

2018

THE ROBOT AND
AUTOMATION ALMANAC

THE FUTURIST INSTITUTE

Software-Defined Automation

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The industrial automation sector is booming. And because manufacturers and integrators are enjoying record years, one might overlook the disruptive transformation underway.

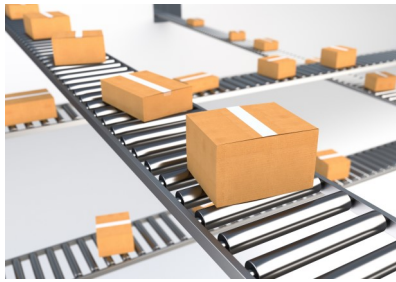
Software, to paraphrase Marc Andreessen, is beginning to eat the mechanical automation industry; new players are primed to dominate, and many current players will stagnate or cease to exist.

Despite the boom, the industry is ripe for disruption because large industrial customers are unhappy with today's systems. Custom-designed systems have two- and three-year lead times. Automation is not reducing labor fast enough to offset current labor shortages, especially in distribution. Mainframe-like monolithic solutions have poor ROI, and their rigidity can't keep pace with accelerating demand for versatility.

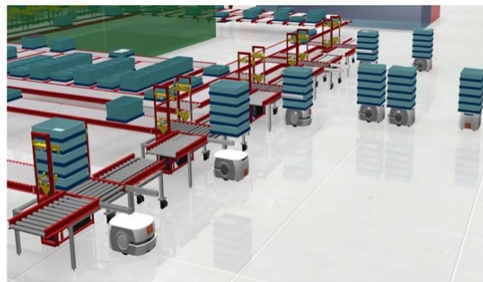
Software Will Dominate the Automation Industry

Today's hardware-first industry is transitioning to software-first. The mobile phone industry is a useful mental model that foreshadows the automation industry transformation. While the hardware in today's phones is remarkable, the software apps (Android, iOS, Facebook) dominate. Today's industry leaders are software companies, and none were in the phone industry before the transition to smartphones.

Bye-Bye, Conveyors¹



Conveyor system: Monolithic with poor utilization — some lanes jammed; most empty.



Swarm of mobile robots: Diminutive with 100% utilization.

The elimination of conveyors is a key aspect of the industrial automation transition. Today, conveyors are the mainstay of large-scale automation systems. Tomorrow, the system mainstay will be mobile robots.

Mobile robots are to conveyors what PCs are to mainframes. Mobile robots are slow and expensive today, but they will be fast, cheap, and smart tomorrow. Their sensor-rich, 360-degree vision makes them safe in human environments.

Swarm-based software lets each mobile robot operate as an independent agent adhering to a simple rule set, which results in an astounding emergent collective behavior. Scaling is as simple as ordering more mobile robots. Installation time is literally 24 hours versus a year or more for a large conveyor-based installation. New workflows can be programmed with no hardware changes. Just as the mainstay of today's largest data centers are PCs, so the mainstay of tomorrow's largest industrial automation systems will be mobile robots.

Hundreds of test systems were launched in 2017. In 2018 there will be a few large-scale installations and a small but ominous slowdown in orders for large, conveyor-based, monolithic ASRS (automated storage and retrieval) installations.

Making the Transition

Individuals and companies can take specific actions to use this transition as an opportunity for advancement. Actions can be categorized along two paths — technical design and strategic/career planning — and several of these are highlighted below.

The intent is to trigger your own ideas for the many ways to use this transition as a once-in-a-generation opportunity.

Winning Through Technical Design

Focus design toward autonomous vehicles and articulated robots:

- A **software-first** mantra leads to simpler, general-purpose hardware design. If, in a design process, you have the thought that this simplified hardware design means the software is much more difficult, you are on a good path.
- For large systems purchased by industrial customers, strive for an **integrated hardware/software** solution. Model your design strategy after the Apple juggernaut of combining hardware and software and designing both at the same time.
- Recognize the power and price points of **consumer electronics** as highly viable industrial components. This carries over to software. For example, an inexpensive, powerful gaming engine platform is, for some use cases, better than industrial simulation apps. It's the total investment in consumer electronics that causes this surprising outcome. Billions are being invested in cameras and game engine platforms, but the cost per user is pennies.
- Use the software technology that operates **printers as a model for operating complex equipment**. A driver is written to sit between the complex system and the printer. The driver consists of simple building blocks or instructions sets. The complex system can get the printer to do anything and advance the output of the printer for years without changing the driver code.

In 2018, the first few big winners among the new robotics companies will emerge.

Winning Through Strategic/Career Design

- Seek companies and business opportunities that are not dependent on technologies that will be in decline. A key indicator is the **size and quality of the software effort** in a company. Is the company moving to a SaaS model? What is the size and caliber of its software team?
- **Study AI.** It's the real deal. Forty years ago, there was a great buzz about relational databases. Today, relational database technology is deeply embedded and pervasive in all major computers systems. Today, AI is on that same path. It is so powerful. It will make software smart and less intolerant — and it will reduce the great coding burden on all companies.
- Move to **product-focused** companies, not those with customized systems. The modern approach is to productize and configure rather than customize. Industrial customers are not happy with the heavy burden of managed software, while at the same time, paying hundreds of millions of dollars each for these large software applications, such as an ERP. By 2018, many large companies will likely be working to pull the plug on their ERPs.

I hope I've provided some insight into the future of the industrial automation world. If the transformation occurs as predicted, the next few years in automation will be fun and exciting for those leading the transformation. ~

Note

1. Image Source (Left): AdobeStock GraphicCompressor. Image Source (Right): Mercury Startups.

Louis Borders is a Founder of Borders Books, Mercury Startups, and HDS Global.