PRIVATE EQUITY PERFORMANCE IMPROVEMENT Quantifying the Benefits of Automation: Betting on the Safety, Quality and Productivity Trifecta

Make the CapEx Case for Plant Automation by Quantifying Safety, Quality and Productivity ROI

As companies look to improve manufacturing processes, they often turn to automation. On an automation business case, the trifecta bet is safety, quality and productivity. When those horses come in that order, capital expenditure (Capex) is approved. However, most business cases fail to quantify the safety and quality aspects, if they include them at all. Worse still, they typically undervalue the productivity benefits as well. Complicating matters further, production leaders who clearly see the benefits of a Capex investment into automation struggle to persuasively quantify the benefits to the financial approvers, who only speak in dollars. For these reasons, many Capex requests to support manufacturing automation ultimately go unfulfilled.

To bridge the communication gap between production leaders and financial approvers that can hinder automation Capex requests, the business cases must fully quantify the return on investment (ROI) and financial implications of automation through the safety, quality and productivity improvements.

How Do Safety, Quality and Productivity Translate Into ROI?

Financial approvers and other leadership often look for quantitative, financial benefits when reviewing automation Capex requests, something that is often incomplete from these business cases.

Safety can be called out as a qualitative reason for an automation Capex request. However, this only tells us what process is being made safer. This is important, but not so much to the approver who is looking for a return on capital because it fails to tell the "so what" or "how much" money can be saved through automation with improved working conditions. Luckily, the quantification of the safety benefit does not need to be difficult thanks to the Occupational Safety and Health Administration's (OSHA's) cost per injury calculator.¹ This easy-to-use cost estimator calculates the cost per injury based on workers compensation insurance claims.

Automation can reduce the risk of injury from several sources. It can serve as a substitute for repetitive tasks like picking, placing or packing, which can lead to repetitive stress injuries. According to OSHA, the direct cost per repetitive stress injury is \$30,000. To include these costs and potential savings in a business case, the injury rate for a process over a representative time horizon will need to be calculated and the incident rate expressed in dollars. For example, if a business experiences two incidents of repetitive stress injuries over a three-year period, the financial benefit of automation would be \$20,000 per year assuming the incident rate would stay the same without automation.

^{1.} Estimated Costs of Occupational Injuries and Illnesses and Estimated Impact on a Company's Profitability Worksheet | Occupational Safety and Health Administration (osha.gov)

When implemented correctly, automation also improves manufacturing quality through improved quality control and product consistency, which will need to be a part of the business case.² However, there are many cost elements that make up the cost of poor quality, and any one of them can help bolster the business case. One element that attracts the most attention, and subsequently the highest cost, is direct customer escapements - when a defective product leaves a factory, and the customer discovers the defect, the customer loses trust in the supplier. This is the highest of costs that cannot be estimated. However, what can be calculated are the costs associated with returning, replacing and reworking the defective product. Typically, these costs are found on general ledger line items such as customer returns and credits, and the simple calculation is to take the average product cost — including freight — and multiply it by the volume of returned or defective products to annualize the total cost of quality.

Traditional ROI analysis for automation in manufacturing narrowly considers productivity components of direct labor. However, the current labor landscape and new technology present benefits that should be considered. Industrial automation is as relevant as ever considering decreasing technology costs, increased factory applications and viability as a solution to mitigate challenges factories are faced with as labor supply dwindles. According to the Bureau of Labor Statistics, the availability of labor has become the scarcest it's been in 20 years, from a high of 67 percent in the early 2000s to 62 percent in July 2024.³

ROI calculations of automation projects tend to focus almost exclusively on observable direct labor cost savings relative to the capital required for automation solutions. These analyses often show elongated payback periods as the upfront costs of automation design, equipment, configuration and support can be millions of dollars, even for small factories. In recent cases, however, where labor shortages have had large impacts on a factory's ability to reliably generate revenue, this approach has become short sighted.

Given the current state of the manufacturing landscape, a modified approach has been adopted by some manufacturers. This approach thoroughly evaluates the cost benefits of automation projects yet moderates the implications of soft savings and risk mitigation, which don't always appear on the profit and loss (P&L) statement.

ROI CASE STUDY

How Have Real Manufacturers Quantified Automation Benefits?

The Background and Challenges

A mid-size U.S. consumer products manufacturing company with operations in northern states faced pain points that limited its efficiency and production. A labor supply shortage, depreciated equipment, an increased reliance on manual labor, consumer demand growth and post-COVID-19 volatility concerns regarding Capex investment risk all presented challenges that necessitated process improvements.

Our Approach

To address these challenges, A&M assisted the company in automating its operations. Each of the company's 13 converting lines required two dedicated packers to support high-volume picking, placing, inspection and packaging on the back end, a highly manual process. However, these processes could be largely automated by retrofitting applications with a combination of vision-system-enabled robotic arms and a shared material handler across several lines. This allowed the manufacturer to reduce headcount from two packers per line to one material handler for five lines and improve costs and efficiency.

Traditional Approach

With an initial payment of \$8.5M to retrofit each of the 13 lines with a \$650,000 system, payback was calculated as the savings from reducing the labor and fringes cost of two people to 0.2 people per line. These savings were then extrapolated across all operating hours for those converting lines on an annual basis for a typical \$22 per hour employee with fringes and 20 percent overtime along with the savings of shifting to automation with a shared support resource. Annual savings were calculated to be approximately \$4.0M once the project commences, which would establish a two-year payback agreement.⁴

^{2.} Automated Quality Assurance: Ensuring Consistency and Compliance in Product Manufacturing and Testing | LinkedIn

^{3.} The Employment Situation - July 2024 (bls.gov)

^{4.} Sample case P&L is anonymized and modified for purposes of client confidentiality though representative of cost at an adjusted scale.

Is there a Better Way to Assess Automation ROI?

A traditional ROI analysis would focus on labor cost savings, balancing the total cost of Capex required to install automated equipment — such as a robot, vision system or palletizer — against the direct costs of the manual labor.

Managers tend to evaluate savings by modeling the cash flow over the depreciable life of the equipment, which is assumed to be seven years, and appraising the initial payments against annual savings. Typically, management expects a payback period of around two years. However, in times of economic volatility when there is a high cost of capital, there could be increased hesitance on the part of financial approvers.

To complement the traditional approach, additional factors that generate real savings but that often get overlooked should be considered. Although these may vary from plant to plant, the following considerations are useful for building automation Capex business cases:

- Overall equipment effectiveness improvement In the case study example, looking a layer deeper into the data indicates that 70 percent of unscheduled downtime was a result of staffing shortages on a day-to-day basis, forcing lower output per day than expected and a high prevalence of overtime. In this and other similar cases, lowering the overall employee base and staffing needs can reduce unscheduled downtime and lower absenteeism. The savings would be recognized as both lower overtime requirements and higher output per year.
- **Materials savings** Establishing automated vision systems to objectively detect defects and flag machine adjustments can provide a feedback loop that eliminates the risk of false defects, improves long-term scrap rates and reduces customer escapements. At the case study plant, this would reduce the 0.5 percent of total production volume that is rejected due to packer subjectivity despite meeting product specifications, resulting in savings.
- **Direct support costs** Costs associated with training and factory supplied uniforms that are associated with direct labor employees, which often get overlooked, are impacted by automation.
- Indirect labor savings Since this cost category captures salaried staff and support functions, such as
 maintenance, it can be assumed that a need for direct labor management functions is proportionate to direct labor
 headcount which includes operations, supervision, HR, payroll and safety staff. However, this would be offset by
 a potential increased need for engineering and maintenance support to cover additional automation and equipment.
- Overhead support savings With turnover and attrition sitting at record highs, it's common for plant resources, even at small plants, to be dedicated to recruiting, onboarding and terminating employees. Automation can minimize these efforts, saving time and resources. Assuming that an 80 percent reduction in turnover for the case study plant's addressable team is achievable, this would translate to only one full-time equivalent needed on the plant overhead and HR team, further reducing labor costs.

These additional categories culminated in a **36 percent increase** *in projected annual savings* for the case study company, directly contributing to the EBITDA and valuation of the business and accelerating the payback period by seven months. Without taking these factors into consideration, production leaders are hindering their business cases when requesting automation Capex.



What is the Future of Automation Capex Business Cases?

The allocation of capital to plant automation projects has seen mixed commitment among manufactures over the past decade, primarily due to a narrow viewpoint on safety, quality and what constitutes real productivity as well as a focus on recognizable cost savings after implementation. By betting on the safety, quality and productivity trifecta, including everything from unplanned downtime improvements and materials cost savings to non-wage-related direct costs and salaried support, manufacturers may expect to see double-digit percentage increases in annualized savings and higher automation Capex approval rates. This modified approach to automation business cases may make the difference as to whether capital is allocated to these projects and how their success is recognized moving forward.

Why A&M?

Effectively assessing and implementing automation opportunities requires experienced leadership, a clearly defined strategy, and a dedicated team to help achieve program success. Each situation is unique and requires a flexible approach to define what a successful outcome looks like. At A&M we take ownership of the outcome by diving into the details of each operation in order to ensure improvements yield the expected benefits. We support our clients in providing advisory perspective, hands-on assistance, and comprehensive project management support in these situations.

Our team of professionals works directly with you and your manufacturing team on manufacturing performance improvement projects.

Key Contacts:



Managing Director +1 312 961 8353 jguyette@alvarezandmarsal.com

James Guyette



Director +1 518 744 9526 mack.brown@alvarezandmarsal.com

Mack Brown

ABOUT ALVAREZ & MARSAL

Companies, investors and government entities around the world turn to Alvarez & Marsal (A&M) for leadership, action and results. Privately held since its founding in 1983, A&M is a leading global professional services firm that provides advisory, business performance improvement and turnaround management services. When conventional approaches are not enough to create transformation and drive change, clients seek our deep expertise and ability to deliver practical solutions to their unique problems.

With over 10,000 people providing services across six continents, we deliver tangible results for corporates, boards, private equity firms, law firms and government agencies facing complex challenges. Our senior leaders, and their teams, leverage A&M's restructuring heritage to help companies act decisively, catapult growth and accelerate results. We are experienced operators, world-class consultants, former regulators and industry authorities with a shared commitment to telling clients what's really needed for turning change into a strategic business asset, managing risk and unlocking value at every stage of growth.

To learn more, visit: AlvarezandMarsal.com







© 2024 Alvarez & Marsal Holdings, LLC. All Rights Reserved. 450773