INTRODUCTION

The purpose of this White Paper is to outline some of the key ways cobots are already contributing to re-contouring certain basic structures of worldwide capabilities for manufacturing and finishing the goods that our society depends on to meet its multitude of needs – real or imagined.

We will consider some of the key drivers for this important process of change, as well as outlining some of the mechanisms involved, in which collaborative robots of the types manufactured by Universal Robots play a crucial role.

Finally, we will sketch some of the “big picture” opportunities already emerging from reshoring activities, and how the use of collaborative robots can serve as a catalyst in this process.
WHAT IS RESHORING – AND WHY IS IT SIGNIFICANT?

Reshoring is all about bringing manufacturing, assembly and finishing operations back closer to the markets in which their end products are to be sold.

Such reshoring is made possible by new ways of integrating automation and robotics with unique human skills, to drastically increase productivity as well as product quality and individualization.

The “big picture” significance of reshoring lies in bringing the points of production and consumption closer together, reducing the massive logistics chains involved in a globalized infrastructure, and reducing the environmental impacts that result from these.

Closer geographical proximity also paves the way to new capabilities with regard to faster responses to changes in customer needs as well as a revised commercial mindset based on customer-centricity, greater inclusion and responsible manufacturing processes.

“Reshoring = the reversal of offshoring – i.e. the transfer of a business operation back to its country of origin, or in closer proximity to its primary market(s).”
Globalization has revolutionized patterns of manufacturing, logistics and consumption worldwide. The entire process has been – and still is – heavily and consistently dependent on placing manufacturing and assembly operations in countries where labor costs are low. The aim has been to achieve competitive advantage via savings on labor costs in manpower-intensive processes, and this resulted in millions of low-skilled jobs disappearing from developed countries.

In the early years of globalization, many countries and many companies were able to make use of a low-cost, relatively unskilled labor force in a wide range of processes that could – and in many cases still can – be kept manual. This kind of setup based mainly on low-cost labor – regardless of where it might be – gives a company relatively much “production capacity per dollar”. It is also an attractive alternative to investing in big-figure mechanization and automation setups.

**Rolling redundancy, natural limits**

However, there’s also been steady, rolling change in terms of the “currently cheapest” source of low-skilled labor. This kicks in at different times in different countries and regions and with different industries with specific manufacturing processes and labor requirements. In almost every case, however, the near-inevitable wage creep sets in and steadily erodes the labor-cost advantage on which the production setup is based.

There are also natural limits to applying more low-cost labor to a manufacturing or assembly process. In modern manufacturing, the more processes are spread across straightforward, easily repeatable manual tasks requiring little skill, the more suitable they become for automation. Which then does away with the core rationale for offshoring – the low cost of unskilled labor.

**THE OFFSHORING ADVANTAGE**
As the low-wage competitive edge is eroded, many countries and companies have therefore adopted varying mixes of highly automated Industry 4.0-style setups and low-cost manual procedures (as explained in the Universal Robots white paper entitled “The Role of Cobots in Industry 4.0”).

When combined with the complex logistics and long transportation times and strategic vulnerability associated with offshoring, many manufacturers are being encouraged to consider new ways to tackle issues associated with manufacturing costs and productivity. Such considerations become more urgent in the light of increasing concerns about the considerable environmental impacts of such global logistics activities.

There are many different opinions about the figures involved, but according to non-profit organization the Reshoring Initiative®, the net loss of jobs to offshore has stopped. Net annual reshoring (reshoring minus offshoring) went from losing about 150,000 manufacturing jobs/year in 2003 to approximately zero in 2013.

**An accelerating process**

Automation using advanced robotics and associated technologies is helping this shift by enabling companies of all sizes remain cost-competitive while keeping their manufacturing operations at home – or relocating and returning them to facilities closer to home.

According to a report from Boston Consulting Group, based on polling U.S.-based manufacturing executives, “the share of executives saying that their companies are actively reshoring production increased by 9% since 2014 and by about 250% since 2012. This suggests that companies that were considering reshoring in the past three years are now taking action.”

56% of the respondents in this particular survey believed that falling costs of automation had improved their product competitiveness, and 71% believed that advanced manufacturing technologies will improve the economics of localized production. Nearly three-quarters (72%) said they will invest in additional automation or advanced manufacturing technologies in the next five years.
WHY ENGAGE IN RESHORING?

There are many reasons for manufacturers to re-evaluate the traditionally offshored setups for manpower-intensive processes, and to consider reshoring as a commercially viable alternative.

Companies are increasingly recognizing that considerations previously ignored – including more-or-less hidden costs, risks and strategic impacts – are actually sufficiently large to overcome the shrinking wage advantage in offshore locations. They are seeing the strong, multiple benefits of locating key activities in proximity to the home market.

In addition to the fact that offshore wages are steadily and consistently rising, the main reasons for companies to engage in reshoring include:

- Easier/better access to a skilled workforce capable of adding concrete value to a product or process
- Faster response to changing customer demands and market preferences, because of shorter lead times
- Reduced logistics costs and lower environmental impacts
- Easier to monitor and verify product quality and consistency
- Less buffer inventory required, because of greater responsiveness
- Easier retention of the benefits available from the capabilities and experience provided by skilled human workers
- Better opportunities for innovation and product differentiation

RESHORING AND PRODUCTIVITY

One of the key features of reshoring a whole gamut of manufacturing, assembly, finishing and checking processes lies in the greater productivity made available by such a game-changer step. Offshoring – whether based on cheap labor or complete lights-off automated manufacturing setups – is fundamentally posited on racking up significant upticks in productivity, and any re-contouring of the overall manufacturing landscape therefore has to provide more than marginal improvements in order to convince companies that such a fundamental strategic realignment is good business.

Robotics plays a major part in reconfiguring the productivity metrics of a manufacturing setup located in close-to-home places normally characterized by the high cost of labor of all kinds. A 2015 Harvard Business Review paper calculates that robotics has actually increased labor productivity by 0.35% annually. That’s approximately the same increase normally attributed to the steam engine, which is considered a classic example of a “general-purpose technology” that has a pervasive, longstanding impact across multiple, dissimilar industries.

“Economists agree that raising productivity is the key to improving people’s living standards.”
RESHORING AND THE SKILLS GAP

Manufacturing industry is generally an early adopter of advanced technology and employs a wider range of automation technologies than other segment of industry. In high-cost countries, the productivity gains available from using collaborative robots (cobots) is enabling companies to “reshore” parts of their operations previously outsourced to low-cost countries, bringing back jobs and/or creating new ones.

One of the big upsides of such reshoring lies in easier access to skilled manpower, which is a limited resource that has proven crucial for improving quality and boosting value. Having skilled human workers engaged in suitable configured manufacturing, assembly, finishing and inspection operations side by side with cobots is one of the most cost-effective ways to leverage the unique value-adding capabilities of a skilled human workforce.

Best of all worlds
The effective use of cobots therefore provides an excellent tool to help companies deal with the much-vaunted skills gap, by making the most of whatever skills are available to create maximum value. It also enables human workers and robots to work closely together so that each does what it’s best at and makes the most powerful contribution to overall productivity and flexibility.

HOW COBOTS HELP WITH RESHORING

The automated capabilities introduced by small, lightweight and extremely versatile cobots make it possible to automate tasks and processes inconceivable with traditional industrial robotics. Companies can add automation of bottleneck processes without disturbing or remodeling the rest of their workflow or machinery layouts.

Cobots enable companies of all sizes, located anywhere in the world, to significantly boost their levels of output, quality capabilities and commercial survivability. This applies even to companies that do not have the resources or any wish to deploy traditional industrial robots in complex, integrated Industry 4.0-style setups – which often involve costly greenfield development, substantial infrastructure and logistics underpinnings, and considerable investment.

In fact, setups involving a combination of reshoring and human–robot collaboration can enable companies to completely leapfrog any Industry 4.0-style stage of development and move on to an Industry 5.0 setup.

The use of cobots in reshoring setups opens up new vistas for commercial effectiveness and quality improvement because they make it possible to introduce immediate, high-impact changes with no need for big capital investment, and removing geographical limitations.

By producing small-footprint, easy-to-program, flexible and affordable cobots, Universal Robots plays a vital role in democratizing robots so that virtually any business of any size anywhere can gain from the greater competitiveness that robotic automation allows.
From either/or to both/and

Cobots also serve as a catalyst in effective reshoring because they are so flexible. They are lightweight and versatile, and are easy to move around, re-program and re-purpose as needs change.

For any company considering investing in cobot technology, this flexibility significantly reduces the element of risk. Universal Robots is consistently able to demonstrate a remarkably rapid return on investment and the company is not locked into a risky decision about one specific, relatively immutable manufacturing configuration.

The killer combination of low risk and rapid return on investment provide companies with powerful motivation to enter into reshoring decisions, when supported by flexible mixes of cobot technology and skilled human workers.

Boosting employment

Contrary to much journalistic sensationalism and over-simplification, this increase in automation is not expected to have a negative impact on employment. One of the big advantages of collaborative robots is that experience shows they don’t actually displace human labor.

In fact, the introduction of cobots almost always results in net job creation, because the skills of the human workforce can be put to use creating greater value. The workforce usually ends up being “upgraded”, and the company’s market potential expands (see the Universal Robots white paper entitled “Robots, Cobots and Human Labor”).

Cobots positively affect employment in another way, too. Wherever they are deployed, cobots improve consistency of quality and consistency of flow – two parameters that help determine whether a company can competitively manufacture products for the global market. This is a big benefit for small and medium-sized enterprises (SMEs), because cobots are able to help achieve the productivity and flexibility gains needed to compete with larger rivals. When companies are more competitive they grow, as do their suppliers and other working partners, creating new ripple-effect jobs of all kinds.

50% of the respondents in the Boston Consulting Group survey anticipated net manufacturing job creation in the U.S. in the period 2014–19, with 74% citing access to a skilled workforce as a strong factor for moving production back to the U.S.
Faster market response, greater customer-centricity

When a manufacturing, processing or assembly plant is located in the same country (or in near geographical proximity) as the recipients of its goods and services, the whole supply chain and logistics infrastructure is much shorter, easier to manage and has less of an environmental impact.

This means a company can react faster to any changes in customer preferences or demand patterns, and is able to become significantly more customer-centric in its overall commercial mindset.

Whereas offshore manufacturing is usually configured to meet historical patterns of demand (because of the substantial delays inevitably involved in communication, setup, checking and adjustment as well as the entire across-the-globe logistics chain), reshored facilities are usually able to react quickly to current patterns of demand. Furthermore, members of a human workforce engaged in work processes close to the source market are likely to have a better general appreciation and awareness of customer preferences and what influences these – they probably perceive things in a similar manner.

For a company considering reshoring, standard productivity calculations are only part of the overall cost/benefit analysis. There are often many other wider perspectives involved.
Greater inclusion and responsibility
When manufacturing and processing operations take place “close to home”, the workers involved are perhaps more likely to feel a sense of involvement and responsibility in conjunction with their work practices and their effects.

Any quality flaws and environmental impacts are likely to have some kind of direct or indirect repercussions for them, their taxes and their own society. This can provide good motivation for a greater sense of responsibility in a company’s operations.

The value of know-how
One of the key ways in which cobots and reshoring together have a big impact lies in the retention of know-how and capabilities.

There is a huge value inherent in intangible skills, time-honed craftsmanship and the ability to recognize and detect minute variations in materials, product and finish that automated devices will miss. These unique human capabilities and all the valuable intellectual property associated with them will be lost forever if bequeathed to full automated plants and offshore facilities.

Deploying cobots side by side with a human workforce that still has access to these skills enables companies to ensure continued access to this priceless asset, which is so often a key commercial differentiator and which once unlearned is extremely difficult to resurrect.

Bringing back the human touch
Cobots enable companies to pair the unique skills of craftspeople and other skilled human specialists with the technical capabilities and consistent repetitiveness of a robot in order to reduce production times, boost accuracy and improve product/finish quality.

Cobots are uniquely able to operate side by side with human workers, relieving them of arduous, repetitive and stressful aspects of work processes. This frees up the squishy human part of the production setup to make full use of its intangible capabilities, transforming modern manufacturing as well as a wide range of other processes – commercial and non-commercial – to enable man and machine to work collaboratively, pairing the unique, cognitive skills of workers with the exactitude and repetitive technical capabilities of robots.

This frees up human employees to apply their intangible skills and difficult-to-program creativity to more complex projects – or to notch up a considerable boost in productivity for their particular craft or skill. This in turn makes it possible to comply with new kinds of market requirements and consumer expectations, often involving greater personalization and customization to individual preferences.

This redeployment of human creativity in setups where skilled workers collaborate with robots is necessary because of the ways markets are changing and end-user customers are demanding a high degree of individualization in the products they buy.
THE BUSINESS CASE

If you’d like to read more about some concrete examples of how cobots from Universal Robots have helped companies with their reshoring aspirations...

RSS Manufacturing and Phylrich (USA)
Adding a UR5 to its production setup enabled this company to match overseas competitors on cost and bring manufacturing capabilities back to the U.S.


Voodoo Manufacturing (USA)
With the help of a UR10, this company is running a 3D printing farm setup in Brooklyn, New York that can actually compete on cost with Chinese factories.


Creating Revolutions (USA)
Actual production costs abroad might be a bit cheaper, but a combination of UR3 cobot productivity, tax breaks and savings on shipping enabled this company to create new jobs in the U.S.


Nichrominox (France)
Nichrominox in France is using UR5 cobots to automate part of its production to compete against rivals operating in countries with low labor costs.


LEARN MORE

If you have any questions about Universal Robots’ position on this topic, or about how you think Universal Robots might be able to assist your company in its reshoring decisions, please contact marketing@universal-robots.com or visit www.universal-robots.com
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