AUTOMATION IS TOO EXPENSIVE

Software is the solution

5 ways a cross-brand, easy-to-use robot programming application enables higher ROI implementations

READY ROBOTICS

Introduction

Despite the widespread adoption of robotic automation in some areas of manufacturing, more extensive use of robots is often slow or even blocked by an inability to justify the upfront investment. While we have written about many reasons to automate such as the elimination of repetitive motion injuries (RMIs), increasing supply chain resilience, and as a way to address the global labor shortage, some manufacturers still struggle to identify how they can justify the investment to install robotic automation in their factories.

ROI Targets

A ROI (Return on Investment) model at its most simple is a measurement of the gain generated from a capital investment relative to the amount of money spent to purchase it. The payback period, which is the amount of time to pay off the initial investment, is a major factor when evaluating the investment. Many manufacturers target projects with a ROI payback period of 18 months or less. The ongoing shortening of the innovation cycle means companies need ever shorter ROI payback periods. A constant struggle with traditional robotic automation is finding an acceptable solution whose costs can be justified over this relatively short time period.

Operational Costs

There are several methods to compute the ROI for a new project. One common way is based on the labor costs of the operators who are freed up to complete other required work on the production floor. It should be noted that oftentimes the manufacturer will not need to let employees go as the result of automation, as there are other value-added tasks these trained and skilled employees can perform in the operation. To generate a positive ROI, the automation costs must offset the largest operational cost, labor. The automation enables higher worker productivity and OEE through:

- Additional shifts run with little to no human intervention
- Operators tending more machines rather than being “stuck” at a single station
- Higher overall output since automated systems do not require breaks from activity throughout the workday
- The elimination of injuries from RMIs and working in hazardous environments

Other ROI models are of course far more complex, but the largest cost component typically offset by automation is the cost of labor.

Since operator costs vary by country and industry, many global enterprises must live with different ROI benchmarks across different regions, creating a further challenge to global standardization, and the benefits that accompany it.

Capital Costs of Robotic Automation

Design

The design phase includes the layout of the overall process flow, including the selection of the robot model and peripheral equipment, based on the requirements of the task (primary drivers being the size and weight of the parts, required reach of the robot, cycle time, part presentation and exit strategy, and safety requirements). The resultant design has a BOM (bill of materials), schematics, and project plans necessary for installation. Design phase costs are primarily made up of the man hours required to complete the design.

Installation

The cost to install the equipment, including site preparation for electrical and pneumatics. Depending on the task, installation may require integration with existing machinery.

Training

Workers who will operate or oversee the robot require training for the initial implementation and ongoing maintenance during production.

Robot & Peripherals

The robot is often the most expensive component of the workcell. The cost of a robot is related to its capabilities such as speed, payload capacity, repeatability and reliability. Additionally, end-of-arm tooling suited to the task, as well hardware for part presentation (such as drawer systems), machine vision, safety and machine connectors (door openers, pedal pushers and button pressers) may be required.

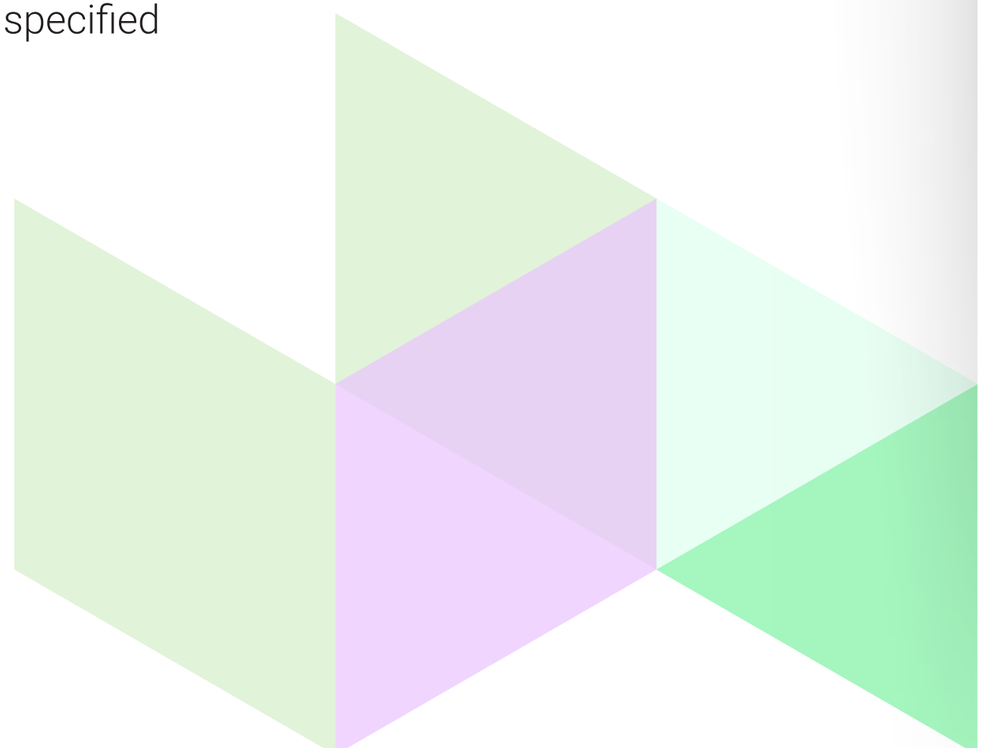
Programming

The robot needs to be programmed for the task. This step traditionally required extensive, specialized training and experience, not only due to the complex nature of programming languages utilized by automation devices, but also due to the fact that adapting a manual process to a robotic process is not often intuitive. Also, programming is rarely a one-time effort, especially in high mix/low volume environments where changeover requires a new program to be created and implemented regularly.

The ROI Gap

Some manufacturers struggle to bridge the gap between their expected automation investments and the costs being offset. Traditional methods of implementing automation don't result in a cost structure that works for them to automate fleets of machines. The reason why these costs are too much for a global rollout of automation, especially at multinational enterprise manufacturers are:

- Labor cost disparity: wages in the US and European Union are much higher than in places like China or Mexico
- The enterprise already has very high OEE on their capital equipment, so there is less opportunity to drive ROI through utilization of unused machine capacity
- The costs don't allow for an ROI in the time period specified by their financial controllers



The Solution to the ROI Gap

It may seem like a leap to say that easy, cross-brand, robot programming can enable implementation costs to be cut in half, but it is possible. Easy, cross-brand, robot programming does more than just lower the cost of the programming, it opens up a way to mix and match all the components in a workcell, yielding an opportunity to lower the overall capital investment. Robot programming languages are very specific to hardware and software integrated with that brand of robot. By opening up the environment, then more generic templates can be followed that reduce the amount of custom designs needed.

5 ways Automation Costs can be Significantly Reduced

Using existing staff for installation and programming of the automation

By having an easy-to-use, cross-brand, robot programming language, external integrators are unnecessary for most implementations. These integrators typically come at a premium, and are best used for specialty workcells, not the implementation of common tasks such as machine tending, pick and place and parts inspection that make up a large part of automation opportunities. By using in-house staff, implementation and programming costs are dramatically reduced.

The experts in production processes are already in your factories. Engaging them in the programming of the automation can result in a better solution than having an expert in robotic automation who is not familiar with your processes.

Having leverage in hardware purchasing negotiations

A necessary component of any negotiation is leverage. When you lack leverage, it is difficult to get the lowest price, and robot vendors know this fact. In today's market, for example, every robot brand has its own proprietary programming language and ecosystem of peripheral suppliers. As such, the vendors know that you are locked into their solution and have little reason to negotiate on cost once you've purchased your first system from them. However, a cross-brand programming language, built on top of a universal operating system for automation, enables unrestricted choice for the end user in hardware since it eliminates the dependency requirements for compatibility across the components of the workcell. No longer are you stuck with high switching costs, primarily in the form of training, when you bring in a new brand of robot or peripheral. As such, it is possible to negotiate based on hardware capabilities since the biggest area of robot vendor lock-in, the programming and user interface, is eliminated. Further enabling your power position in the negotiation is that it is also possible to source from any vendor, in any accessible market, thus allowing for even better negotiating power since a sole-source global contract is not required.

3 *Eliminating costs through standardized designs*

A typical automation implementation starts with the gathering of requirements and then development of a design for that workcell. These designs can be complex since they also have to account for interconnecting many types of peripherals in the workcell. However, if a standard BOM, specific for the market, along with the schematics and implementation specifications is available, then the design cost - which is primarily driven by the time required to complete the design - can be significantly reduced. Think of these templates as being copied and pasted, and then modified for each workcell. The modifications require far less work than starting from scratch on each workcell.

The designs are based on COTS (commercial off-the-shelf) parts sourced and serviced locally. As such, common skills already in place in the factory can be leveraged to install them such as electrical and mechanical staff. Through the use of design templates, and easier to program robots, a wide range of staff can implement the workcell, not just robot-specific integrators. In addition, we've found that reference designs requiring small modifications can eliminate the amount of design and controls work necessary for an implementation.

4

Reducing the need for employees skilled in robotics

The combination of an easy-to-use robotic programming language, standard design templates, and task-specific documentation means that your workers are able to implement automation without having to rely on external integrators or a team of robotics engineers. As noted previously, while complex work cells will still require skilled automation experts, many workcells, especially those needing ROIs in short time frames at relatively low cost can be implemented with skills likely already available on the factory floor.

5 *Dramatically reducing training costs*

Training costs can be dramatically reduced through the introduction of an easy-to-use automation programming interface. This democratization of capabilities enables workers to be trained through online videos and self-directed hands-on training. Costly vendor training, whether on-site or remote, becomes unnecessary, meaning more workers are able to interact with and manage automated workcells on the floor.This provides a unique opportunity to dramatically upskill or reskill existing workers at a fraction of the traditional training investment cost.

Conclusion

Wide-scale implementation of automation will benefit all members of the manufacturing ecosystem by increasing the flexibility, resiliency, and scalability of the global supply chain. However, until acceptable ROIs are achievable for a broader array of applications, these investments will not be made, and automation will continue its current growth trajectory. This trajectory has been shown to not be fast enough, especially given the dramatic increases in production demand and dwindling resource pools (labor) available to meet that demand. READY's easy-to-use automation applications, utilization of COTS hardware, and available reference designs enable the implementation of robotic automation at dramatically lower costs than ever before.

READY Robotics developed Forge/OS, an industrial operating system, to allow for vendor independence and plug and play usage of robots and peripherals. Running on Forge/OS, Task Canvas, a visual, flowchart based programming application for automation is the only cross-brand general purpose robot programming application on the market. Task Canvas democratizes robotic programming by enabling manufacturers

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