Solving the Global Manufacturing Labor Shortage

5 Barriers to Reskilling and Upskilling Manufacturing Workers in Automation

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INTRODUCTION

The National Association of Manufacturers reports that 26.2 billion US dollars is being spent to upskill workers in manufacturing in 2020. However, even with that level of investment, there will still be a significant skills gap not just in the US, but globally, for workers that can implement and maintain industrial automation. 26.2 billion dollars is just the beginning since The World Economic Forum estimates that over 1 billion people globally need to be re-skilled by 2030 as technology transforms as part of the Fourth Industrial Revolution. Deloitte and the Manufacturing Institute also report that by 2028 2.4M (53 out of 100) open positions will lie vacant due to a skills shortage in the US manufacturing industry. Unfortunately, we believe that the investments being made in upskilling and reskilling workers will not have the return, or impact in closing these reported gaps, that many manufacturers, and even governments, expect.

The 5 reasons we believe upskilling and reskilling of industrial manufacturing workers has too many barriers for success using current marketplace solutions are:

1. TECHNOLOGY USED FOR AUTOMATION IS OVERLY COMPLEX

A fully automated workcell is a complex system comprised of many different components such as robot arms, programmable logic controllers (PLCs), robot peripherals, vision systems and force sensors. These components each require a different skill to implement, making for a large amount of education necessary to train the workers. The result of this complexity is that workers need to take many weeks, if not months, of training to master all of the components used in a common automated workcell.

2. ROBOT AND PLC PROGRAMMING INTERFACES ARE DIFFICULT TO USE

The user interfaces and programming languages of robot arms and PLCs are unlike what almost all of us in 2020 are comfortable using: smartphones, touch screens and user interfaces that help us with our tasks such as context sensitive help and menus. Some of these industrial device programming interfaces don't even support the most basic of functions such as cut and paste. In addition, the physical devices used for the programming are very difficult to use with all text screens and button arrangements that are atypical from computers in use today.

3. SCHEDULING TIME OFF FOR TRAINING IS CHALLENGING SINCE MANUFACTURES ARE ALREADY UNDERSTAFFED

Given that so much training is required because of the complexity, manufacturers are faced with identifying when they can send the worker to training. The scheduling is difficult because manufacturers already have a major problem with finding labor for their skilled and unskilled tasks. Having a worker attend training for

2 months, or even just 2 weeks, may not be possible while ensuring production schedules are not impacted. This scheduling challenge creates a catch-22 since workers need to develop new skills to become more leveraged, but there is no time to do so, resulting in more demand for their time as production increases.

4. A LACK OF COMMON TEMPLATES FOR AUTOMATION BEST PRACTICES

Almost all automation projects require a skilled manufacturing or controls engineer since each implementation is a custom project. There does not exist a set of templates available to teach workers repeatable processes they can use to automate common tasks, such as loading and unloading a CNC lathe, mill, or stamp press. In addition, the manufacturers of automation equipment, robot arms in particular, provide little to no guidance as they have traditionally relied on integrators to design, program and install complete systems. Because of the complexity, lack of pre-defined solutions nor standards of interoperability between suppliers, the level of expectation for what the worker must learn to design these processes is unreasonable.

5. THE TECHNICAL SKILLS ARE NOT TRANSFERABLE

The robot arms and PLCs in particular present a challenge to training since there is not a common way to program them, each having its own programming language and user interface to write the programs. There are over 25 vendors of robot arms and 20 vendors of PLCs. Not to mention dozens of suppliers for vision, force sensor, and gripper systems. The challenge this fragmentation presents is that it's nearly impossible to provide general training that is of any use since the implementation details are so specific to the brand, make, and model of the device. As such, a manufacturer has to pick a set of technologies, but then when a better, cheaper, or a device more specific to the task being implemented becomes available, the old training is no longer of use.

CONCLUSION

There is a clear need to reduce the training effort required to enable more workers to design, implement and maintain automated solutions. For manufacturers in mature, as well as emerging markets, to meet rising demand, maintaining high quality standards while controlling costs automation is a proven solution. The availability of lower cost robotic arms has also drastically reduced the equipment costs for automation. However, to enable more workers to manage these systems, a more modern approach is required. A similar situation existed in the 1980s when Microsoft released Windows and plug and play technologies. Suddenly, anyone with next to no training could use a powerful application, Excel, and plug a mouse, printer or monitor into their PC and it just worked. Microsoft achieved its goal of a PC on every desk, and

there is no reason to doubt that we can transform people's lives by automating more industrial processes by upskilling them using easier to use technologies, that will proliferate as the ecosystem of compatible hardware and software grows.

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READY Robotics has developed an operating system, Forge/OS, and an award-winning visual programming application, Task Canvas, and a hardware standard for enabling plug and play of automation work-cell components. Manufacturers using Forge/OS have already seen the impact of augmenting their existing staff to design, implement and maintain automation that was previously not possible because of the cost, and lack of skills to implement and maintain the solution.

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