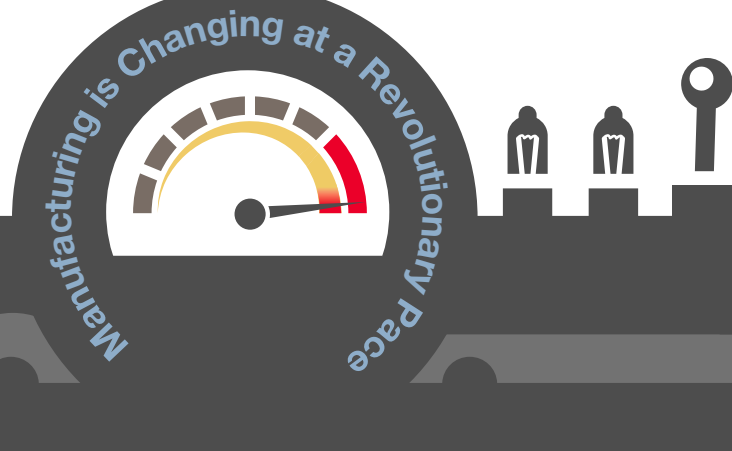


Staying Ahead of the Manufacturing Revolution



“There have been advancements in manufacturing for as long as people have been building things. Right now, however, these changes are occurring at a pace we haven’t seen since the space race in the 1960s. In every industry, there are fundamental, radical shifts occurring in record time.”

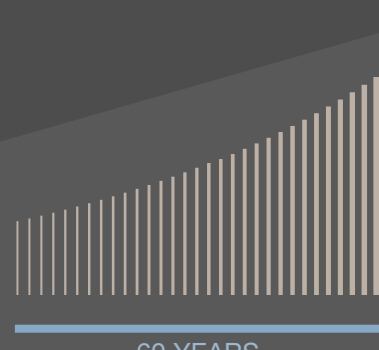
-Tom McGaughy, Director of Technology, EWI

Technology innovations are resulting in less labor-intensive, more cost-effective production



Advanced materials alone are expected to have a \$500 billion economic impact by 2025²

U.S. manufacturing output has increased 3.7% per year over the past 60 years¹



Disruptive technologies, which cause dramatic shifts in industrial processes, affect both productivity and product performance

Change Driven By

In recent years we’ve seen increasing use of

- Simulation and modeling
- Advanced robots
- Additive manufacturing
- Integrated computational materials engineering (ICME)
- Advanced materials
- Renewable energy
- Energy storage
- Advanced exploration and recovery for oil and gas

And there’s more to come...

1

Higher Product Performance Requirements

Auto

- More rigorous CAFE standards
- Quieter passenger cabins

Oil & Gas

- Exploration into more severe arctic environments
- Increased production targets with smaller footprint

Aerospace

- Extended range aircraft
- More energy-efficient turbines

Heavy Manufacturing

- Ever-tightening environmental standards
- Fatigue performance

Consumer Electronics

- Miniaturization
- Longer battery life requirements

Medical Devices

- Reduced scale
- More sophisticated, non-invasive diagnostic tools

2

Availability of New and Advanced Materials

- Lighter
- Stronger
- Less Expensive
- Greener/cleaner

3

Faster Product Design and Manufacturing Cycles

- **Automotive** design cycles reduced by up to 50%
- **Consumer** products design cycles reduced from 12 months to 6 months
- **Oil & Gas:** 4 year reduction in time required to design, build, and commission offshore platforms

The Manufacturing Revolution impacts:

- Joining processes
- Forming processes
- Inspectability and quality assurance
- Design methodologies & tools
- Process monitoring & control
- Procurement protocols
- Design & fabrication cycles



“Manufacturing is undergoing a change that is every bit as significant as the introduction of interchangeable parts or the production line—maybe even more so.” Michael Idelchik, GE³

Are you prepared for the Manufacturing Revolution?

EWI can help you meet the challenge

A world leader in developing and deploying new technologies which enable manufacturers to meet demands and stay ahead of the manufacturing revolution, EWI has developed multiple technology roadmaps designed to advance innovation, identify challenges, and set R&D priorities.

ewi.org 614.688.5000

EWI
We Manufacture Innovation

¹<http://www.naefrontiers.org/File.aspx?id=46423>

²<http://www.mckinsey.com/tools/Wrappers/Wrapper.aspx?sid={21F95813-D665-4176-80BD-3823144E3FE2}&pid={A1D4B928-3A7B-4073-AFFA-6AD78525CDB1}>

³<http://www.wsj.com/articles/SB1000142412788732406304578522812684722382>