply Chain evolves at a different speed depending, in a certain way, on the speed of the clock of its product, the speed of the clock of its processes and the clock of its organizations. Technological changes accelerate the clocks and increase the competitiveness in the sector where it is produced.

First, let's take a look at the technologies and systems that were used in the 20th century. In that period, there was one of the greatest technological changes that had a direct impact on the professional and business environment; the emergence of the Internet was the entry into the new era of information.

If we look into the warehousing operations, in 1970, a warehouse operator spent almost as much time recording activities on paper documents as performing the actual task of moving items from pick-face to pallet. Around 1990, the use of spreadsheets became popular and allowed a huge reduction of paperwork, and supposed a big impact in efficiency and accuracy. Was in that era when appeared a new warehousing strategy. While a warehouse was seen as an inconsequential place, at the end of the 20th century warehouses become to be an essential part of the company, being a priority for the companies the reduction of costs, the increase of the efficiency and of the productivity. New methodologies appeared in order to calculate the minimum stock that a company required and there was beginning thought of *logistics*, what linked manufacturing, warehousing and demand in order to establish a more optimal logistic system. In 1990, there was a big promotion and expansion of logistics. Technology continues to position itself in conventional logistics processes and distribution channels. Appeared new software that facilitated the monitoring and management of data and the improvement of computers made the logistics a business in itself. Appeared many companies that offered outsourcing services, and the demand for logistics services expanded.

In the field in which the most spectacular advances have taken place in the 20th century, it has probably been the transportation. The current means of transport are not only of economic importance, but also have importance in time, allowing to travel long distances in a short period of time. At the beginning of the 20th century, most of the companies operated in a local way. It means that their market was focused in a reduced area. This limited their customer expansion and also business expansion. Most of business relations were also at a local level, where companies from the same area bought from other local companies, and the end-user used to reside in the same geographical area. This situation occurred because of the high cost of the transport. Transportation by boat was very expensive and took a big amount of time, so just large companies could allow to use it. Almost all the transportation operations were carried out by trucks or by railway. However, the capacity of the trucks and trains was much more limited, the road and rail system was much precarious, and the cost was also higher. However, during the 20th century, appeared new ways of transportation that opened new business possibilities and raised the potential demand to previously unsuspected limits. Transportation by ship had a significant improve and it became much more affordable, being able for the medium-size companies to use it. Moreover, the appearance of the air transportation, being able to transport products faster than by ship, allowed many big companies to expand in a national level but also international level, raising their customer base and so, their benefits. In addition, trucks were increasingly sophisticated, as well as trains, being able to transport

more cargo and reducing the delivery time of the products. The improvement of the road and rail system made the transportation of goods much simpler and led to an enormous increase in long-distance transport by road, thus also appearing many companies that offered transport services.

Success in business goes beyond selling good products to customers; most of the people besides looking for something in exchange for their money, want an experience from beginning to end, which is enriched by customer service, a fundamental piece in the relationship between business-consumer. To achieve true user loyalty, the quality in the service of the care that is provided to them is a priority for the companies. At the beginning of the 20th century, there was not a use of technology in the relation between customer and supplier. Commercial people went house to house showing their products, selling them, and trying to establish a connection with the customers. Later, the phone was the means to communicate with the customer. From the beginning, it made easier and faster the way to communicate, shortening distances and increasing customer satisfaction, as well as allowing a bidirectional and immediate communication. Subsequently, with the arrival of the Internet, the email allowed to express any doubt or inconvenience by leaving a record to support such communication. Despite technological progress, companies are still clear that the best strategy to grow as a company is to retain customer loyalty.

But, the most significant technological innovation was the appearance of the Information Technologies. Before the computer was generally established in the business world, one of the main limitations that a company had to face was the acquisition, collection, storage, management and analysis of data. As companies grew and increased their customers, their operations and the volume of business, the amount of data that was generated was increasing. The companies became increasingly coarse and inefficient. the flexibility of the same decreased and the number of administrative personnel that was required was increasing, which also substantially increased the costs of the company. Errors and inaccuracies were common, and the good development of operations was compromised by a quantity of information that in many cases could not be managed correctly. However, the appearance of the computer meant a drastic change in the administration of information and data. Originally, it was no more than an instrument of calculation, but it became an extremely complex instrument for archiving and retrieving information. The ASCC (Automatic Sequence Controlled Calculator), built in the United States by IBM in 1944, can be considered the original prototype of modern computers. Although it was basically an electronic device, it contained many mechanical devices related to those present. The ASCC weighed five tons, was 16 m long and

contained 800 km of electric cables, and was capable of multiplying two 11-digit numbers in 3 seconds.

Through years of development, computers became much more sophisticated and affordable. Many companies started developing new managerial software packages, most of them focused in data managing and process automation. There also appeared some information sharing software, but they still did not have a very big presence and establishment since companies still were not concerned with the importance of the information sharing.

Production in series or in chain, also named as mass production, emerged in the Industrial Revolution and was the main production strategy used by companies in the 20th century. It was a form of organization of production in which each worker specialized in a specific function and operated machines also better developed technologically, raising the quality of the products and production times per unit. At the beginning of the 20th century Taylorism emerged, which was based on the division of tasks in the production process and owes its name to Frederick Winslow Taylor, an American engineer and economist who developed this theoretical model. This was a new method of industrial organization, whose purpose was to increase productivity and avoid the control that the worker could have on production times. It was based on the application of scientific methods to the study of the relationship between labor and modern techniques of industrial production, in order to maximize efficiency, through the systematic division of tasks, the rational organization of work in their sequences and processes, and the timing of operations, plus a system of motivation through the payment of bonuses to performance, suppressing all improvisation in industrial activity. After Taylorism arises the Fordism that owes its name to Henry Ford, American industrial engineer who founded the Ford Motor Company in 1903. The main idea of Ford was that, if manufacturing cars in series, the costs of production of the car would be reduced, which would also lower the sales price and that would increase demand, the market and income. The machining process came into use in industry at the very beginning of the Industrial Revolution. However, was in the 20th century when such technology began to evolve. As *M. E. Merchant* explains in *20th Century Evolution of Basic Machining Technology*, in that period, it has gone through three main stages, namely, development of empirical technology, of science-based (predictive) technology and of computer-based technology. Empirical technology can be said to have had its beginning as an organized process in the late 1890s to early 1900s. Science-based technology began to emerge in the 1940s and computer-based technology in the 1970s. Each of these three stages was ushered in by a key event. The first originated with F. W. Taylor's pioneering engineering research and development of empirical methodology (and

empirical equations) for estimating reasonably economic machining conditions. The second stage was initiated largely by Merchant's physics-based modeling and analysis of the basic force system acting between cutting tool, chip and workpiece in a machining process. The third (and major) stage was the "watershed" event of the advent of digital computer technology and its application to manufacturing in general. That enabled computer-based engineering of the machining process and its integration with all of the databases of the full system of manufacturing.

Nowadays, technology has reduced the barriers of doing business, increasing revenues, improving processes and implementing new tools within companies. According to the vice president of H.P. John Brennan, the companies through their managers must concentrate on achieving their objectives and for this it is important to invest in current technology and according to their needs and growth projections to be able to compete in this market.

In recent years, storage logistics has evolved hand in hand with fields such as robotics, electronics and automation. According to Jeff Bezos, CEO of Amazon, the company will increase the robotic force in its warehouses with 45,000 units. It should be noted that six years ago Amazon decided to acquire Kiva Systems, the company that manufactured these robots, for a price of 775 million dollars. Like Amazon, other companies invest large sums of money in their logistics storage centers, which has driven to a huge innovation in the sector. In addition, the development of emerging technologies, such as robotics and electronics, have allowed optimizing different logistic processes and reducing costs. Some of the systems and technologies that are at the forefront of this competitive industry are: *Robotic storage systems*, WMS (Warehouse Management System), *Radio Frequency Identification (RFID)* systems and *Voice Picking* systems. The *robotic storage systems* are composed of robotics systems and advanced software that improve the operation in warehouses, increase the speed and reliability of merchandise management, reduce costs in the management of the warehousing center, among other advantages. Despite the fact that automated warehouses require complex specialized software, today operators can handle it in a simple way. With these systems, the productivity of the company gains in speed, precision, organization, high performance and total reliability. The *WMS (Warehouse Management System)* allows to take an exact and real time control of the operation, increase the speed of the transactions and have a wide visibility of the movements in the warehouse.

This computer tool identifies the goods and shows their location, manages the resources when they are going to be moved, regulates the workforce, eliminates empty movements and saves the company time thanks to the precision of each displacement within the warehouse. The *Radio frequency*

identification (RFID) technology facilitates the simultaneous reading of several products avoiding passing them one by one through a reading device; In this way, the storekeeper can know the time the product was stored, in what places, etc. Basically, its use allows knowing the location of any merchandise within the supply chain. Moreover, the *Voice Picking* technology improves the order preparation times in the warehouses, because it allows the operator to receive instructions orally, through a headset and a microphone, and thus be free to engage in other tasks.

According to the transportation, the exponential growth of new technologies also had a direct impact in the 21st century on goods transport systems. Both maritime and air transport systems have been nourished by these innovations, as well as those also experienced in the field of energy and mechanics, to greatly increase their reliability, efficiency, speed and capacity. In this way, today it is viable for any company of a certain dimension the transport of goods and merchandise in an easy, efficient, fast and at a reasonable price. In the last 20 years, have emerged new companies destined to the transportation of merchandise of companies, as well as of goods of individuals, at a national and international level. On the other hand, the process of sophistication of road and rail transport has continued, leading to levels of speed, load capacity, transport quality and efficiency that is vastly superior to that of the 20th century.

It also highlights the connection between the different means of transport. transport. Today, it is possible to send a container of goods from China to Germany without having to open the same container, quickly and efficiently. Work has been done on linking the transfer of goods from, for example, a ship to a train, and from the train to a truck and thus reduce costs, reduce the time required for loading and unloading and increase efficiency. Finally, there has been a remarkable technological development of the machinery necessary for the loading and unloading processes that has helped to improve transportation in the 21st century.

Consumers have increasingly become more demanding at the time of requesting reports, requesting support or clarifications and those businesses that have the best times and variety of channels in customer service are the most fortunate at the time of closing sales. The amount of competition is fierce in almost all business areas and that is why the commitment to increase customer service is of great importance when it comes to gaining customers, their trust and loyalty. Thanks to technology, today companies can take advantage of various channels and tools to stand out in their service, streamline their information and attract more interest from prospects, as well as position the brand with an excellent perception of personalized service. The most common channels are the telephone,

your website and the email. The key in them is constant monitoring and the most immediate response time possible, in terms of response via email or website, the ideal is not to exceed 30 minutes on average. However, social networks allow openly offering a line of service. It is a channel that fails because of its versatility and because it is a bidirectional channel for customer loyalty or maintenance, as well as to provide valuable content or brand messages. Through Automated Email Marketing, companies can also use technology to optimize their times while quickly serving their customers. With software like *ESP (Email Service Provider)*, you can automate reports, welcome responses, products or any other that apply to your type of business. In addition, in the B2B market, the information sharing is now a priority. Companies have realized that for establishing a lean supply chain, the information must be shared through the whole supply chain. In the 21st century, new software developer companies appeared offering new IT systems that allow companies to share information with their customers and suppliers in order to predict future demand patterns and to adjust production and stock to the optimal level required, thus reducing enormously costs and increasing efficiency.

Today, the implementation of technology is no longer a luxury, or an investment, but a fundamental need that allows large and small companies to be at the forefront of the new times, with competitive processes in both the national and international markets. According to HP vice president *John Brennan*, the mission of the companies that supply the different types of technology in this market remains clear: to help companies obtain more results in their businesses from their investments in technology. What it means is that the company must concentrate on achieving its objectives or results (focus on its work) and not have to worry about technology, so it is important to be up to date on technological advances with the support of a good company. Likewise, said the manager that these solutions optimize productivity, because they are focused on the needs of the companies and are worked with business partners to meet the requirements and needs of these companies and future. The added value of these new technologies that multinationals are currently incorporating and what makes them different from the others is that they have a large amount of resources, products, solutions and services. The Internet has become the fundamental tool for communications and for business in general. According to *José Fernando Díaz Melo*, director of Business Solutions in this area, if a company seeks greater interaction with its employees and reduces costs of disseminating information in addition to many other things, the ideal will be an intranet; if what I want is that you can meet me, show my products and make sales online, the best will be a webpage with a virtual store (that gathers catalog, shopping cart and means of payment). Likewise, it is important to consider that the growth

of the Internet channel allows the globalization of companies. In addition, it offers the possibility of getting easier and faster at lower costs, since it is easier because it is in a completely global environment, it is much faster because it allows the entrepreneur to place information that he needs immediately so that he is in view of everyone and at lower costs through the global network that already has positioning and recognition.

The implementation of modern production technologies has allowed companies to optimize the time and quality of products and services. These electronic systems proportional to the organizations and the technicians an important tool for the elaboration of certain activities that go from the planning, the design and manufacture until obtaining a finished product. Some of the main technological advances in this field are explained below. The *Computer-Aided Design (CAD)* is any computer system designed to assist the designer in his specific task. The *CAD* primarily deals with those tasks exclusive to the design, such as the technical drawing and its documentation, but it usually allows for other complementary tasks related mainly to the presentation and analysis of the design carried out. The *Computer-Assisted Manufacturing (CAM)* is defined as the effective use of computer technology in the planning and control of the function of manufacturing. The *CAM* system is used for the direct control of process and/or transport equipment and material handling, or to indirectly support manufacturing operations. The *Computer-Integrated Manufacturing* is defined as the integration of digital computers in all aspects of the manufacturing process. The *Flexible manufacturing systems* result from a new approach to production that with the application of technology has created highly automated systems. It is a philosophy of production that is based on the effective control of the flow of materials through a network of work stations very versatile and compatible with different degrees of automation. The *Computer-Aided Engineering (CAE)* is the use of computer software to simulate performance to make improvements to product designs or to support the resolution of engineering problems for a wide range of industries. This includes the simulation, validation and optimization of products, processes and manufacturing tools. Finally, one of the most significant advances has been the development of the *Computerized Numerical Control (CNC)*.

In a *CNC* machine, unlike a conventional or manual machine, a computer controls the position and speed of the motors that drive the axes of the machine. Thanks to this, you can make movements that cannot be achieved manually such as circles, diagonal lines and complex three-dimensional figures. It also increases the manufacturing speed and the quality of the goods produced, also reducing costs.

Artificial Intelligence (AI) [2][3]

The Supply Chain is increasingly operated with technology. There are many technological advances that have had a favorable Impact on the future of the Supply Chain and there are still many technological changes that are yet to come within this sector. One of these changes is the appearance of Artificial Intelligence (AI), but how can this affect the supply chain of a company?

In recent years there has been a great advance in the development of Artificial Intelligence, which has greatly improved its performance and greatly expanded its possibilities. A clear example of this is the most famous chess game of all time. In it, Gary Kasparov (one of the brightest minds and assiduous chess player) was defeated by Deep Blue, a supercomputer whose strong point was the use of Artificial Intelligence.

Deep Blue was able to memorize a lot of steps and analyze the situation something that, a priori, does not seem new. However, this super computer also learned from its mistakes, and this gave it the ability to improve.

There are many companies that already apply this knowledge in the field of transport. For years, companies around the world have used Artificial Intelligence to perform a better tracking of products thanks to the connection they establish with position satellites. But this, which is already a help at the logistical level with the entry of Internet sales, can be overcome by everything that can be done by correctly raising the IA.

On the one hand, this technology can be used in the warehouse area as Amazon does. Thanks to it, all the products can be categorized automatically, something that helps to better dispose them and the time saving that it takes to search for products in an unclear and orderly warehouse. In fact, Amazon's Strategy is what they called Organized Chaos. It is based on the premise that you do not need to have all similar items together. You do not organize them by categories, brands or labels. All the articles are distributed in different places of the warehouse, so they are always at hand. A robotic AI system identify which is the closest location of the item and take it to the operator. In addition, the operator cannot be confused when taking the articles because the ones around are completely different. In conventional warehouse management, an employee can walk up to 1.2 kilometers a day (just looking for orders). Meanwhile, according to Amazon Robotics, in their warehouses "you do not go to the shelves; the shelves go to you". Amazon uses a powerful (and very expensive) software of Quiet Logistics, what allow the labeling and geolocation of each product. The computer knows at all times

where their products are and when and where they move. Moreover, Amazon uses a “Tetris Organization”. It serves to take up all the empty spaces. The operator chooses where the new product he wants to store will go. All he has to do is scan it to inform the robot about the location. According to Amazon, the use of robots and the AI system has reduced the order selection process from 90 minutes to 15 minutes.

If we continue in the warehouse area, the AI can help predict the demand that there will be in the future and, based on this, manage the stocks in one way or another to adapt to the forecasts. This can be very profitable for the company to avoid critical or extreme situations, either of breakage of stock or of a very high stock that originates large expenses to the company.

The prediction of routes, delivery times and other types of variables related to delivery can also be greatly benefited by Artificial Intelligence. This is possible thanks to the use of data from the satellites and the study and analysis of them, making the delivery route as efficient as possible.

Everything mentioned above can help a company like Amazon a lot. But, we could go a step further, applying artificial intelligence to vehicles.

There are many cars that already incorporate the function of autonomous driving thanks to artificial intelligence but according to Sky Matthews, chief technical officer of IBM Watson, at the end of this decade it will be a reality implemented at a more generalized level. This implementation will make it possible for the vehicles to drive themselves and to adapt perfectly to the environment: traffic signs, road conditions, circulation of other vehicles. However, all this supposes a great investment for the companies and a separate legislation of the governments to be able to manage this type of vehicles. This topic will be discussed more extensively and deeply later.

Blockchain technology [4]

Blockchain is, with no doubt, one of the most important technological innovations of the moment. There are people who defend that, depends on the implantation and diversification in all the business areas of the business and industrial world, it can suppose a technological revolution of the level of the appearance of the PCs.

To understand how this technology emerged, it must be mentioned the name of Satoshi Nakamoto, whose identity is unknown to date. In November 2008, under that pseudonym, an article entitled Bitcoin: An electronic cash system of Peer-to-Peer on the cryptography portal metzdowd.com was registered. The text details how to use a computer network to create a digital transaction system, what we know today as blockchain. Satoshi's goal was to stand up to the institutions by creating a decentralized system in which nobody had power over the issuance of the currency. What he did was create a program that anyone can download to a computer to issue Bitcoin. Once installed, it connects and forms part of the large network of computers that make up the blockchain and becomes a cryptocurrency issuer. In January 2009, Nakamoto launched the first Bitcoin software to the network and with it the first digital coins.

To get in situation. If a person called for John wanted to send \$5,000 to another person called for example Lewis, it is normal for the transaction to be carried out through a bank. That bank acts as an intermediary of that and many other transactions, effectively centralizing the movement of capital from one side to the other. John would ask his bank to withdraw \$5,000 from his account and transfer them to Lewis' account. In some time, that bank will have written the transaction into his account, subtracting \$5,000 from his account and communicating to the other bank that must be added \$5,000 to Lewis' account. Someone in Lewis' bank (a computer program) will note that in Lewi's account there are \$5,000 more coming from John's bank account. This management has not needed a transfer of bills from one place to another, but simply there has been one or two banks that have been responsible for making the money pass from one to another with a simple change in the balance of their accounts. But, neither John nor Lewis have any control over the process, of which only those banks have all the information. Both depend on those banks and their way of doing things to complete that transaction. They are subject to their conditions and their commissions. The blockchain basically eliminates intermediaries, decentralizing the entire management. The control of the process is of the users, not of the banks. And this is not only about money, but the example can be extrapolated to

many other types of transactions. The users basically become part of a huge bank with thousands, millions of nodes, each of which becomes a participant and manager of the bank account books.

So, the blockchain is a gigantic book of accounts in which records (blocks) are linked and encrypted to protect the security and privacy of the transactions. It is, in other words, a distributed and secure database (thanks to encryption) that can be applied to all types of transactions that do not necessarily have to be economic. That blockchain has an important requirement; to carry out and register a transaction in that gigantic account book, it is necessary that all the nodes involved in this operation verify and validate it.

Returning to the previous example, if John wants to withdraw a bitcoin from his account to give it to Lewis, first he warns everyone with a peculiarity: nobody knows that John is John and that Lewis is Lewis. They only know that from a digital portfolio (what would be a bank account) you want to transfer that amount (which is known) to another one. John, therefore, warns of his intentions, but without revealing his identity. When sending that message, all users of that network first check that the home portfolio has enough money to send it to the destination portfolio. If so, they all write down that transaction, which happens to be completed and to be part of the transaction block.

The operations remain permanently registered in that blockchain and cannot be modified without altering all the blocks that are linked to it, an operation that would also require that most of the nodes validate it. That account book is not only distributed and safe. The linked blocks (hence the blockchain) have a hash pointer (encoded) that links to the previous block, plus a timestamp and transaction data, and that information is public. The blockchain, although protecting the privacy of its users, does allow to control the traceability of those transactions. It lets you know the whole path that the bitcoin of the portfolio that belongs to someone has followed (in this case to John, although his identity is not known by the other users) before reaching someone else's portfolio (from Lewis, although your identity is not known by the other users). In the same way, it would allow knowing that a supplier has sent an order to the company of which it is a supplier, and that the company has received it.

The design of the blockchain itself has clear advantages. For example, it confirms that each unit of value (for example, each bitcoin) has only been transferred once, which avoids the traditional problem with the double spending of digital currencies or false money. Likewise, it greatly reduces the risk of internal and external fraud, as well as the misappropriation of funds. It also significantly facilitates the accounting of companies, taking financial and logistics transparency in business to a next level,

as well as the information sharing between companies. All this, reducing to remote levels the possibility of being hacked due to the fact of the encryption present in all the blockchain, as well as the fact that the multiple nodes involved in an operation should be hacked.

As previously mentioned, although the block chain is closely related to new crypto currencies or cryptocurrencies, this system is valid for other types of transactions. In fact, that is what the Ethereum platform, which has its own chain of blocks and its own currency, called Ether, is trying to achieve from the very beginning. Unlike Bitcoin, the transactions here are smart contracts, which can be more or less complex, and allow you to define all types of transactions. As with Bitcoin, the good thing about these transactions is that they will remain in the blockchain, unalterable and accessible throughout the life of that blockchain. If we go to the extreme, Ethereum could basically replace any intermediary, substituting products and services that depend on third parties to be totally decentralized.

The versatility of this technology is so enormous that it is difficult to think of an area that cannot be transformed by this idea. At the moment, there are many ideas and projects in full development in many different areas of business. However, this technological revolution, although possible and with unlimited potential, seems still distant. Intermediaries (in all areas) have become an integral part of the economy and society. Decentralizing all these industries is much more complex than it seems, especially because those same intermediaries will try to reject these changes or adapt them to their own needs.

A company that could undoubtedly benefit a lot from the establishment and implementation of this technological innovation is Amazon. Below is an estimation of what it could mean for Amazon's Supply Chain and the impact it would have for the e-commerce firm.

The blockchain technology could be extremely useful for Amazon in the B2B area. However, this utility will not be evident if the blockchain is not implemented globally, since the blockchain has great benefits in terms of transactions, which inherently implies two or more parts. This utility could also be transferred to the B2C area if the bitcoin cryptocurrency reaches a massive acceptance and a big presence in the society. However, while in the B2B area the implementation of this technological innovation could have repercussions both at the level of economic and operational transactions, in the B2C area it would probably be limited to the economic scope of purchased items payment and to the traceability of shipments.

If we do an analysis at the operational level, the advantages that the blockchain can bring to Amazon are giants. It would allow a unique registration for Amazon and its suppliers about the items purchased. Considering the large size of the company and its huge volume of business, any step towards simplifying the transaction operations and their registry is an important advantage. In addition, it would take the information sharing between Amazon and its suppliers to one of the highest levels, since both parties would account for their financial transactions, objects and services in a single common unmodifiable and consultable database. It would be very easy to verify that a shipment was made correctly (considering all the aspects such as transportation, quality, delivery date...) and, in addition, allowing the traceability of each order that Amazon received and stored in one of its warehouses.

Considering customer service, the establishment by Amazon of the blockchain technology could help Amazon to allow its customers a verification of having received the purchased item, in the desired conditions and at the agreed time; all this in a simple, safe and private way. As explained in this research project, the future transportation options and shipping operations of Amazon could be quite diverse and complex

, and ensure traceability and check that each item sent reaches its destination is essential for Amazon in order to maintain loyalty from its customer base. On the other hand, if there really is such an important change in economic matters as the actual implementation and the massive use of bitcoin or any other cryptocurrency, operating in the blockchain would make it easier for Amazon customers to pay their purchases quickly, simple, safe, private and without intermediaries.

At the level of the company itself, it is evident that it would benefit from the aforementioned advantages in terms of cyber security and fraud prevention. Both Amazon's economic and operations accounts would be practically immune to hacking risks. In addition, the possibilities of commission of internal and external fraud, at an economic, contractual or operational level, would be reduced to a large extent. In addition, the elaboration, modification or extension of contracts would be affected. The personnel contracting, as well as financial contracts, services contracts or merchandising contracts, both internal or external, may be facilitated and could be avoided much of the bureaucracy and the current paperwork. It could be taken an exhaustive and veracious control, and would improve company's transparency.

In conclusion, blockchain can offer great business advantages to amazon, especially related to big data analytics, exchange of information, in the scope of contracts and, above all, at the level of

financial and transaction accounting of all types. It can also mean an improvement at the level of cyber security, and prevention of fraud and capital misappropriation. However, the main weak point of this technology is that Amazon and any company that wants to make use of it can gain advantage if most of the business sector begins to establish and use this technology. Amazon can take advantage of the implementation and individual use of the blockchain, but the global implementation expands its business opportunities notoriously. Considering the social and corporate inertia to such profound and significant changes, it is reasonable to think that, despite its enormous potential, it is a technology that is still quite distant and that will take time to have a notorious relevance in the business world and, probably, even more in the field of logistics.

Big Data Analytics [5][6][11]

In February of 2011, Watson, IBM's intelligent computer, won the rest of the contestants of a popular television program in the United States. Today the supercomputer is 90 times faster than it was five years ago. Then, because of its size, it only fit in a large room. Today it occupies the space of a few boxes of pizza and its ability to analyze, understand, create, innovate and solve problems is much greater.

That cognitive ability should be applied in the company. According to Lucía Álvarez, director of IBM Analytics for Spain, the company of the future is a cognitive company: "it can understand its environment to innovate, learn from mistakes or anticipate a situation". The data has become the new raw material that must be exploited to generate value. An example is the medical sector, which generates millions of documents every year between clinical trials, tests or reports. There is no doctor in the world capable of digesting all that information. Therefore, a data system that stores, manages and analyzes all that knowledge will help a patient to be able to implement a treatment according to their needs, much more personalized, and not a generic one that may not have such good effect.

Nowadays, everything leaves a trail of information. The data analysis has the challenge of combining that track with everything that happens out of doors. That is to say, to mix internal company information, obtained through transactions, surveys or conversations with consumers, with external information.

IBM is carrying out a project with insurance companies adding weather information to their data. The climate influences business. A car insurer that notifies its customers, in real time, of the damage they may suffer due to a storm, instead of managing accidents, will predict accidents. The possibilities, in addition, are much more extensive. In the health sector, thanks to big data you can predict if a person is going to have one disease or another; or in the electricity sector, how much wind energy will be produced in a specific period. Currently, big data has been applied to structured data. The objective is to do it with the unstructured information.

But this is a real challenge for the sector, since the amount of data handled is really huge. It is estimated that more information has been created in the last 10 years than in the history of mankind. The capacity to store digital information doubles every 40 months since 1980 and, according to IDC, in 2025 there will be more than 163 zettabytes of data worldwide, 179,220,395,327,488 Gb. According to Matt Bregman, CTO of NetApp, we are going from big data to huge data, a model that

will require new architectures to store and process that data, going from the mere collection of information to its use to create business opportunities based on large-scale, high-performance analytics. It is in this position when the origin and nature of the data itself become the added value of the analysis. The capture of reliable, good and useful data will have an impact on everything the experts do with them later.

Bregman defines three main trends in Huge Data. The first, the autonomy of the data. "The data is becoming self-describing, it tells us what it needs us to do with it and how we should manage it." The second one involves the simplification of security and the management of roles in access to data. "The whole governance process is simplified because the information will know for itself who can see it and how it should do it." Bregman's third premonition of the very nature of this huge data goes through the imitation of the collaborative economy. «Data leasing models are being promoted, data management as a service, with Amazon Web Services and Lambda as precursors. It's the same base shared by services like Uber or Airbnb ».

The profile of the consumer has changed, their behavior patterns are no longer easily predictable. Companies face a greater demand from the customer, largely as a result of the large amount of information available to them and which influences their purchase decision. This, together with a lower consumer loyalty towards products and brands, forces companies to understand in depth what their public needs and to respond to them.

In relation to the previous point, the supply chain must be focused on contributing value to the company in a sustainable way over time. Before designing the supply chain, its operation and organization, it is necessary to know the consumer and their demands. In addition, in a context in which the life cycle of products is much shorter and there is more variety of options than in the past, the need to differentiate from the competition also gains weight when managing the supply chain.

These technologies can make a difference in the business sector, offering new levels of innovation and competitiveness, and positioning itself as a differentiating element. Amazon is one of the great examples of how big data analytics and data mining strategies can create a competitive advantage over its competitors, and can focus the overall strategy of the company in the sense that consumers want, in order to increase the niche market and create an efficient and sophisticated network of data management and analysis to support its logistics, marketing and business expansion activities. There is no doubt that Amazon will continue to develop and implement technological innovations in this area.

A great advantage that the development and innovation in Big Data can bring to Amazon is the implementation of technological improvements that enable the acquisition of data and allow discovering the needs and points of improvement in the company. A second advantage is that the improvement in the analysis of the data can substantially improve the decision making within the company, minimizing the risks. In this way, Amazon could optimize its decisions by analyzing customer data, employees, operations, transactions, and other internal data, but also external. Third, data analysis makes it easier for companies to evaluate their products. Through a more sophisticated analysis and more data, Amazon would obtain valuable information that would allow it to create new product lines or redesign existing ones, as well as support Amazon's diversification strategy in different lines of business.

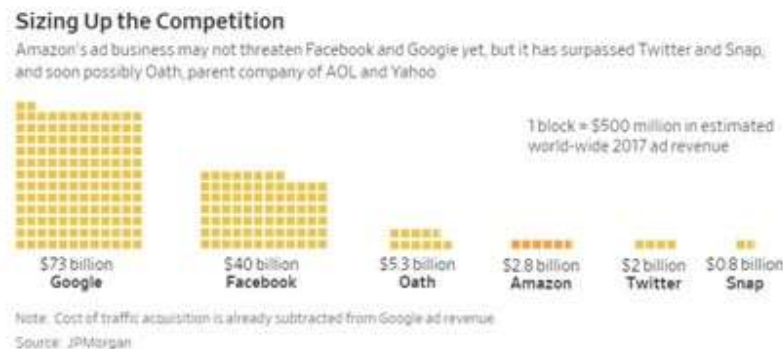
Another advantage is the segmentation of customers to customize actions. However, through the incorporation of external data and the computational analysis of these with inmates, Amazon could guide their services and meet the needs of their consumers in a specific way and, at the same time, understand more deeply the needs and desires of those users who are not customers, and work to meet their demands and thus increase their customer base.

Finally, Amazon would obtain an improvement in the accessibility and fluidity of the information within the company itself, creating a faster and more efficient work dynamic. Something essential for a gigantic company with thousands of employees and a large amount of internal information generated.

As a result of this increase in collection, storage and, above all, in the data analysis, there are some strategic opportunities that Amazon can take advantage of. Google and Facebook are without a doubt the main protagonists of online advertising, but there are voices in the industry that have warned of the irruption of Amazon as a new actor to be taken into account. Although Amazon does not publish detailed information about its advertising business, it accounts for most of the 'Other Income' category, which accounted for \$ 1,735 million in the last quarter of 2017 (3% of total revenue excluding Whole Foods and 62% increase compared to 12 months before).

In February 2018, investment bank JP Morgan published its opinion on the growing advertising business of Bezos' company and its potential disrupter. JP Morgan points out that the company has a huge amount of proprietary information that differentiates it from the duopoly formed by Google and Facebook. She is the only one who knows what customers buy. Analysts also highlight the resources

Amazon is devoting to developing its advertising platform and strengthening its relationship with media agencies and advertisers, including an office in New York.



Source: The Wall Street Journal

However, the data show us today an unequal struggle. Both Google and Facebook continue to grow, and Amazon will have to work hard to become a market player. To do this, Amazon already has a full range of search-based web and mobile self-service advertising solutions (sponsored products, featured ads, display ads), ads on Kindle devices, programmatic solutions, etc. He is also developing personalized advertising for video streaming and plans to offer product advertising on his Alexa platform.

On the other hand, although a majority of searches on the internet starts on Google, Amazon is becoming more and more users at the starting point when it comes to obtaining information about the products they wish to acquire (more than 50% in the US). And given their ability to close the cycle, many of these searches end up materializing in purchases in their stores.

This use of Amazon as a search engine could have a negative effect in the medium term on the advertising business of Google and Facebook:

- The searches initiated in the shopping page translate into fewer ads served by the search engine and the social network.
- The loss of data impairs, even minimally, the ability of the duopoly to extract quality information from users' browsing.

In addition, any increase in Amazon's retail market presence strengthens its advertising business and brings it closer to the competition by retracting data and revenue to the two largest. By improving its Data Mining capacity, Amazon, in addition to having information on what customers buy, will be

able to know with certainty how they buy, how they consult products, what makes them decide on one or the other, their frequency of purchase, etc. Valuable information to segment users and to improve their advertising product offer, making it more attractive to agencies, vendors and end customers of its platform.

Based on this knowledge, an important part of Amazon's strategy in the advertising business is to attract advertisers who do not sell on the company's platform (non-endemic brands). In this line, Amazon works with these advertisers and with the agencies, offering them consultancy and education on how to advertise in the store and get to know their customer better based on the purchase they make of other products.

In addition, whether we like it or not, nowadays advertising is an essential element of the market economy. Its evolution has been marked to a large extent by the media and technology, which determine the audience segmentation capacity in order to increase the effectiveness of the messages sent. The digital revolution of the last two decades has brought with it innumerable new advertising opportunities. Amazon, as a technological leader, has undeniable strengths (data, technology, market power) that place it in a good competitive position for the future.

As mentioned above, customer knowledge and its segmentation are key in Amazon's retail business, since it helps it optimize its product and service offerings, improve its inferences about future purchases and generate cross-selling opportunities. Among the final objectives, it would be to fine-tune the price at the client level to adjust it to the value assigned to the good object of the purchase.

It seems evident that advertising will be more effective the more relevant (personal) it is to the one who receives it. On the other hand, this extreme personalization must be careful not to be intrusive and provoke rejection. Amazon has invaluable information from its customers that can be treated at an aggregate and individual level.

The enormous size of its customer base and data collected, together with its technological capacity, allows Amazon to experiment, take the segmentation to the limit and generate new data. If the company does things well, this potential should be reflected over time in an improvement of the advertising efficiency in its pages and in a generation of additional income and higher margins.

At the same time, more and more users make their purchases online from their phones. In markets like China, this is the most common practice. The reality is that we all carry in our pocket a device

with extensive information processing capabilities and that knows our situation. It is a matter of time before advertising takes advantage of all this.

On the one hand, when it comes to hitting the advertising message, not only does personalization count. It is also necessary to be relevant, adapt the message to the context in which the receiver is. And the location is a fundamental part of the context. In this way, knowing our location, Amazon could focus and further segment their advertising, increasing efficiency in that field.

On the other hand, this increase in Big Data Analytics, supported by other technological innovations, could allow Amazon to facilitate its users the buying process. Through graphic recognition software and computational comparative analysis, its users could take a picture of a product they see and, automatically, the app would indicate if said product is in stock, its price, different varieties of the same product, etc. In this way, Amazon would take online shopping and customer service to a level that would allow the company to gain even more market share.

In addition, Amazon has just entered the world of augmented reality with AR View, an application that will allow us to visualize the product we want to buy in the physical environment to which it is destined.

Autonomous vehicles [7][8]

A century after the invention of the automobile, the great manufacturers and technological emporiums are committed to making autonomous driving a reality. By definition, it is a car capable of imitating the human capacities of driving and control. As an autonomous vehicle, this machine is capable of perceiving the environment that surrounds it and navigating accordingly, in addition to using advanced control systems and interpreting sensory information to determine navigation routes, as well as obstacles and relevant signaling. In short, it is a vehicle that drives itself, an independent machine that does not need the direct intervention of men in the execution of their task.

It is expected that by 2020 there will be some 10 million cars capable of driving alone, running without a driver on the roads. There will also be more than 250 million smart cars, connected to high-tech networks, sharing routes with them. In fact, there are already certain functions of autonomous driving implemented in some models thanks to companies such as Tesla, Mercedes and BMW. All thanks to Machine Learning and the complicated systems of sensors, cameras and software that helps vehicles to be able to absorb data from their environment and learn to respond to what the data tells them.

Regarding autonomous trucks, the more than 8.7 million employees in the United States in the trucking industry have good reason to be concerned about how driverless trucks will affect them. Daimler has just launched an autonomous 18-wheel truck that will run on the country's roads. It will not be completely driven alone, although it will have autonomous driving functions similar to those of the autopilot of current aircraft. It can also be maintained at a continuous speed and circulate at a safe distance from other vehicles, among other things. But progress is already being made toward complete self-driving on trucks. For example, the Swedish startup Einride has presented a prototype autonomous truck without cabin that can be controlled by remote control or drive without human intervention. Last year, the autonomous Uber truck traveled more than 100 kilometers to make its first distribution of 50,000 beers.

But the future of transport without a driver does not only happen on the road, but also by airplanes and other flying vehicles. In Dubai, authorities have already tested, in collaboration with Volocopter, a taxi-drone that circulates through the air without a driver. It is a model with two seats, which took one of the princes of the country on a five-minute flight. In the future, in Dubai they pretend that you can call an air taxi as you ask for an Uber, to avoid traffic jams. Meanwhile, Amazon is changing the

distribution of merchandise with Prime Air, using unmanned aerial vehicles (drones) to take products to its customers in less than 30 minutes.

Transport by sea is also beginning to register changes. Rolls-Royce has made public its plans to build freighters capable of transporting goods without humans on board. The fleets of this type of ship would be controlled from a ground control center. Since they would not have personnel on board, operating with these ships would be more economical and would have more room for goods than current ships. As predicted from the company, we will see a remote-controlled ship for commercial use before the end of this decade.

However, all these latest advances also have their limitations. The accidents that the google car has carried out during the tests in the real streets have shown certain limitations that must be faced. Mainly, these vehicles are able to circulate efficiently only by pre-programmed routes and mapped in advance. In addition, in urban traffic, autonomous vehicles are somewhat undecided when trying to suddenly change lanes or give way to other vehicles while evading obstacles, since the vehicle still cannot recognize or anticipate the movements or possible actions of other cars. It is proposed that the solution in these cases could be to establish a system of communication and general interconnection between all vehicles. In this way, vehicles can communicate with each other and know exactly what actions each will take, eliminating incidents between them.

In addition, there are limitations with adverse weather conditions, such as heavy rains, snow, fog and total darkness that impede the complete functioning of sensors and cameras. Volvo and Ford try to solve these conflicts. Volvo, on the one hand, proposes a system of marking magnets hidden in the road for when the visibility is bad or some sensor fails, while Ford has already made tests of their vehicles on completely dark highways.

But the difficulties are also in the legal field, since technology advances its steps faster than laws. The legal system is not yet qualified to face autonomous driving. To achieve this, it is necessary to change the entire vehicular traffic code, which is different in different countries. In addition, the law faces the consideration of ethical issues related to the driving by a machine.

The development, implementation and establishment of the autonomous vehicle would, obviously, have a great impact worldwide, both in the business sector and in the social field. For Amazon, the consequences of the success of such technological innovation would be enormously favorable. Although to date Amazon does not carry goods and objects, but outsources the shipment of packages, this could change in a short period of time if the popular unmanned aerial vehicles, called drones, are

incorporated into the operating strategy of Amazon. However, this particular technology will be analyzed later in greater depth. The appearance of autonomous transport - by road, sea and air - will have a big impact on the company. In the short term, this technological innovation will allow transportation companies to increase their efficiency, which will allow a price reduction for its users, reporting financial benefits for Amazon. The capacity of the vehicles will increase, and there will be no limitations in terms of maximum time of circulation, which will reduce delivery times, increase the frequency of shipments and reduce accidents. All this will mean benefits for companies subcontracted by Amazon, such as UPS, as well as for customers, as it will result in a clear improvement in service and may reduce waiting times for the item purchased to a minimum that is currently impossible to achieve. This will also make easier and faster for Amazon to send items from a far-away warehouse to another one in order to avoid stock rupture, or to reship the product to a customer.

This is a very nearby innovation that will affect the whole business system and will generate many benefits for almost every industry. However, there will be many people that may lose their jobs, or they lifestyle may change significantly. Despite the huge range of possibilities that autonomous vehicles offer, there are social issues and legal issues that have to be faced. Moreover, the safety of such vehicles must be guaranteed. The first fatal accident of an autonomous Uber car has already occurred in Tempe, Arizona, unleashing the mistrust and fears of many sectors of society. That could delay its establishment but, almost with total certainty, in few years it will be a generally established technology, allowing companies to reduce costs, reduce lead-times, increase efficiency. In the non-commercial field, it will reduce enormously accident risk, reducing notoriously trip mortality.

On the other hand, in the long term, it will be still more profitable for Amazon, since the company is working on a very ambitious project to reduce intermediaries to the minimum. The news agency Bloomberg leaked the existence of the “Dragon Boat” plan in which Amazon works for, among other things, dispense with the distribution services provided by UPS or FedEx, and have their own fleet.

In addition to having a transport and logistics platform worldwide, Amazon would take care of the purchase, reception at origin, transportation, custody and delivery at destination. Thanks to the volumes handled, Amazon would monopolize capacity in certain transport routes. Thus, an evolution of the storage, packaging and shipping service is proposed, the so-called 'Fulfillment by Amazon', which the firm offers to companies that sell their products through its website. Amazon could offer the transport and logistics service to these companies at reduced prices. In addition to driverless

transport, greater automation of the entire contracting system for services and distribution processes would lead to a greater reduction in costs and a substantial increase in profits, which would also be more attractive for the business market. to the decrease in the prices of the services that Amazon could afford. Thus, the larger the merchandise traffic that passed through their hands, the possibility of optimizing and arbitrating is multiplied, and, with it, the benefits associated with their role.

According to Bloomberg, it would be a potential business of 400 billion dollars. Its focus would be, initially, in China and India. The main objective would be to weaken in the Chinese market its only great rival at world level, Alibaba, offering opportunity to other producers that, otherwise, would not have possibility of exporting to the western world.

RFID (Radio Frequency Identification) Systems [9][10]

RFID (Radio Frequency Identification) is an identification technology that uses electromagnetic waves (radio signals) to transmit data stored in a microchip. A digital RFID system identifies data in real time without manual and visual human interventions, adding time, security and efficiency gains in various applications in the process of information acquisition.

This technology is used to identify, track and manage products, documents, objects, people, animals, etc., without contact and without the need for visual field. Projects around the world have proven their functionality, which can be applied in security, access control and traffic in all types of different sectors. RFID technology has wide application in the management of the logistics chain. In addition to the control of movement and storage of materials throughout the logistics processes, it manages to optimize time, reduce the costs of distribution and movement of materials and improve services and customer service.

The functionality of RFID technology facilitates management and adds value to products and services. Companies that use this technology can focus on activities that add more value, which will have a direct impact on the company's results with improved productivity and customer service. The RFID technology also allows to store product data, send position indicators and combined location to a GPS, informing of the precise location, as well as storing the solicitations and characteristics of the product.

While it is true that the greater the volume of a company's logistics system, the greater the difficulty of managing it, the greater the possibility of optimizing the supply chain and the greater impact it will have on the global situation of the company. It is evident that this technology would bring innumerable advantages to Amazon in case of being implemented. Some of which would be the optimization of the processes of reception and shipment of products, with the automated reception integrated and planned, and the control of the shipments without needing to await notifications; automation, control and supply of stocks, automatic registration of product inputs and outputs; optimization of price checking, missing items, returns and expiration date of the products; agility and reduction of errors in deliveries of customer orders; time gains in movements and product locations; agile and simultaneous capture of several tags with elimination of the "one to one" reading processes of the barcode; guarantee of authenticity of products with unique code recording not alterable; accurate product tracking via GPS in real time; guarantee of capture of the RFID tag with recording

and recording of date and time of reading; agility and reduction of manpower to make the inventory of products and materials.

With broad functionality and multiple benefits, RFID technology can be a competitive differential for Amazon. However, it is a technology that needs specific solutions in different situations, such as radio frequency band, range, interference, barriers to radio waves, hardware and software compatibility, energy sources and standardized code structures.

In addition, this technology has three main disadvantages, which can be a handicap at the time of implementation and establishment in Amazon's logistics and operating system and should be taken into consideration and try to act on them in the best possible way.

First, RFID systems are much more expensive than other alternatives such as barcode systems. While passive tags such as bar codes are less expensive, active tags are expensive because of their complexity. Active tags consist of an antenna, radio transceiver and microchip, increasing the overall cost of an RFID system. As long as the unit price of each label does not decrease sufficiently, it will be too great an impediment to its implementation.

On the other hand, another limiting factor of said technology is the so-called collision. There is tag collision and reader collision, and they are common in the use of RFID systems. Collision tag occurs when numerous tags are present in a confined area. The RFID tag reader activates multiple tags simultaneously, all of which reflect their signals back to the reader. This results in the collision tag, and the RFID reader does not differentiate between incoming data. RFID reader collision results when the coverage area managed by an RFID reader overlaps the coverage area of another reader. This causes the interference of the signal and several readings of the same label.

Finally, we must bear in mind that RFID technology gives rise to numerous security problems. Since the system is not limited to the line of sight, external (and malicious) high-intensity directional antennas could be used to scan sensitive labels. Fraud is always a possibility when using technology for high security operations, such as payment verification.

Future developments in the Amazon business and operational strategy [12][13]

Taking into account some technological advances that will be incorporated in a massive way in the business and operational world of the companies, as well as the strategic movements that Amazon is carrying out, together with the fact that the financial muscle and the market volume -every time greater- that the e-commerce firm has, will allow Amazon to make totally huge and radical changes in its global structure of business. It is certain that in a short-term and medium-term future, the situation and the logistic and operative system of Amazon will be totally different from the current one.

As is evident, Amazon will focus on reducing costs as much as possible and, at the same time, increase the quality of the services it offers. This goes through one of the most ambitious plans of the company, previously mentioned, which is to internalize the entire transportation and shipping system of products that is currently outsourced. Amazon sees itself with sufficient operational, financial and management capacity to, in a few years, have absolute control of the transportation and shipment of its products, from the receipt of the same until the product reaches the consumer. This would mean a huge cost reduction by itself. However, what Amazon tries to do with this movement is nothing more than having the ability to put together the pieces of a gigantic puzzle to make a global innovation in its transport and shipping system that would mean a revolution in this matter. Joining this piece to another piece of the puzzle, the emergence and development of autonomous vehicles that do not require a driver -technology in which Amazon is investing large sums of money and is working to bring it to light-, many new options appear. For example, the fact of having its own fleet of autonomous vehicles would allow Amazon to increase its transport capacity due to the fact that these vehicles would not have limitations regarding the number of maximum hours circulating and could work both day and night, taking advantage of the fact that it is precisely at night when there is a lower concentration of vehicles on roads, ports and airports. All this leads to a clear reduction in waiting times for the customer to receive their order, significantly increasing the satisfaction of Amazon users. Also, both to drive a huge trailer and to deliver a package in a small rural town, a driver is required. Incorporating autonomous vehicles, Amazon will be able to significantly reduce fixed costs. In addition, the automation of the vehicles would coincide with a global atomization of the processes of transportation and shipment of products, which will undoubtedly allow automate transport times, optimize shipping routes and control and track the packages that Amazon has in circulation at any

time. The more automated the subsystems of a global system are, the better is the rapport between them, and much better is the automation and optimization of the processes carried out.

In addition, this new, powerful and huge global transportation network that Amazon, with great security, will implement, leaves open the door to the company to diversify its business model -as it has been doing since its inception-. Due to its huge volume of transported products, it will capitalize many transportation routes and, probably, will develop its own routes in order to optimize the logistics network. In fact, there are voices saying that Amazon plans to own their own freeways for autonomous trucks, which according to traffic could be redirected from a distance. This will allow Amazon to fully engage in the business of transporting goods, offering companies that sell products on their website, in addition to the current storage service that Amazon offers, the transportation service of the same, which could have an impact at a global business level since it would allow small companies to export their products. In this way, Amazon could open a hole in a business model totally different from the previous one and, due to its corporate weight and its technological innovation, it would have a totally destabilizing weight in the sector.

In my opinion, once Amazon takes charge of its own distribution and shipping of products, as well as having incorporated the autonomous vehicles, the transportation and distribution of the packages will be done in a completely different way to the current one. First, one of the limiting factors when optimizing the sending of packages is that the schedule of receipt of the packages by the users is a partial schedule. If Amazon had the possibility to deliver packages 24 hours a day, it would mean a huge reduction in delivery time and costs. Before how to expand the delivery, schedule has been speculated enough with the possibility that an operator of Amazon had access to the address of a user and deposit the package inside the house despite the owner was not in it. However, this entails great complications both in the legal sphere, as well as an evident need for users to accept and trust an intruder in their home, which is highly questionable. However, what could be a good solution to the problem would be to have some spaces where Amazon could send the packages and, the recipients, could pick them up without this being a great annoyance. Analyzing how Amazon has entered the business sector of supermarkets, acquiring Wholefoods, as well as Amazon is buying properties and opening physical headquarters of the company in more and more cities and places, it is possible that what the company is planning is to restructure the entire process of sending and receiving the package by this way. That is, it is possible that Amazon install compartments in supermarkets where the company can deliver shipments at night and users can pick them up, with a code that would be sent to your mobile device, when it is convenient, thus attracting users to their supermarkets and increasing

the business possibilities. In the same way, it is possible that Amazon acquires or builds large logistics centers for the storage of packages throughout the main urban centers. In this way, the package would be sent to the storage center closest to the user and, in the same way as the previous situation, the user could get his package when it was good, and the company would expand its operational delivery schedule.

On the other hand, it is well known that Amazon is working on the development and implementation of drones in its delivery system. As explained in previous sections, these autonomous vehicles have both advantages and disadvantages. This, from my point of view, will lead Amazon to develop a duality in the packaging delivery system. On the one hand, it will focus on the distribution of large urban nuclei in a dimension that prevents the use of drones. It is obvious that it is not viable to have thousands of drones flying over a city like Chicago on a daily basis. Not so much at an operational level, but at a visual, ecological and ergonomic level, and at a legal level. That is why Amazon could choose to wield the aforementioned service based on storage areas of packages, which would arrive through unmanned vehicles such as trucks or delivery vans. However, the idea of using drones makes much more sense when considering the shipment and distribution of products in rural or sparsely populated areas. Since there is no high rate of concentration of distribution in these areas, there is no real problem of visual contamination nor is there a legal problem as exhaustive as it can be in urban areas. Precisely because of that low concentration of orders, being the shipments many more dispersed and distanced among themselves, it supposes a loss of time and of money much greater the shipment by means of the conventional method of transport by road. It is there where the ability of a fleet of drones to send packages in a very individualized way and with a much lower unit cost than a delivery van can be greatly exploited. Despite some situations that should be considered as the lack of performance range, which can lead to the need for a drone to be recharged throughout a shipment, or to the safety of the same drones that ensure total reliability of delivery, the distribution by drones in sparsely populated areas can be a key element when it comes to reducing costs for Amazon. The delivery of the package could be done in a packet storage building waiting for the user to pick it up in towns with a sufficient population density or, in almost a quite remote area, directly in the user's house, which would entail take into consideration some issues such as the interaction between user and drone in order to guarantee that the package arrives in legitimate hands without being lost or stolen by a third party. However, one of the most striking solutions that Amazon could probably take benefit from is the use of floating warehouses. The company has a patent that allows its centers to be floating in the sky. These platforms would allow the drones to pick up packages and be replenished

without having to reach land. This is one of the last patents obtained by the company, in December of last year.

On the other hand, beyond the retail business, a huge part of the benefits of Amazon come from its unstoppable division of cloud computing services for companies, Amazon Web Services (AWS). It is the fastest growing unit of the multinational and one of its main engines. It's a very important part of Amazon's business and, according to Jeff Bezos, it can be equal to or even larger than the company's retail division. According the Wall Street Journal, AWS has taken 10 years to reach a turnover of 10,000 million dollars, much less time than it took the retail division to get that same figure. In addition, within the world of information technology, AWS is the company that has achieved the fastest turnover; the rest has taken twice as long, and that they had a very different business model, since they forced their customers to pay in advance, while with AWS they should not make any kind of prior payment. They only pay for use and afterwards.

From my point of view, Amazon Web Services (AWS) plans its future by looking to the Middle East. Before 2019, the company has announced the opening of new data centers to help it enter that area. A terrain where its positioning is still weak due to other giants with more weight in the territory such as Alibaba. Amazon confirms that it will open a new infrastructure in that region, specifically in Bahrain. Andy Jassy, CEO of AWS, said: "With the transformation they are experiencing in the Middle East, technology must play a key role and the cloud is in the middle of this change." In fact, the momentum of the region began already in early 2017 when AWS opened an office in Dubai. The future plans of the cloud services part of Amazon aim to turn the Middle East into a strategic area where it will be challenged face to face with Alibaba. A strategic move over the war that both giants are waging for the supremacy of the international market and with which Amazon could try to unseat its rival in that geographical area.

After months of delays, in January of this year, Amazon opened a physical store in downtown Seattle called Amazon Go. In it, the mobile is the central element. It is the key that not only opens the main access, but is the indispensable element to make the payment. It is a system based on object recognition technologies, a tracking system that takes advantage of the data sent by the thousands of sensors and infrared cameras deployed by the facilities. It is a small shop of only 167 square meters in which, mainly, food products are sold. One of its most interesting and novel aspects is the lack of lines of boxes and, therefore, of human cashiers, who in the traditional trade are responsible for

scanning the products and charging the consumer. In Amazon Go, everything is automated. The supermarket has a staff of employees who are responsible for replacing the products on the shelves, cooking fresh products and addressing the doubts of customers. The consumer enters through the door after scanning a QR code from the phone, inserting the items in a bag (or trouser pocket) and, as soon as they leave the premises, they have already loaded it into their Amazon account. However, not everything is positive. The project has been delayed one year due to continuous technical failures when carrying out collection operations. The selected products were not recognized correctly, especially at times of great mass. The system needs to assess the movements of customers and, according to the company, is thieves-proof. The supermarket is constantly monitoring and identifying customers, a scenario that the staunchest defenders of privacy will find dangerous. Despite these adversities, this new store concept revolutionizes the traditional style of retail commerce, facilitating the user experience, making it more comfortable and much more efficient by eliminating the main bottleneck, the time of payment. The fact of the opening of Amazon Go, coupled with the acquisition of Wholefoods by Amazon, inevitably leads to think that the company has the objective of implementing this innovative model of physical store across the United States and thus try to mitigate the increasingly undermined Amazon competition, such as Target. And, in case of obtaining a positive result, knowing of the expansionist and globalist strategy of the company, export it to other countries.

If we analyze the company from another perspective, a press release from the company about its business loan business has gone almost unnoticed. The Financial Times, for example, published an article on the subject, "Amazon to ramp up lending in challenge to big Banks", in which it speculated about the possibility that Amazon will become a competitor for traditional banks, long ago uneasy about the progress of the Fintech initiatives. This is a not unreasonable possibility and that, if we analyze the situation a little, it makes a lot of sense.

As defined by Ben Thompson in his article, "Amazon's new customer", we are facing a service provider company that relies on the economies of scale generated by its own activity to increase its supply of those. The number of companies that use the Amazon platform, whether to sell or not, does not stop growing. On the one hand, every time Amazon enters a new category of product or service, it attracts a multitude of sellers from that market to its marketplace. These merchants become users of the aforementioned Amazon Web Services (AWS) technology platform, which provides them with a robust, scalable and configurable IT services offer at a price without competition. The counterpart is that, as companies subscribe to more services on the platform, they increase the barriers to exit,

making it practically insurmountable for the majority. If to the previous thing the use of the logistic systems of Amazon is added, the lock-in is almost total. The reverse way is also given. Many companies start using AWS services, as a technology provider, and end up becoming members of their sales platform when Amazon starts serving their markets. The result is the same. This ability of Amazon to scale its services, with minimum marginal cost, and attract a majority of suppliers (if you are not in Amazon, do not sell) allows you to increase your offer of products to end customers and companies. The preference, logically, is to look for those services that generate more margin and encourage permanence in its platform (more or less forced). From this point of view, the provision of financial services to the users of its marketplace and to other AWS clients seems a further step, and logical, in Amazon's strategy of making its business customers loyal and extracting as much juice as possible. In fact, he is already taking steps in that direction. The company launched its Amazon Lending program in 2011, and until 2016 had granted \$ 3 billion in loans to 20,000 US companies. UU., Japan and the United Kingdom that operate in its sales platform. Of this amount, a third part was borrowed in 2016. It seems that the business is gaining strength, and there is no reason why it should not go further, quite the opposite.

Customer knowledge is a basic pillar of the banking business. And for this we need data, something that is not lacking precisely in this era, in which the possibilities of capturing information multiply. As a result, immense and growing volumes of information (Big Data) are generated that companies analyze in order to extract value from them. The problem for banks is that the data is increasingly in the hands of online merchants and platforms. Focusing on financing companies, Amazon has a series of strengths that make it a fearsome adversary for banking. Among them are a technological platform of reference in the market, robust and scalable, a deep knowledge of the client and an optimized management of risks, through the generation of data and the analysis of them, a more efficient commercial management and the existence of a prior commercial relationship. To date, approximately half of Amazon's sales (in terms of units) are made by the more than two million independent merchants that operate on its sales platform. Amazon has therefore a vein to exploit in small business, and it seems that Amazon can direct its offer towards these small companies with short-term loans and reduced amount.

Therefore, it is logical to expect Amazon to increase its offer of financial services slowly, as it broadens its knowledge of this business, it generates trust between companies and they use more Amazon solutions and share more information with the company. Amazon Lending is not the only incursion of the Seattle company into financial territory. In 2007, it launched Amazon Pay, a service

that allows its users to pay in other pages and applications using their Amazon account or accept payments under those conditions. The service is available in the main markets of the company, although its diffusion seems limited, and could be seen as a step in the construction of an alternative to the companies of means of payment or a way to take part of the margin.

Farther, if we take into account the huge volume of transactions that Amazon makes daily, both with its suppliers and with its customers, the implementation and use of the aforementioned Blockchain technology would suppose a total advantage for the firm.

Recall that Blockchain is simply a database that keeps an open and distributed digital book. This is what the arrival of the "Internet of Transactions, in which any physical asset can have a digital representation". Giving place to an Internet of the Value, that in the logistics, as in many industries, it is summarized to certain functions that until now escape from the hands of many companies and are realized by third parties, or that suppose an extra effort of traceability. That is, the possibility of having a register, a control, a visibility of the entire process, of the entire supply chain, to minimize fraud, errors, incidents and automatically exchange value through the Smart Contracts, with which contracts can be executed without the human hand and with the possibility of seeing each movement in real time.

It means an efficient complement that Amazon can count on to execute certain functions and make them more transparent and automated, bringing greater efficiency and productivity to the company.

In short, the Blockchain is an effective tool in an environment with multiple participants and with a certain opacity as it is the case of Amazon, since it enables a common space, with a common language that brings with it access to a concrete documentation in real time.

Like all technological innovation, Blockchain also presents certain barriers in different areas of application that Amazon should consider, such as legal, business or educational. Mainly, this technology faces different challenges ranging from scalability, lack of standards and maturity, the fact that there are many projects around it, but few remain afloat (like Bitcoin), the lack of knowledge that goes linked to an absence of talent in the sector to continue developing it, lack of confidence and clear legal regulation.

Despite all these challenges that Blockchain faces, it is a tool in development that could bring to Amazon the configuration of an ecosystem open to generating collaborations and open to the execution of more transparent, hyperconnected and, therefore, efficient transactions.

Another of the great challenges for Amazon is the management of transportation in the "last mile". Traffic congestion continues to increase in large urban centers around the world, with a direct effect on urban distribution, coinciding peak traffic hours with the usual distribution schedule. According to a study by the Traffic Management Authority (TMA), 50% of urban distribution in Chicago takes place between 7 am and 12 noon, a schedule that makes it difficult to ship and transport products. In this sense, the aforementioned strategy of distribution of packets in places of storage of the same ones so that the clients can collect them then continues gaining strength. By allowing the delivery of packages at times of low traffic concurrency, this would help the company reduce last mile friction and cost.

On the other hand, Amazon started a new program to deliver packages to its members' parked cars. Amazon has begun to offer such service in 37 cities in the United States. If this service is well received by users, the company will foreseeably expand its offer to other cities and other countries. The objective of the implementation of this system is again consistent with the last point made, the transportation management in the last mile, as well as the strategy that the company is trying to implement to expand the delivery schedule of its packages, currently concentrated in some fairly short stretches.

As is known, Amazon shuffles the option of offering package delivery service to users in their own home without the need for them to be present. However, this supposes great and evident requirements of confidence and reliability on the part of the user with the company, in addition to possible legal or operative problems. It is logical that nobody is comfortable allowing a stranger to open the door of your own home. That's why the firm e-commerce raises the opportunity to deliver the package in your vehicle. It is much simpler and less aggressive to allow a stranger to open the trunk of your car than the door of your house. "I'm sure many consumers would prefer to have their car trunk opened remotely by a third party than their front door," said Greg Melich, an analyst at MoffettNathanson. This trend could be exploited and take it to the extreme, to the point that you can indicate a place where you would like the deliveryman to leave the package, such as a mailbox, a shed or a safety chest, and that way you can make the trip. of the package without the need for a large intrusion in your privacy and with a minimum security risk.

The counterpoints of this strategy would be that it would require a prior investment by the user to acquire the necessary technological equipment, in addition to a minimal technological domain of apps and technological services that, perhaps, for a more advanced user could imply a Some difficulty and

an access barrier to the use of this new way of collecting orders. “I think this is a good example of Amazon’s test-and-learn culture. The company tries many different things, some are successful, others less so, but all provide important insights for the company,” Atlantic Equities analyst James Cordwell said.

Conclusion

In my opinion, Amazon's future strategy will continue to be based on, first of all, strengthening, improving, optimizing and innovating in its basic business, the sale of articles and products online. Amazon tries to gain control of all processes involved in its Supply Chain, thus having the opportunity to ensure its own management and execution, gaining independence and flexibility, and optimizing and reducing operating costs of all stages and processes of the logistics chain.

However, as it is already a corporate seal for the giant e-commerce firm, its future business development strategy will be based largely on business diversification. Some lines of business already existing, but still weak and underdeveloped, such as the case of Amazon's film and series production company or its financial entity, will be reinforced and their market presence, their business volume and their importance for the parent company will increase substantially.

On the other hand, through business development processes such as the aforementioned project of centralization of the entire logistics system, with the incorporation of a fleet of own transport and the use of own transport routes, or as the growing weight of the company in the In terms of advertising and the experience and knowledge it has of consumers, it appears to Amazon, naturally, new lines of business that will undoubtedly explode to continue to stay among the companies that generate the most benefits in the world. There are also experts who predict the entry of Amazon into completely new markets for them, as it could be in the health business. However, there are still many unknowns about which areas and in which way the company of Jeff Bezos could extend its corporate roots.

What is certain is that Amazon will continue its corporate business expansion, and, predictably, very successfully. And the fact is that the success of the company is not due to fortune, but to two basic pillars in which they intend to continue as a business growth model: technological innovation and good strategic decisions. Amazon has the latest technology at the moment not only at the logistics level, warehouse management or business management tools and information, but through its own technology development companies such as Amazon Robotics, is responsible for developing completely new technology, which apply and implement in a few years. This technological advantage leads to a direct competitive vein that makes impossible for its competitors to reach Amazon, which is always one step ahead. Amazon has also made large acquisitions of technology companies not only to acquire technology of interest, but to control the implementation and establishment of such technology by their rivals, and competitively distance themselves from them. On the other hand, Amazon has one of the best groups of corporate strategists who have been demonstrating their good

work for years. It is expected that they continue to be successful in the business model that the company should follow in the short, medium and long term, making its expansion in the markets in which it operates and its expansion into other business niches, a successful and very beneficial reality.

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