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Industry 4.0 and the full integration of supply chains.

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Abstract
The article was designed in three parts. First, it presents the identification of the main characteristics of the technologies of the Industry 4.0. The research then explores the management of current supply chains in a globalized context and the challenges faced by multinationals. The final part is about how Industry 4.0 technologies can operate within supply chains in a globalized world. According to the survey, Industry 4.0 seeks to optimize industrial processes through standardization, with the help of new technologies such as Cyber-Physical Systems, Internet of Things, Internet of Services and Smart Data, increasing product variability and flexibility. The technologies of Industry 4.0 seek to simplify the management of these chains, in which the interaction between the physical and the virtual world is essential for the company to supervise the movement of its merchandise along this network of supplies, arising terms like "Control Towers". The visibility of a supply chain will be a key factor for global supply chains.

Key words:
Industry 4.0, global supply chain, visibility.

Introduction

Industry 4.0 was first mentioned during the Hannover Fair[1], a business fair in Germany about industrial innovations and technologies, in 2011. Known also as the fourth industrial revolution, Industry 4.0 aims to optimize processes, products and services, creating complex, precise and integrated networks in all sectors of an enterprise, which can operate in real time communicating with employees and machines of the production line. Within these departments, the survey focused on the part of supply chain management (SCM), including the benefits of Industry 4.0 in logistics and challenges for a company operating this new technology.

Results and Discussion

The methodology adopted was the research of published materials, such as books, periodical articles and texts available on the Internet. Besides, it was used articles from consulting firms which were hired by companies wishing to plant the Industry 4.0 technologies. The material found is mostly available in the english and german languages, since USA and Germany are already in a more advanced step of development.

There are four main technologies making up the fourth industrial revolution: Cyber Physical Systems, Internet of Things, Internet of Services (IoS) and Smart Data. The first one is about the integration of physical and virtual world, where computers are able not only to control production processes, but also add them new capacities[2].

Internet of Things is the way how it is done this communication among machines in the production line, using Radio-Frequency Identification (RFID) systems. Thus, IoS represents the communication among services both for the physical and virtual worlds.

The consequence of highly precise and complex processes is the creation of a large amount of data. As the human intelligence is not capable to manage this size of data, the Smart Data technology offers the possibility of storing all the information and managing them in a clever way.

These technologies will be applied to any supply chain in Industry 4.0, creating the Supply Chain 4.0. CPS will identify, locate and monitory all products through the entire SCM, which will communicate with Control Towers of the enterprise, a logistic centre that commands all the value chain of the company[3].

The impacts of Supply Chain 4.0 will be the increase of the visibility, the most important point in SCM. Besides, this new transparency will make the supply chain trustful and lean, reducing around 20% of operating costs. Lead times will be reduced as well, forcing the company to work with decentralized distribution centres, adapting according to the demand[3].

Conclusions

Although Industry 4.0 still operates relatively in small proportions, it is causing a big interest of the most industrialized countries, like USA and Germany. For example, in 2015 Angela Merkel visited two factories of Siemens in Germany, who promised that the German government will invest huge amounts of capital with the new technologies of Industry 4.0.

Supply Chain 4.0 represents an evolution of the nowadays global supply chains. However, as Industry 4.0 works with many sophisticated technologies, all countries where value chain flows need to be aligned with the fourth industrial revolution. Once any issue in boundaries entry or exit of products will affect the efficiency of logistics of the company.

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