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Industry 4.0, a key ally in the fight against pandemics

The Covid-19 epidemic we are currently facing is not an unprecedented event. During the last hundred years, our civilization has known several major epidemics such as the Spanish flu (1918), the Asian flu (1957) and the Hong Kong flu (1968). Each has caused between 1 and 40 million deaths worldwide.

But medicine, technologies and our society in general have evolved, leading to a completely new management of health crises. The closure of borders, confinement of the population, massive distribution of protection devices, and shutdown of non-essential production are all strict measures taken by the majority or countries around the world.

Such measures are hardly compatible with an industrial production, especially when its processes are global

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Faced with the epidemic, global industrial balances are at risk

Indeed, these drastic measures, of an unprecedented scale, destabilize global economic and industrial balances, and no one was able to predict it. Some industries are at a standstill, such as the automobile industry. Some industries have to maintain constant production despite absenteeism, distancing measures or supply problems, such as the food or pharmaceutical industries. Finally, others saw their demand explode to provide enough protective masks, hydroalcoholic gels or respiratory assistance devices. However, our largely global industrial apparatus is comparable to precision mechanics. It has been optimized for over forty years for mass production and process stability, hardly withstanding radical uncertainty.

The question then becomes: what to do in the face of such destabilization that is as brutal as it is unpredictable? Do automakers need to prepare to produce medical equipment?

Industrial Tool Conversion Initiatives

Though the idea may seem absurd, this is the challenge that Lamborghini was able to meet in a few days. The Italian manufacturer's saddlery workshop now produces 1,000 protective masks per day. As for the 3D printers from its R&D and Carbon Parts departments, they print 200 protective visors daily. These figures may seem modest given the magnitude of the global shortage. Remember, however, that Lamborghini only collects 8,000 vehicles per year, while Renault produces almost four million.

Other similar initiatives have emerged in recent weeks. LVMH, for example, currently makes protective masks and produces thousands of bottles of hydroalcoholic gel from its perfume lines. What is the secret of such rapid conversions? Could this be the prerogative of luxury houses with workshops on a human scale and with mainly manual tasks? As these factors are undeniably favorable, the major technological investments undertaken by these companies for several years have to be acknowledged.

Investing in flexibility and responsiveness of production tools

The example of the Urus production line, Lamborghini's first SUV, inaugurated in 2018, touts many new technologies. These are grouped together in the Industry 4.0 concept: collaborative robots, 3D printers, autonomous carts, etc. These investments have enabled the brand to reconcile productivity and advanced the customization of its vehicles thanks to a flexible and responsive production system. We could combine these two qualifiers under the notion of agility. They are the key to a rapid reconfiguration of factories in the face of changes in demand, however extreme this may be in the current crisis.

Efficient production technologies in the fight against covid-19

Among the technologies from Industry 4.0, additive manufacturing is certainly the most visible. It is indeed capable of producing any plastic or metallic element from digital plans. This is the technology retained by the Public Assistance of Paris Hospitals, by purchasing 60 3D printers for two million euros. Thus, it has spare parts for its artificial respirators, resuscitation masks and frames for protective glasses. The German aerospace agency has switched its additive manufacturing equipment to the production of masks and valves for artificial respirators. The rates are still very modest: 15 valves per day for the German aerospace agency. However, the initiative demonstrates the capabilities of this new technology to immediately adapt to a new need.

When higher rates of production are required, digital twins, programmable robots, or even autonomous vehicles can be powerful allies.

They allow the quick reconfiguration of a production line. Free of fixed conveyors, and with robots capable of performing several functions that are fully testable digitally, the 4.0 production lines are able to adapt to all new configurations more quickly, with minimal human intervention on site.

Finally, advanced automation, remote supervision and maintenance minimize the exposure of the staff on site. This is particularly the case for industries that need to ensure continuity of production such as the food or pharmaceutical industry.

Towards a more local and thus more agile supply chain

It would be impossible to discuss industry and production tools without mentioning the Supply Chain. Indeed, how to maintain activity when the supply itself and/or distribution chain is damaged? How can production continuity be ensured when most components come from other continents and the logistics routes are cut off? Again, the industrial trends of recent years are incredibly consistent with the situation we are experiencing. We have lived through decades of globalization and supply at the lowest cost. Today's demands for flexibility, responsiveness - and even sovereignty - of the market are gradually leading companies to relocate their Supply Chains.

Geographically close and responsive suppliers: this is one of the factors currently enabling Air Liquide to dramatically increase the production rate of its artificial respirators. Normally, the company produces 200 units per year. The requirement increased to 10,000 units to be produced in 50 days. A real challenge! The suppliers of many components of these machines, located in France or Morocco, were able to mobilize and respond very quickly. But for other elements, the strategy is more complex. Sometimes a producer must go back to tier two, three or even four suppliers, some of whom are located in China, to access certain parts. And when there is no solution, it is 3D printing - provided by Valéo - which again meets the need.

Such a resizing of the Supply Chain - and more generally of the production apparatus - of Air Liquide is a major challenge. One can salute the exceptional commitment of several manufacturers and their employees, under the impetus of the State. By creating an unprecedented consortium, they completely transformed the industrial scheme of their company. PSA, Schneider Electric and Valéo thus contribute, through their respective expertise, to secure the supply of components. In addition, such devices optimize production lines and increase their capacities – even the creation of additional assembly workshops on their premises - thanks to voluntary employees. Beyond the technological innovations that Industry 4.0 can bring in the face of such situations, daring, innovation and solidarity remain solid values.

After the crisis, what changes for the industry?

Since the start of the strict health measures, analyses have been multiplied to best anticipate resumption of activity. In particular, they try to predict the changes in behavior and consumption habits that this event will leave as a legacy. Some experts believe in a refocusing of our civilization on values, on what is essentials, to the detriment of overconsumption. When it reopened on April 11th after several weeks of confinement, the Hermès boutique in Guangzhou recorded an historic sales record for the brand in China: 2.5 million euros in turnover in one day, with some receipts at more than 130,000 euros.

"Predictions are difficult, especially when they concern the future," said Pierre Dac. The industry of the future is unlikely to allow predictions of any levels of certainty. However, it will certainly push our societies to adapt more quickly and more effectively. This transformation from a forecasting and anticipation industry to an adaptative industry has been underway for several years. However, it is likely that current events will accelerate it even more.

"In the new world, it's not the big fish that eats the little one; it's the fastest that eats the slowest." Klaus Schwab, Founder and CEO of the World Economic Forum.

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Manager at Eurogroup Consulting in France, Cédric is an experienced professional serving a wide variety of French and international clients in the industry and energy sectors. Additionally, he heads the Industry 4.0 practice of Nextcontinent, steering a team of skilled consultants and industry experts to better support clients around the globe.

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