

## **Industry 4.0 and AI to Reduce Labor**

The application of IoT (Internet of Things) solutions or Industry 4.0 is not new in Mexico, especially in the manufacturing sector. There are many success stories and a robust supply segment offering solutions locally. In the last year, however, I have been to plants where they basically do not exist, which never ceases to surprise me, given that these companies are falling behind. The implementation of IoT solutions is one of the paths that manufacturing companies in our country will have to take to reduce the amount of labor hours used in their plants, with the goal of reaching 40 hours per person per week by 2030.

### ***Capabilities and Skills***

Where do I recommend to start? Build the skills of your team to, progressively, go from the simplest to the most complicated. Do not use consultants, or you will not be able to have independence from them nor develop the skills necessary to continue with more advanced solutions. Having qualified and motivated personnel will allow you to make progress consistently. Believe me, this is a very important point. I have been to plants where every failure of a piece of equipment controlled by a PLC (a PLC!), resulted in a costly hiring of a consultant to diagnose and correct the failure.

### ***Automated Guided Vehicles***

The first solution I would like to propose to you is the use of AGVs (Automated Guided Vehicles) to automate the movement of materials in the plant. There are many solutions currently, so you can easily find one that adapts to the type of material (weight, volume) and to the type of delivery system you have implemented in your manufacturing flow. AGVs can easily replace personnel dedicated to moving materials between your warehouse and the points of use, as well as moving finished products back to it. What is important, however, is that you have well-defined material movement frequencies, the routes that will be used, the type of containers in which the material will move, and this goes hand in hand with your plan for the presentation of parts to the operator.

### ***Cobots***

The second solution is the implementation of collaborative robots for simple assemblies and movements within the production line. CoBots currently have sensors that allow them to coexist alongside operators, stopping their operation if they detect any situation that could put a human being at risk. You can use these CoBots to move finished product to its final packaging, move heavy subassemblies between stations, or even perform some simple

assemblies at the stations. I am sharing the following link so you can see information regarding these devices: <https://youtu.be/ArBxq3mOt2s?si=ybt3QzLnUCVBOztW>

### ***Automated Visual Inspection***

Another category of systems you can use to reduce the number of operators on a line is the automated inspection of subassemblies or finished products. These systems allow you to achieve high reliability in the results, while at the same time allowing you to export the results and use AI to graph them and implement statistical process control. This combination not only allows you to reduce the labor involved in inspection, but also in data collection, chart preparation, and the interpretation of the results.

### ***Automated Assembly Lines***

The next level of automation is the implementation of completely automatic lines, where without operator intervention (perhaps only for some auxiliary tasks), you can achieve the transformation of raw materials into finished products. Clearly, these types of systems involve a high cost and require advanced knowledge of manufacturing systems, including control loops, feedback, and communication between equipment. For this reason, these systems can generally only be implemented during the launch of a new production line. However, this is where a good feasibility analysis of the investments is required. Typically, these types of systems will cost you practically the same in Mexico as in other countries, eliminating the advantage of labor costs. Some products, especially low-cost ones, would not be cost-effective with such investments.

### ***Lights-Out Factory***

The ultimate goal, if it were possible to reach it, is to arrive at a "lights out" factory, where work is performed completely by automated means, without human intervention and, therefore, without the need for lights. If it seems to you that it is something very distant, I invite you to watch the following video which compiles five factories that have reached such a level. [https://youtu.be/6J7VmnpUqXg?si=0aWF6lzy\\_WZEIEno](https://youtu.be/6J7VmnpUqXg?si=0aWF6lzy_WZEIEno)

### ***Conclusions***

As I mentioned at the beginning, the key point when starting with process automation is to plan the preparation of your personnel. You not only need personnel with the necessary technical skills, but you also need to have people with imagination to develop new solutions for your processes and thereby reduce the number of personnel on your production lines.

Likewise, it is important that you have a good strategy for relocating the collaborators you are replacing with automated processes. It is important that your personnel do not see your automation efforts as a threat to their job and that they understand that the profitability of

the business (on which their job depends) must be preserved even with the reduction of the working hours, which, incidentally, does not have any government support for employers.

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