Robotics for Advanced Manufacturing

ROBOTT-NET
Robotizar… Consideraciones a tener en cuenta antes de empezar

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Today's reality: The automated production line
Meet the New Generation of Robots for Manufacturing

They are nimble, lighter and work better with humans. They might even help bring manufacturing back to America.

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FIVE REASONS TO USE ROBOTICS IN MANUFACTURING

• Robots used in manufacturing create efficiencies all the way from raw material handling to finished product packing.
• Robots can be programmed to operate 24/7 in lights-out situations for continuous production.
• Robotic equipment is highly flexible and can be customized to perform even complex functions.
• With robotics in greater use today than ever, manufacturers increasingly need to embrace automation to stay competitive.
• Automation can be highly cost-effective for nearly every size of company, including small shops.

FIVE WAYS ROBOTICS MAKE EUROPEAN MANUFACTURERS GLOBALLY COMPETITIVE

• Automation allows domestic companies to be price competitive with offshore companies.
• Robotics in manufacturing achieve higher throughput, so companies can vie for larger contracts.
• Robotics in manufacturing allows to guarantee repeatability in Quality standards
• Robots achieve ROI quickly, often within two years, offsetting their upfront cost.
WHAT DO ROBOTS DO?: 5 MOST POPULAR APPLICATIONS

Any repetitive task is a candidate for robotic manufacturing, especially if it's difficult or dangerous for a human, or takes place in a hostile environment. What’s more, adding force sensing and vision systems lets a robot adapt to changes in part position or orientation, increasing flexibility and versatility.

• 1 – Robotic handling operations (38%)

Material handling is the most popular application with 38% of operational stock of industrial robots worldwide. This includes robotic machine tending, palletizing and various operations for metal machining and plastic moulding. With the introduction of collaborative robots in the last few years, this part of the market is always increasing.

• 2 – Robotic Welding (29%)

This segment mostly includes spot welding and arc welding which is mainly used by the automotive industry. Spot welding is still more popular than robotic arc welding but not for long; as arc welding is becoming very popular in the metal industry.

• 3 – Robotic Assembly (10%)

Assembly operations include: fixing, press-fitting, inserting, disassembling, etc. This category of robotic applications seems to have decreased over the last few years, even while other robotic applications have increased. The reason why the applications are diversified is because of the introduction of different technologies such as force torque sensors and tactile sensors that gives more sensations to the robot.

• 4 – Robotic Dispensing (4%)

Here we are talking about painting, gluing, applying adhesive sealing, spraying, etc. Only 4% of the operational robots are doing dispensing. The smoothness of robot makes a repeatable and accurate process.

• 5 – Robotic Processing (2%)

Processing is not a big segment of industrial robots (only 2%) and this is probably because a lot of automated machines are available on the market to do specifically these applications. The main application areas are mechanical, laser and water jet cutting.
WHAT DO ROBOTS DO?

FOCUS ON INDUSTRIES

ARC WELDING
The absolute specialists for arc welding

MACHINE TOOL
100% utilization of machine tool potential

FOUNDRY
Fitting the mold. Robots for the foundry and forging industry.

PLASTICS
Rethink efficiency

 ELECTRONICS
Programmed for the future. KUKA robots for the electronics industry.

FOOD
Well-served.

AUTOMOTIVE SUPPLIERS
A firm grip on innovative strength

AUTOMOTIVE MANUFACTURERS
Driving profitability forwards
**WHAT DO ROBOTS DO?**

**FOCUS ON INDUSTRIES**

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<thead>
<tr>
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**Our offering**

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<tr>
<th>Automotive</th>
<th>Electrical &amp; electronics (3C)</th>
<th>Food &amp; Beverages</th>
<th>Foundry &amp; Forging</th>
<th>Metal Fabrication</th>
<th>Packaging and Palletizing</th>
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<tr>
<td>We provide a comprehensive range of solutions to Automotive manufacturers and Automotive Components makers around the world.</td>
<td>From casing to packing for Computers, Communications and Consumer Electronics (3C), ABB robotics offers corresponding solutions throughout the production processes.</td>
<td>The demands are equally high within both the food and the beverage industries.</td>
<td>Modern foundries are constantly on the lookout for ways to improve efficiency, increase flexibility and improve workplace safety.</td>
<td>ABB has the system-competence to offer turn-key solutions.</td>
<td>Robot-based automation ensures you get the flexibility, productivity and reliability you need.</td>
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<tr>
<th>Plastics</th>
<th>Robot Welding</th>
<th>Solar</th>
<th>Solutions Zone</th>
<th>Wood Industries</th>
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<tr>
<td>Easy-to-use, 6-axis robots are more accessible than ever to plastics moulders.</td>
<td>Improve the efficiency of your welding processes with robot automation.</td>
<td>Renewable energies, such as solar, are becoming increasingly important for the future of us all.</td>
<td>Search case studies for robot solutions by Industry, Application or Customer Product.</td>
<td>Applications including Materials Handling, Packing, Palletizing, Painting &amp; Finishing.</td>
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Some fear that Robotics is a massive Job killer?

¿Are Robots bad for employment? ¿This is a really active discussion field in these times of Crisis!

The number of jobs lost to robots decreases. In the past, new industrial businesses increased job opportunities. But this is not true for the present generation.
Some fear that Robotics is a massive Job killer?

¡People mix the potential impacts of tasks automation based on Computer science, Artificial Intelligence, Cloud and Mobile technologies, as well as industrial robotics and service robotics!

¡Plus a bonus of science fiction dreams!
Some fear that Robotics is a massive Job killer?

Robotics DOES NOT kill jobs! So says the serious European Commission!

Companies that use industrial robots show better efficiency in their production processes, allowing them to maintain their production lines in Europe.

Automation helps maintaining in-house different stages of the production lines, leading to a better added-value of the production and an increased productivity.

This study has demonstrated that the Positive impact in productivity provided by industrial robots IS NOT counterbalanced by a Negative impact in employment in these companies.

It can be observed that the deployment of robots slightly stimulates employment increase.

Source: Analysis of the impact of robotic systems on employment in the European Union
October, 2015
WHY ROBOTS SHOULD NOT BE OPPOSED TO MANUFACTURING JOBS

ROBOTS ARE GOOD FOR MANUFACTURING JOBS

• When European companies can't compete, jobs are sent offshore.
• There are some jobs that robots do better than people — anything requiring repetitive motion, consistency, speed and precision. In fact, some miniaturized products can only be assembled by robots. Higher quality and increased productivity lowers costs, which stimulates demand that benefits everyone.
• Robots protect workers from repetitive, mundane and dangerous tasks, while also creating more desirable jobs, like engineering, programming, management and equipment maintenance.
• Robots free up manpower to let companies maximize workers’ skills in other areas of the business.
• Today’s labor market includes fewer skilled manufacturing workers due to decades of offshoring, and robots eliminate the shortfall.
• New jobs are created directly in robot and associated industries, in fields like programming, engineering, end-effector design and manufacture, and integration.
• Other jobs are created as manufacturing businesses is maintained and grows.
• Robots in manufacturing help to create jobs by reshoring more manufacturing work.
Robot resistance?

While there is a momentous uptake for robotics technology, there nevertheless exists some strong barriers to widespread adoption. A PwC survey of US manufacturers finds that lack of a perceived need and cost ineffectiveness rank as top barriers.

- Not cost effective
- Insufficient resources and expertise
- Displaces workers and lowers morale
- No need for robotics

Source: PwC and Zpryme survey and analysis, “2014 Disruptive Manufacturing Innovations Survey,” conducted in February 2014. Q. Looking ahead to the next 3 years, what would limit your future investment in robotic technology?

Number of respondents: 107.
Barriers:
1. The level of support available for SMEs using robots
2. Ongoing changes of robot models to solve the SME specificities:
   - Cost
   - Easy to integrate and reprogram
   - Able to interact safely with humans (fence-less)
Many businesses think robots aren’t appropriate for them. Some are under the impression they are only for high-volume manufacturers like auto companies. Others believe that robots can't do the type of work needed, or it's not appropriate to use a robot. Unfortunately, there are a lot of myths about robots and it's time these were corrected.

**MYTH 1: ROBOTS ARE EXPENSIVE**
- State-of-the-art factories produce robots in quantity, resulting in low prices and high quality. In contrast, dedicated automation equipment needs design and development effort before putting it on the factory floor. A robot can be purchased and installed in less time and for less money. (In fairness, end effectors, guarding and integration add some cost.)
- Robotic automation is a lower-risk investment than dedicated equipment. If demand changes or new products are introduced a robot can be redeployed quickly. Dedicated, hard automation can only be reconfigured at great cost and has little to no residual value when the time comes for replacement.

**MYTH 2: ROBOTS ARE ONLY FOR HIGH-VOLUME OPERATIONS**
- As programmable as a Computer Numerical Control (CNC) machine, a robot is switched from running one part reference to another by calling a new program. With careful design it’s often possible to incorporate enough flexibility in the end-effector for an entire family of parts. If necessary, a robot can swap grippers the way a CNC machine changes tools.
- Advances in sensor technology have simplified part presentation. Vision systems locate and identify parts, reducing the amount of hard tooling needed. Force sensing helps the robot adjust for precise assembly tasks.
- Modern robots can be used in low- to medium-volume manufacturing. They are programmed and changed over quickly, resulting in economical high-speed production.
DISPELLING MYTHS ABOUT ROBOTICS

MYTH 3: ROBOTS ARE HARD TO PROGRAM

- A robot is programmed via a teach pendant or through an offline PC program. With a pendant, the programmer or engineer guides the robot through a sequence of steps, fine-tuning and storing each point. The robot is then taken through this program to check for collisions, before running again in continuous mode at low speed. Only when the programmer is satisfied with the taught motion will he run it at 100 percent.

- Offline programming allows a user to model a complete cell and develop the sequence of moves that the robot will use. How well the model confirms to reality determines how much modification the program needs once installed on the robot.

MYTH 4: ROBOTS SYSTEMS ARE COMPLICATED AND DIFFICULT TO SUPPORT

- Robots are very reliable machines. Vendors quote mean time between failure (MTBF) numbers of 62,000 hours or more, (about seven years.) A robot cell typically includes other equipment plus numerous sensors that may have lower reliability, but overall a cell is usually less complex than dedicated automated equipment.
ARE YOU ROBOT-READY??

Of course... you’re interested in ROI... but it’s not the only question!

• Why robotize?? -> What counts more for your business:
  – Flexibility to produce multiple product variants?
  – Cycle time to increase throughput?
  – Quality improvements or guarantee?
  – Bad ergonomics of current manual stations?
  – Marketing/image of innovation for you company?
  – Difficulties to find and retain skilled people?

• Probably you don’t need/can’t automate ALL the process... think about What makes sense to robotize
• Have you audited your manufacturing processes and identified repetitive, onerous, or dangerous tasks done by humans that could be carried out by robots?
• What are your parts and is the parts supply/logistics and the tooling ready for automation?
• Do you have lots of product variants and small batches? Or stable production?
• Do your process requires a high online adaptability of the robot ? -> use of sensors and online adaptation (even for standard robots and high productivity)
• Would your robot need to move along your part? Or from cell to cell?
• Are you ready to change things in your product/process to allow for automation? (tooling, jigs, logistics, packaging...
• Have you skilled staff to run and program robots?
• Are you ready to discuss with your staff and manage their fear? Convince them of the benefits of robots for your company? How will They benefit from it (and only your bank account), how will they be trained and gain valuable experience...

TECNALIA
TOP THINGS TO CONSIDER WHEN SELECTING A ROBOTIC INTEGRATOR

- **IS THE COMPANY CREDIBLE?**
  Your integrator’s reputation and track record are critical. Make sure the company is highly experienced and has industry and ISO certifications and association memberships.

- **DOES THE COMPANY UNDERSTAND YOUR BUSINESS?**
  Your integrator should have extensive design, build and installation experience, with hands-on expertise developing robotic systems integration in your application. A top-flight integrator helps you find solutions that improve all aspects of your operation.

- **WHO WILL KEEP YOU UPDATED ON SYSTEM PROGRESS?**
  Keeping you informed at every step is vital for a successful integration. The best integrators offer a designated manager to supervise all aspects of the project, including the scope of work, team transitions, internal and customer run-offs.

- **HOW GOOD IS THEIR SERVICE?**
  You should expect your integrator to have trained technicians nearby enough for your service needs and have a strong reputation. Consider how many service engineers are available and whether service consists of on-site repairs only or also includes process improvement, preventive maintenance and remote troubleshooting.
TOP THINGS TO CONSIDER WHEN SELECTING A ROBOTIC INTEGRATOR

• **ARE YOU BUYING THE RIGHT SYSTEM FOR YOUR APPLICATION?**
  Your robotic integrator should explain the system features and how everything will work together to deliver the best results.

• **HOW TRANSPARENT AND PRECISE IS THE QUOTATION?**
  A trustworthy integrator will include and detail everything in the quotation, including responsibility areas and timetables.

• **IS THE SYSTEM SAFE?**
  Ensure that the system meets industry and your own company’s safety standards. The integrator should offer safety audits to accommodate any special requirements.

• **CAN I GET SPARE PARTS WHEN I NEED THEM?**
  An integrator should stock spare parts so that you can receive them quickly, including ordering availability 24/7.

• **IS TRAINING PROVIDED?**
  Your integrator should provide training to your employees once the system is in place, along with ongoing support and maintenance.

• **CAN YOU RELY ON THE COMPANY YEAR IN AND YEAR OUT?**
  The best robot integrator choice has the financial strength and longevity to stand by your side as a long-term strategic partner. This may not necessarily be the cheapest solution upfront, but it delivers far greater value over time.
WE’RE HERE TO HELP!