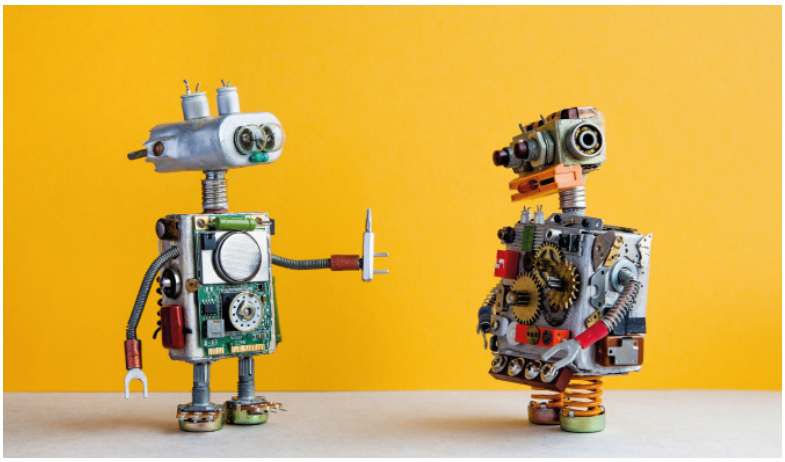

# MECHANISATION, AUTOMATION, ROBOTISATION : WHAT'S IT ALL ABOUT ?

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In the era of absolute digitalisation and changes in consumption patterns, logistics is caught up in a race for productivity, resulting in a constant desire for responsiveness.

Faced with ever more demanding and versatile customers, delivering quickly, qualitatively, quantitatively and responsibly is a constant challenge. The company must be able to offer sufficient additional references and to trace its operations, both inside and outside the warehouse...

Whether we call it «Supply Chain 4.0», or even sometimes 5.0, it does not matter! What we can see is a strong willingness to adapt the supply chain to its environment in an atmosphere of technological, but also societal revolution. Mechanisation, automation, and robotisation of logistics processes are a fundamental trend where machine learning, artificial intelligence, vision systems and the IoT drive innovation. These new practices allow significant advances in efficiency while ensuring that the resources, rates and overall productivity of logistics platforms are controlled.

Adapting to stay competitive is the goal of any business! But what tools should we use? What place is there for humans in these changes?

**Mechanisation, automation, robotisation: what uses ? What complementarity ?**

Improving performance and limiting stress are the two main objectives associated with the invention of tools and machines. Symbolic of the first industrial revolution, the primary objective of mechanisation is to replace human strength by helping move or carry heavy loads, to limit movement and to increase output, while reducing the physical impact on the operator.

Warehouses are driven to mechanise by the increase in flow volumes and by the requirement to manage large numbers of item references. Mechanisation is an effective solution for performing repetitive tasks in a shorter time. It is found in warehouses through pallet trucks, forklifts or simple conveyors.

From a productivity standpoint, mechanisation makes it possible to gain in efficiency by supporting the work of the operators.

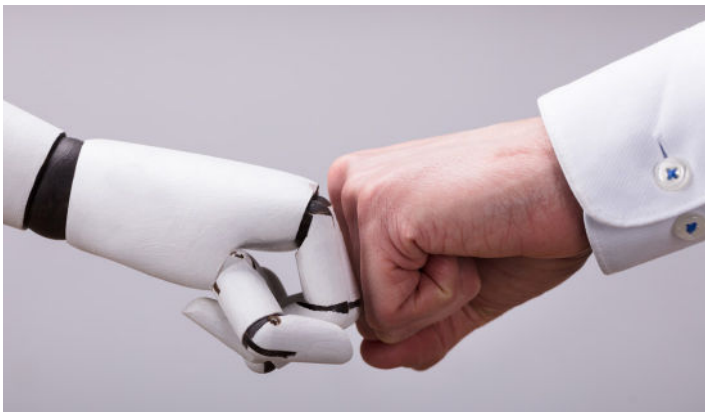
**Automation: when machines get smart**

Automation is described as «rendering a process automatic, making it work on its own»[1] (implied, without human intervention). This is where the difference lies: it enhances the mechanical system's ability to perform autonomous tasks. This capability can be primarily physical, as for packaging machines or stacker cranes, though it may also be electronic. In the

In the logistical context of the warehouse, automation will answer issues such as the best way to carry out a sequence of preparation tasks, to determine the optimum preparation path, the best storage location or the best bin for preparing an order, etc. Automation is put into action in the warehouse with optimised order launching solutions, or flow synchronisation on goods-to-person systems, for example.

Its ability to generate critical data for understanding what is happening in the warehouse, monitoring and tracking activity makes automation a critical data source. Real-time order preparation progress, performance indicators, production counters, etc., all of which can be used for rationalisation purposes, or to improve productivity and forecasting, in terms of maintenance for example. Although many execution and management actions are still performed by humans, the generalisation of automated processes in a warehouse requires a global supervision system, capable of generating a detailed activity progress and equipment performance report.

**Robotisation: the ultimate degree of evolution**



Robotisation can be defined by the action of robotising, introducing the use of robots into a structure. A 100% robotic logistics process is a completely autonomous process, requiring no human intervention, either for physical operations, or for flow organisation and synchronisation. Robotisation is thus the ultimate degree in the evolution of mechanisation and automation since it brings even more flexibility than simple automation, both in terms of physical actions and intelligence:

- In terms of physical actions, robotising retail sampling operations or palletising heterogeneous loads are complex actions that are already or will eventually be replaced by autonomous robots.
- On the intelligence side, the possibilities offered by machine learning contribute significantly to activity forecasting, resource allocation and organisation, and even to predictive maintenance operations... thus replacing team experience.

With robotisation, the role of humans is to supervise the progress of the activity, to perform maintenance and system correction actions and to manage any anomalies. The robot performs arduous and repetitive tasks, whether physical or intellectual, at a very high rate, allowing humans to apply their added value to analysis, decision and strategy. Indeed, nothing replaces reasoning and human decision-making in specific contexts, in emergency or unforeseen circumstances.

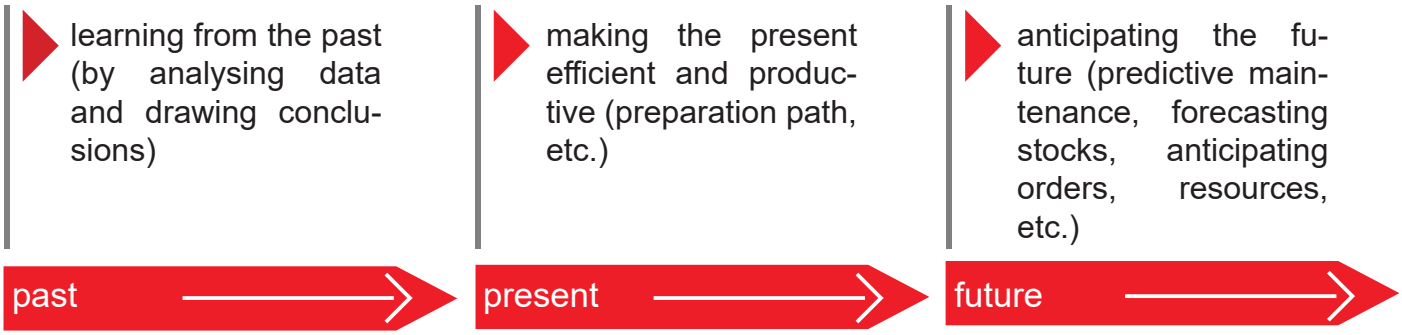
[1] Source: Encyclopedia Universalis

**The way forward**

The notions of mechanisation, automation and robotisation underpin three objectives:

- to respond to the inevitable «customer promise» to provide everything in the shortest time and under the best conditions
- to make the warehouse a pole of efficiency, productivity and quality
- to further reduce operator difficulties

These three objectives are positioned on three different time-scales:




In a context of increasing capacity for field data analysis, modelling and simulation of processes, future logistics innovations will be driven by two major levers:

The ability to trace very precise operational information in real time, from the temperature of a component to the geolocation of a mobile device. This digital intelligence embedded in all processes allows the automated warehouse to generate and retrieve information, for more help in decision-making and to participate in increasing the order-fill ratio.

And it is through Machine Learning that it will be possible to analyse and optimally exploit these data. These algorithms learn by iteration based on the analysis of past and present to deduce the future.

At Savoye, we are convinced that the Supply Chain is an ideal area for Machine Learning application, on topics ranging from resource planning to load forecasting, picking shortage anticipation and resupply optimisation, or the anticipation of equipment maintenance actions.

**Conclusion**

Although they represent different stages in the evolution of a logistics process, mechanisation, automation and robotisation functions are entirely complementary and each have a place in a warehouse, according to the flow volume to be processed and the logistic profile of the activity. For example, for detailed preparation activities, mechanisation via picking stations is very relevant for a small number of high-turnover references, whereas a goods-to-person or even goods-to-robot system will be much more productive for all medium and low-turnover items.

While a person can operate a simple intralogistics installation, as it can be understood as a whole by a human, complex installations will require «smart» systems to help humans control them.

The supply chain in general and intralogistics in particular are now in full swing, at the crossroads of changing consumption patterns and technological breakthroughs. Warehouses are true distribution plants and must combine performance, order-fill ratios, property optimisation, scalability in the face of growing flows and responsiveness in the face of ever-increasing delivery constraints.

While in just a few years, automated and robotic solutions have become essential for meeting these challenges, the next 10 to 15 years still promise major breakthroughs.