

# Artificial Intelligence as the Brain of Industry

## 4.0

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**Abstract**— The purpose of this article is to demonstrate the importance of applying artificial intelligence in enterprises that seek to reach the paradigms that form Industry 4.0, thus unifying the interactivity between systems, machines and assets to result in a more harmonious production environment and efficient. Nowadays, many companies have realized the benefits and started investing millions in the technology applications that make up Industry 4.0 . And with that it is possible to store the relevant data, so they can be analyzed and managed. It also allows objects, such as machinery, to be controlled over long distances, remotely, without the need for a face-to-face asset to manage. In addition, there is the technology that can be considered the brain of the fourth industrial revolution (or Industry 4.0 ) which is Artificial Intelligence , because from it is possible that certain decisions, which previously were only possible to be resolved with a human being , are resolved by Artificial Intelligence itself, without any interference from an asset (human being).

**Keywords**— Artificial Intelligence; Industry 4.0; Revolution Industrial.

### I. INTRODUCTION

Industry 4.0 has communication between man and machine, or better saying Artificial Intelligence, as one of its fundamental characteristics. As a result, the interaction between technological equipment and employees makes processes more harmonious, instead of signifying the decrease in workers.

The resolution of deeper occurrences is essential for the identification of any errors that may occur in the production network and, consequently, resulting in a faster and more effective solution. The control of production paradigms together with the means of inspections, helps the factories to be safer environments for workers. In addition, equipment that has a certain degree of artificial intelligence can protect workers from services that can be harmful. It can be said that this is one of the pillars that form Industry 4.0, because automation and productivity is something that favors the factories.

It is correct to say that industries can take advantage of 3 major aids that Artificial Intelligence provides. Firstly, it is the reduction of failures, since soon after being instructed, the algorithms generated by Artificial Intelligence already obtain qualifications to perform services liable to human failures. Unlike humans,

algorithms do not suffer for external reasons, so it is unlikely that anything of this kind will occur.

Another advantage or better saying the second advantage is the decrease in expenses, according to experts. Numerous banks or businesses that focus on electronics used smart devices so that the customer can be served, since human interference is only necessary to solve more relevant problems. In this way, it allows employees to be allocated to more tactical services, which help increase profits, but there is also the possibility that companies will reduce employee costs.

The third advantage that artificial intelligence provides is profit growth. With the reduction of failures and professionals allocated to services of greater relevance, while it may leave the routine tasks to Artificial Intelligence, with this the company will have more time to analyze its own business.

### II. LITERATURE REVIEW

#### 2.1 Industrial Revolution

Historians consider the Industrial Revolution to be a time of great contribution, with regard to technology and this event, which took place in the second half of the 18th century, enabled modern industry to emerge. As a result,

there were countless changes, but in particular the work relations and the exchange of manufacturing for machining, that is, the production process.

#### The First Stage of the Industrial Revolution

Occurred between 1760 and 1860, the first stage of the Industrial Revolution was restricted, preliminarily, in England. The cotton fabric industries, with the help of machine loom machines, began to emerge. And the improvement of steam engines had a significant relevance for the advancement of the Industrial Revolution.

#### The Second Stage of the Industrial Revolution

Between 1860 and 1900 other countries (Germany, France, Italy and Russia) also started to join industrialization. Some of the main innovations that occurred at this stage were:

The use of fuel derived from oil; The use of electricity; The advance in chemical products; The creation of the steam locomotive; The creation of the explosion engine; Steel factories.

#### The Third Stage of the Industrial Revolution

The third stage of the Industrial Revolution can be dated to the 20th and 21st centuries, according to historians, and some of its innovations are:

Electronic computer; Portable cell phone; Genetic engineering; Use of alternative energy sources.

### 2.2 What is industry 4.0?

It can be said that Industry 4.0 is a segment of the advancement of machines, a constant process that has perpetuated since the first Industrial Revolution. Industry 4.0 also aims to connect (via smart networks) workers, systems and machines. This creates autonomy throughout the production network.

### 2.3 Artificial intelligence

Artificial intelligence (AI) is an aspect of research and study in the areas of computing (computer science, computer engineering, etc...) which aims to develop procedures that replicate thinking (or intelligence) of the human being to solve problems, using computational symbols to generate the reasoning. In the twentieth century, between the years that initiated the Second World War, it is that it has records of research related to the development of something that simulates the intelligence of the human being, that is, artificial intelligence, with the central creators of the research scientists : Allen Newell, Hebert Simon, John McCarthy, among others. But the thought of building beings to act and think like human beings existed decades before, as can be seen in the fiction book by writer Mary Shelley: Frankenstein, from 1823.

## III. MATERIALS AND METHODS

The functions that artificial intelligence offers in the industry are quite varied, allowing the possibilities to be practically unlimited. Based on technical knowledge in the area and bibliographic studies, it is possible to show the most frequent applications. As much as it seems something recent, artificial intelligence only started to stand out with the adoption of Industry 4.0 paradigms, because countless companies, from different sectors, used this technology to improve processes and automate services. Artificial intelligence is not limited only to companies or factories, for production automation, it is also used in machine learning, robotics, preventive analysis, augmented reality, among others.

### 3.1 Some uses of Artificial Intelligence

Creation of products and services, since artificial intelligence will be able to monitor and analyze the suggested designs, thereby being able to identify the negative aspects of the product or service.

Change in the way of working and professional obligations, focusing on the qualifications of the functions of: Programming, designer and manager.

Improvement of products and services, as artificial intelligence is able to identify and correct execution errors.

Increase in the identification of demands and responses, imposed by the market. Taking into account the consumer's desires and needs..

## IV. RESULTS AND DISCUSSION

Nowadays companies have more and more access to information on a constant basis. This information varies from the consumer to the suppliers, but there are still companies that do not know the importance of condensing the most important information. Because of this, tools that use artificial intelligence are used to compile the most crucial information, thereby granting information that brings a differential to the company.

We note that companies that use artificial intelligence to the customer service department (chatbots) claim that there was an improvement in the service to the customer. The chatbots are intelligent programs, pre-programmed, that try to simulate a chat with users of so natural. They take information faster and more accurately, thereby improving the user experience.

Do you think that artificial intelligence benefits the company?

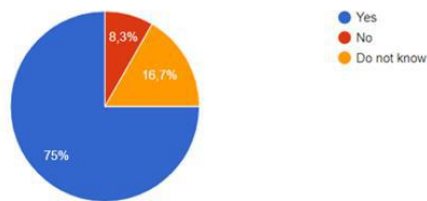


Fig.1: Do you think that artificial intelligence benefits the company?

Source: The Authors, 2020.

We observed that 75% of companies understand that AI (artificial intelligence) can bring benefits that enhance results.

Do you believe that artificial intelligence applied to the digital service has improved the customer experience?

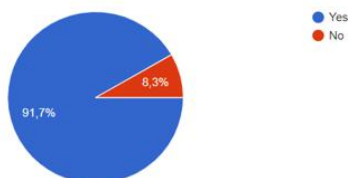


Fig. 2: Do you believe that artificial intelligence applied to the digital service has improved the customer experience?

Source: The Authors, 2020.

Is artificial intelligence already used in your work?

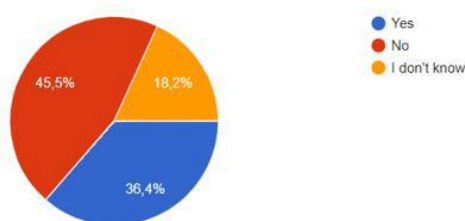


Fig. 3: Is artificial intelligence already used in your work?

Source: The Authors, 2020.

We see that 36,4 % of the users who carried out this research affirm that artificial intelligence is already used in their work environments, however 18,2 % do not know if they use any tool that contains artificial intelligence in their work, and 45,5 % say they don't use it. This shows that the number of assets that work together with artificial intelligence is still a minority.

Do you believe that artificial intelligence has increased your productivity?

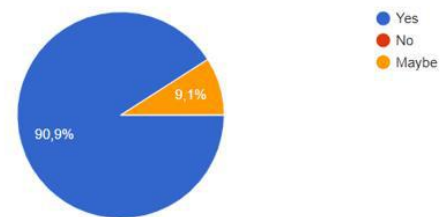


Fig. 4: Do you believe that artificial intelligence has increased your productivity?

Source: The Authors, 2020.

We see that 90,9% of the assets that work together with artificial intelligence claim that there has been an increase in productivity.

Do you believe that artificial intelligence can replace your work?

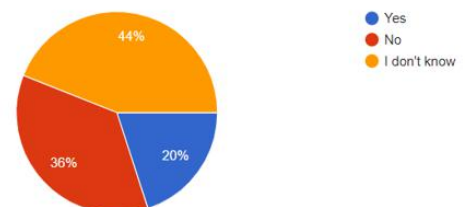


Fig. 5: Do you believe that artificial intelligence can replace your work?

Source: The Authors, 2020.

We can see that 44% of the assets are uncertain about the permanence of their position, after the application of artificial intelligence. Even though 30% say they have no worries about the remaining work, it is still perceptible that a significant portion of workers are afraid of being replaced by smart tools.

## V. CONCLUSION

The conclusion from this article that more and more companies have been adhering to the use of Artificial Intelligence in some of their sectors, such as for managing information until serving customers. This provides that the assets that were responsible for these services can be allocated to other areas, which causes some employees to fear being replaced instead of being allocated to other sectors. However, Artificial Intelligence provides numerous advantages that are fundamental to the company's growth, which makes it inevitably a choice to be adhered to.

## ACKNOWLEDGEMENTS

I thank God first for keeping me on the right track during this research project with health and strength to reach the end. We are grateful to our family for the support they have always given us throughout our lives. We would like to thank our advisor for the encouragement and dedication of his limited time to my research project. We also thank the University Center FAMETRO and all the teachers of the course for the high quality of the education offered.

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