

Industry 4.0 in manufacturing enterprises

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Abstract

In today's world, which is characterized by a constant industrial revolution, where the factors of production: Work, technology and organization, are subject to constant changes, these are intended to bring goods to consumers in a more personalized, which implies a great challenge for many companies. One of the biggest challenges that companies face is the elimination of paper throughout its value chain, with the sole purpose of having a transparency in it, resulting in the disappearance of the black boxes, the same we can describe as those areas where direction and management lose control and only see their results once the goods appear, so they are ineffective. To achieve such a challenge that represents the real-time control of the entire value chain, it becomes necessary to take the concept of industry 4.0, which emphasizes the use of an electronic coding system, which has the characteristic that you can define all the stages within the value chain and through the use of wireless networks, these are recording the different phases that the product is going through, which on the one hand gives coded information to the master production program And contrasts it with what happens in the plant through the information system, compare results to take the respective measures in time, getting the job Just in Time.

Industry 4.0, Value chain, Just in time

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The human resource and the internet

The human resource and the internet in any organization people occupy a primordial place, therefore, the motivation to commit in the work is fundamental to achieve the productivity of the company; For it is necessary that they are in a pleasant working environment, that they can develop a project of life within the company, seek self-realization through work, be happy and be able to know themselves.

This is a necessary requirement for the company to function well and have a future; but how has the new technologies of information and communication shaped this qualified personnel?, in its way of being inner, What is to be postmodernists? Lipovetsky (2015) the people of this time are more concerned with personal enjoyment and little interest in what happens around them, if they feel good the world is well, make use of mobile devices at all times to stay connected no matter the place where they are, when you call their attention they respond with a smile and leave the cell phone for a moment and in a few minutes they return to it with the same enthusiasm, they learn of the news and sites of interest through the internet, they mold their opinion to through social networks, have relevant information through internet search engines, like to study and train through ICT (Information and Communication Technologies), etc.

The values of the Postmodernists are: Freedom, equality, fraternity, caring for the environment, health care, individualism, trust in the future, searching for original ideas, designing religious concepts made Measure, enjoyment as a way of life, not to commit to ideas that do not share, etc.

Faced with this new reality of human resources, productive organizations have to anticipate how to adjust their labor requirements, in order to try to eliminate excessive turnover, take care that the personnel that worked with the company qualify us as boring, with no future and with null Possibilities of self-realization; If this were the case we would be doomed to have workers who only seek temporary income and zero effort, which would generate low productivity, and we could never compete in areas of high technology, only in mass production activities where the price and design of the product are set by the market, where the central objective is to have individuals who do not think and only obey orders.

As we are immersed in a process of globalization, competition between companies is increasingly fierce, and direction and managers have no way to solve their problems of low costs, profits and high turnover, so it seems that not There is a possible solution just to wait for the competition to fail and leave the field free to be winners over time. It may also be the case to seek alliances with local, state and national governments to support their national industry and thereby their work. But on the contrary we have that the workers are dissatisfied and have very unfavorable opinions of the company, resulting in the elimination of this possibility.

It is therefore essential to rediscover how this new dynamic of labor relations, the internet and the motivations of the workers moves; The question is how to make the working group have the same objectives and goals, share the same vision and mission, the solution to it is the one that will allow the permanence or disappearance of the company.

To solve the problem, the company needs to have Kim and Mauborgne (2016) pioneering products (novelty that uses new technological developments, informatics, materials, etc.), migrants (with some innovation that adapts to a requirement of a particular niche market) and settlers (little or no innovation, that is, massive products for the general population), know where the company is located, if in competitive markets (red oceans, products that serve mass markets where the technological development to produce them is in the area of maturity or obsolescence), little competition (blue oceans, products that are in the curve of technological development and therefore are possible customize them).

With this stratification of the goods to produce, managers can look for human resources that adhere to the new technological reality, where we will find individuals with a lot, medium and little initiative, over time they will get to know them and place them in the place where they sit More committed, where the motto of the company is to greater challenges greater economic and social retribution.

With this the company would be taking advantage of the human talent that has at its disposal and could define specific requirements and look for them in the technological institutes, in such a way that over time could be given the double helix relation academia industry, with the profit on one side of open the doors to human talent that promises a lot and is given the means to develop and ultimately integrated with the company; In such a way that for the personal reasons that he himself had to leave the company he would leave behind him able and willing members to continue the task. So the situation changes completely for the company, from just trying to survive (level of much uncertainty), to another where globalization is used to find what has the greatest knowledge and can be made products tailored to the client, with the quality and time required.

For this purpose we have personnel with objectives, goals, mission and vision aligned with the company, because it is part of your life project.

New smart devices in the value chain

We continue with the computerized technological development and with each passing day new challenges and scenarios are established where the intelligent machines can act, the fourth industrial revolution Schwab (2016), opens a world of possibilities where we go from repeating one program to another where the devices are able to search the client's requirements and self-program, which facilitates their application in many areas restricted to people, such tasks in most cases were unpleasant for them as work: night, vigilance, risky, monotonous, unhealthy, customer service, security, crime fighting, customs control, mining, etc .; generating new possibilities those individuals and companies that know to take advantage of this new technological potential, will enjoy its benefits.

In the more than 200 years of industrial revolution the emergence of new technological devices has always been a challenge for society and companies, not know what to do with it, the most classic example was the discovery of the electric motor, spent more than 20 years for someone to know how to apply it, once that was done, there were endless uses. The same can be thought of the new intelligent machines that will invade our industry, offices and homes in the next 10 years, there will be people who dislike it and many who like it, so it is necessary to prepare the way for this new technological transition make as smooth as possible, let the positive and not the negative be seen.

If we look at the new industrial field, it is thought that many of the monotonous and repetitive works can be done by the Smart machines Ross machines (2016), the factories of our time will be dominated by an intensive use of technological equipment, new ways of organizing human activities so that they are compatible with their nature, which seeks to be in a working group in order to interact and thus prevent it from losing its emotional balance.

If the future is the fully automated, computerized and integrated factory, it will be at all times communicated with society through the different networks, so that the pace of work, which to produce and when it has to be delivered, will determine the market, being able to adapt perfectly to a dynamic production, where chance is what determines the operation of the same, no matter how much it changes, will always have a response to the demands of customers; The only limitation is its production capacity.

In the case of the client must be aware that at the time of requesting a good, it will be produced following a master production program, so it can not receive immediate delivery expectations, will be determined by the number of requests made in advance, somehow today we live when we buy a product online, the system tells us the range of time in which we can receive, unconsciously we are educating.

In the case of companies with their suppliers is the same situation, you have to plan in advance all your production logistics, so that they can react in time and their production program is anticipated to only one day and deliver in packages of 2 Hours of consumption to the line at most, making a flow; the same in the distribution part, fill the means of transport with routes that maximize delivery and arrive at the time agreed with the customer.

If we consider that these will be the new requirements in which open markets will be the norm and not the exception, information management and systems integration will be vital to avoid a lack of coordination of activities, which necessarily leads to a stoppage of production, for Lack of inputs; this should not worry the direction and managerial, in any process that goes from linear to dynamic activities, there is a learning curve to achieve that transition, and only with trial and error will the system be tuned and making those who participate In which they can learn, the problem that must be considered is how to organize the resources with which the company has to achieve synchronization.

The fact of developing intelligent factories is a great challenge for those who participate, operate and design this one, you have to have a great vision, because you have a background, and every step you take will be plagued by uncertainty and errors, which must be resolved, with the participation of brilliant minds, who can make use of technological and organizational resources, can define the areas where they can work without human attention and the areas where they are required to be all day or part of it, so that they can make operational, tactical and strategic decisions.

Industries 4.0 and its new potentialities

The manufacturing boom in the West has declined over the past 40 years. In contrast, Oriental products have been increasing by the application of Lean Manufacturing (We must understand it as a business strategy that seeks the elimination of waste throughout the chain of Value, its three guidelines is quality, variety and delivery time); If all is known What is the reason why it is not applied is in the West? one of the possible explanations is the search for quick gain, with a short time horizon.

Unlike Asian competitors it is long-term, allowing greater integration of its operations and more democratic decision-making. In the case of Mexico, having its economy integrated with the United States and Canada; it has forced it to work with the same technological means, in order to coordinate its productive activities; so it is not surprising the widespread use of the Internet and all its applications; so that at this moment he has the conditions for his industry to take advantage of this new industrial revolution in the areas: industrial, health, entertainment, services, government, security, transparency, financial, etc.

How new technological developments help us solve our problem, such as the use of smartphones to organize production, based on the fact that almost all the population has access to them and can pay the connection cost that is approximately \$ 5 per month; At this time, wireless communication networks have been installed in both urban and rural areas, which allow the tracking of mobile devices.

To achieve the above purpose, it is necessary to have different bandwidths defined, so that each mobile device can send and receive information, allowing a knowledge of its activities at all times, keeping the register of these in a database, so that then you can analyze and try to understand their behavior. Big Data emerges and with it the application of 3rd level artificial intelligence, Gilchrist (2016), (1st level artificial intelligence started in 1990 and its objective was to find elements that were common as names of goods or people.

The 2nd level refers to data mining), which can be characterized by finding the differences and thus find patterns, which can be common to a set of random activities that are given in the world, giving the possibility of stratifying the different information and in this way personalizing the relevant aspects of the same, thus reducing the level of uncertainty for decision making, thus eliminating the possibility of giving explanations that do not correspond with reality.

If the technological development has the potential to trace mobile devices, with the use of wireless signals, it is possible to use electronic chips with a dimension 0.3x0.3x0.3 mm, which can be integrated into any good, at the moment it starts the manufacture of it, the information it will contain will be the different phases through which it has to pass the same, until arriving at the hands of the consumer, at first.

When the ERP production master plan records the code of all the stages of the value chain, where manufacturing is included, once this is done, it is sent to the production floor; when leaving the respective task the system generates the code on the chip, this way it has two registers one that corresponds to all the steps and another one that indicates the tasks done, in this way it is possible to compare the planned against the executed, giving therefore the possibility of monitoring it inside the plant and outside it.

As the chip has a read only memory and a write memory, it is possible to define the master and slave code, the latter will change over time to indicate that it has been added to the product, the system will know in real time where it is and compare the planned with the executed and send the respective alerts or make the decisions autonomously.

The objective of any productive process is to give a flow to the production and to know of all the incidents both in plant and outside of it, in this way to register them, to consider possible points of improvement in the time, in many cases depending on the size of the company, there may be more than one problem to solve, with the information received can be analyzed, quantified and make an informed decision that is the most appropriate for the company, leaving aside all that is not true.

With the data generated in a productive process and using the appropriate computer tools, information can be grouped by type of product, consumer age, region of the country, countries where they are most consumed, possible customer interests, real needs and psychological, customer profile, lifestyle, if it is representative of a particular group, vision of the future, etc. once we have defined well the same, we can send films of possible new functions of the products and in this way receive their opinion, which will allow us to make better goods, which take into account the diverse opinions of the market.

Smart companies have constant communication with their customers, the benefits they receive are products with better characteristics that meet their expectations and keep them at the forefront of technology, many times consumers are motivated to change the good they are using, when the substitute represents novelties that they can not ignore, which solve problems in the home, office and factory, as a result of modern life, where you have less time to make unnecessary transfers to solve an administrative problem, clarification, warranty, service, etc. and through the electronic devices that purpose is achieved.

If the product is intelligent, it can give information to the consumer of which part is failing, where it can buy the same, how to install it and the cost, this way it will be possible to easily determine if it is good to keep the good or buy another, all this can do on the schedule outside of work; So that by having an informed decision, the client will take the one that suits him best; and not as it happens now, where products do not give information and are working blindly, in the end can be found with the surprise that the costs and time invested are higher compared to a new one.

If the case were to buy a new product, the previous one could inform you where to communicate so that they come for the one to be discarded and in this way to be able to recycle and help with the care of the environment, by its action would receive a bonus and have the security where the different parts of the product went; This would force manufacturers to design parts whose materials are recycled, thereby reducing manufacturing costs by having a safe source of raw materials.

In the event that the product will reach the collection centers, the government would have all the information of the client of the rejected good, depending on the degree of contamination would be credited to a warning or a fine; the same applies to companies in the case of substantially contaminating parts, which can damage aquifers and soil.

As the chip is so small (0.3 mm cubic), it can be placed in any product, the cycle ends when the same is recycled, so even traceability can be given in municipal waste, so that the people who classify the waste do it in a faster and orderly way, which meets the original objective of being informed, the electronic device is able to continue generating information that helps in the work of the people and takes care to the environment by preventing the contamination of our planet.

Hence the importance of having smartphones, people bring them with them all the work and social time, giving the possibility to configure them with the applications that are necessary for them. We must be aware that these devices are computers and can do endless activities, currently living in a digital world, their possibilities are limitless.

Conclusions

We continue with the technological revolution that began in the 90s with the massive use of the desktop computer, after the laptops in the 2000s and the emergence of smartphones in 2007, So that society is prepared for industry 4.0 and ready to make use of its innovations; For this purpose, the economic policies of distribution of wealth must be considered so that they generate a social benefit.

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