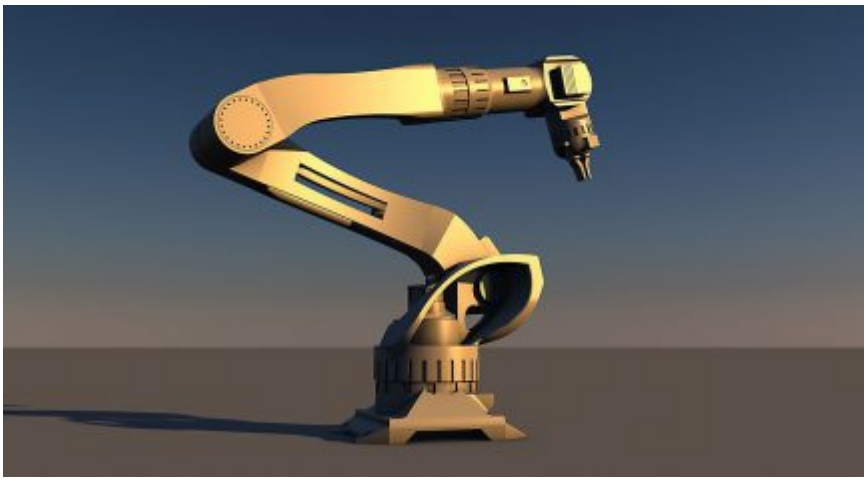
Pick and Place for Profit: Using Robot Labor to Save Money

By Brian Carlisle | September 22, 2017

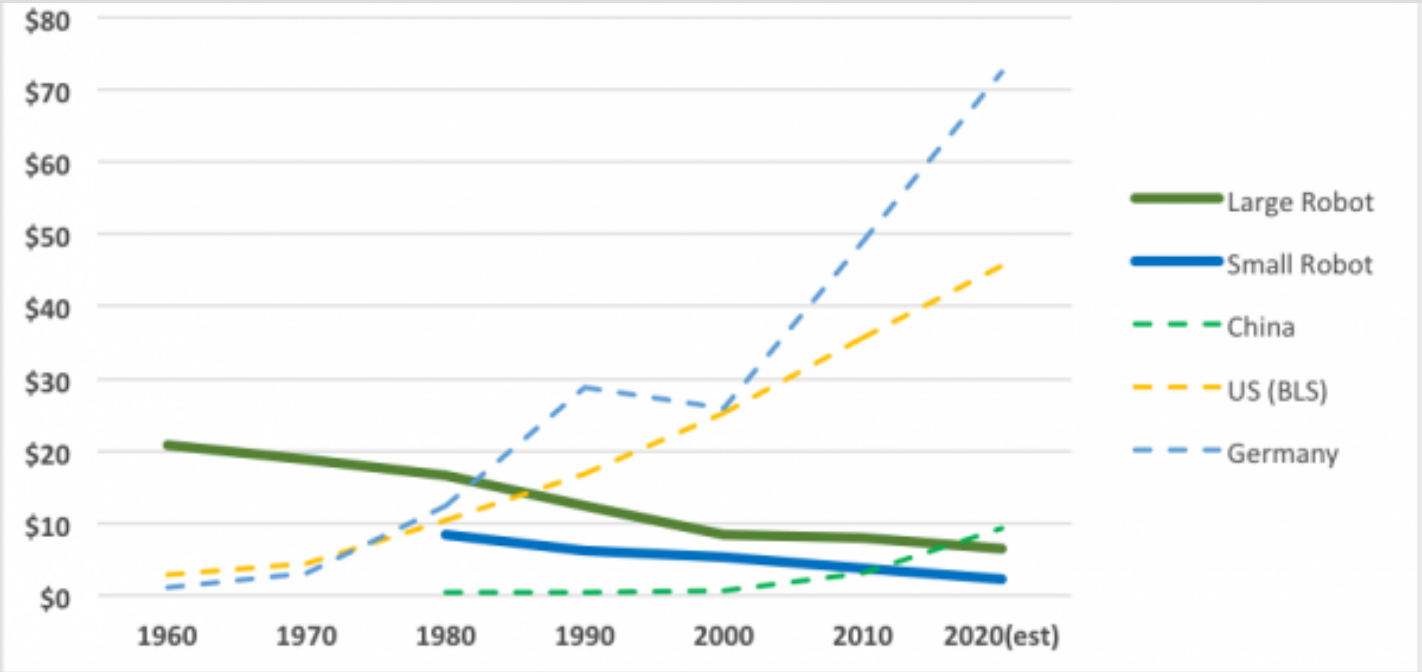


Over the last 50 years the cost of labor in manufacturing has risen steadily, and the willingness of many people to perform highly repetitive tasks on assembly lines has decreased. Over the same period the equivalent hourly cost of robot labor has steadily declined.

Human labor turnover in U.S. manufacturing **averaged 16% in 2016** according to a Compensation Force survey, and overseas contract manufacturing's average turnover is 20 to 30% a year, imposing both a high training and quality cost. Also, in the U.S. labor productivity in the manufacturing sector has stalled over the last few years; according to the Bureau of Labor Statistics it was -0.6% in 2015 and 0.2% in 2016.

A new trend in robot manufacturing

Large powerful robots were **introduced in the 1960s** for heavy and dangerous jobs, and smaller robots were introduced in the 1980s for small part assembly and material handing jobs. Until recently robots had to be separated from workers for safety reasons and required trained programmers to develop applications. Safety screens which consumed floor space in factories and application development costs created significant barriers to installing robots.



Recently, robot manufacturers have been introducing a new type of robot called **"Collaborative Robots"**. These machines are designed to be able to work next to people and will not injure people if they bump into them. In addition, for simpler tasks, such and loading and unloading a machine from a pallet of parts, these robots can be programmed from a graphical user interface without the need to write any software.

These newer robots reverse a previous trend toward faster and faster robot motions. Robot manufacturers selling smaller robots for assembly and material handling had sped these robots up to the point where the tool speed could be 10 meters/second, and the motions were so fast that they were quite scary. The newer collaborative robots are limited to slower speeds, typically 0.5 meters/sec to 1.5 meters/sec, which is similar to the speeds people work at, and let people to feel comfortable near the collaborative robots, allowing people and robots to mix on the same line.

Robot labor cost, computed as the installed cost of the robot plus tooling and engineering, running 2 shifts, at $2-$3 per hour, is now lower than the cost of labor in China and other low-cost regions. To the extent that robots can be easily installed for an application, they allow U.S. and European manufacturers to **reduce labor cost** as a consideration of where to manufacture.

Creating a robotics plan for your business

However, compared to people, robots are still very simple machines and **have many limitations**. There is a tendency to expect that a robot can perform any task a person can do, and this is not the case. Manufacturers who wish to benefit from the introduction of robot labor into their workforce should take some time to understand what tasks robots can do easily, what tasks are more difficult, and what tasks should be

Such a plan should include a prioritization of applications, a clear and simple methodology for financial justification, a training plan for employees, a plan for the operator interface for various machines on the floor, a plan for the data interface and how much data is desired (or not), and a plan for any impact on product design and on part suppliers. Some examples are discussed below.

Examples of easy applications include machine loading, tester loading, packaging, and process applications where the robot uses a single tool, and no major changes are required to the product design or packaging.

An example of a difficult application is assembly, where part feeders must be designed, part packaging must often be changed (affecting suppliers), and the product design may need to be changed. Another example is order picking, where reaching into boxes, designing grippers which can handle a very large number of part shapes and orientations, and changing the packaging from suppliers are all major obstacles to easy automation.

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Implementing Robot Labor

Senior management should establish some quick and clear methods for factory managers to understand how proposed automation investments will be evaluated.

Factory planners should have a plan for the level of complexity they may be introducing into their factories and how they will train employees to handle it. For example, if a factory installs robots from 4 different vendors, and each robot has a different programming interface, operators are going to need to learn 4 different programming interfaces.

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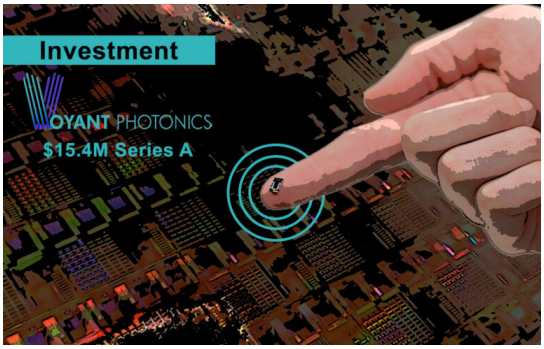

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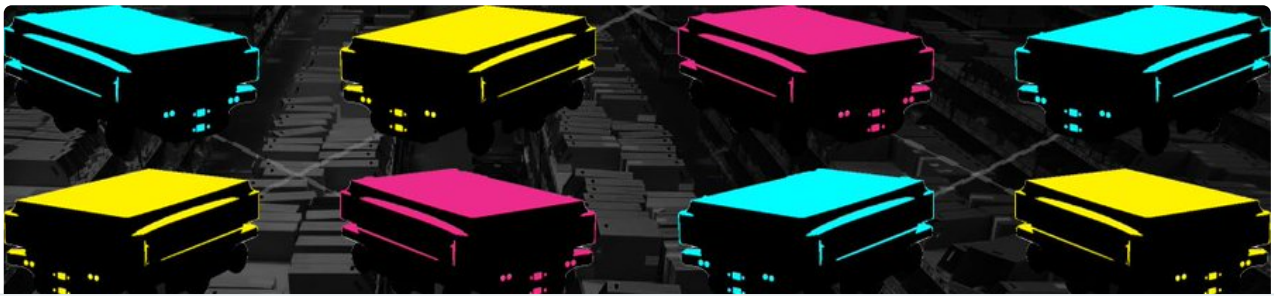

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