Strengthening manufacturing competitiveness: Technology unleashes opportunity for small and medium-sized manufacturers

The pandemic served as a sobering lesson regarding the value of flexible and adaptable manufacturing processes and supply chains. Significant disruptions caused shortages of raw materials and finished products, including essential goods. Geopolitical factors created new risks, impacting sectors including semiconductors, consumer electronics, and automotive. At the same time, many manufacturers, particularly small and medium-sized (SME) manufacturers, are saddled with outdated machines, tools, and processes, some as old as 50 years. The talent needed to address these issues is currently lacking – manufacturers struggle to hire skilled workers.

It is estimated that 2.1 million manufacturing jobs could go unfilled by 2030 in the U.S.

Amid these challenges, an opportunity to revitalize communities through a renaissance of SME manufacturing. Technological advances are creating exciting opportunities for manufacturers to better tackle these challenges while increasing their own profitability and longevity. Products are getting smarter and consumer preferences are changing in ways manufacturers can leverage to be more competitive. Increasing demand for high quality, customizable, and more sustainable products create opportunities to invest in a future of revitalized domestic manufacturing.

In the past, the most cutting-edge manufacturing technologies were only available to large companies that could afford expensive teams of engineers to create customized systems. Now, SME manufacturers can gain access to the same capabilities at a fraction of the cost.

New technologies, including generative artificial intelligence (AI), will help U.S. manufacturing be competitive on a cost basis.
AI driven tools are already being used by manufacturers to augment their creativity and decision-making, while resolving challenges faster and more sustainably. Leveraging AI, along with cloud enabled collaboration and data management, robotics, new manufacturing techniques, and other technologies, manufacturers can strengthen their competitive advantages and deliver products that customers need and want.

Integrating these tools into all areas of a business, also known as digital transformation, can yield outcomes such as improved efficiency, reduced errors, more seamless collaboration, more flexible and adaptable supply chains, more sustainable products and manufacturing processes, and smarter, more premium products.

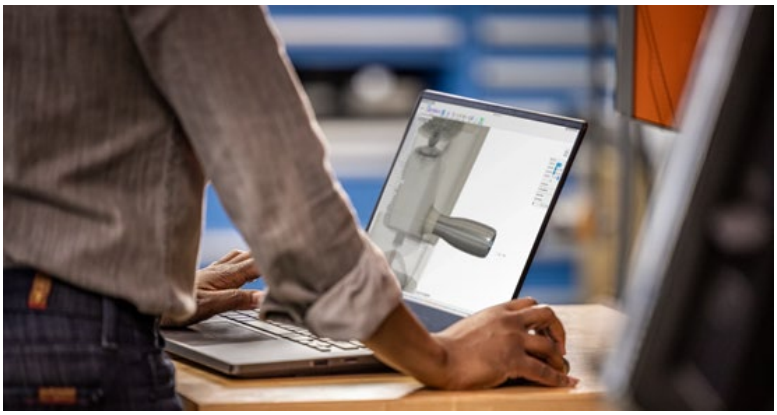
Research by McKinsey concludes that digital solutions can yield:

- *15-30%* improvements in labor productivity
- *85%* improvement in forecasting accuracy.
- *30-50%* reduction in machine downtime
- *10-20%* improvement in cost-of-quality improvement.

AUTODESK

Digitally enabled manufacturing builds resilient and sustainable supply chains.

Digital tools are critical to building resilient supply chains, defined as the ability for manufacturers to absorb and adapt to disruptions at their suppliers while continuing to deliver their products or services. This requires effective systems to measure and monitor supplier risks and vulnerabilities, which the majority of manufacturers lack, according to a 2021 McKinsey survey. Digital tools help manufacturers create those systems—including tools for tracking and diversifying suppliers, enhancing visibility and collaboration, and improving decision-making through predictive modeling.



Benefits of digital transformation in the manufacturing sector:

- Increased competitiveness and longevity for manufacturers
- Lower costs, reduction of wasted materials in the manufacturing process
- More resilient and sustainable supply chains
- Final products designed for sustainability and carbon reduction
- The development of high-quality, customizable products

Despite these advancements, SME manufacturers are lagging larger firms in digital transformation.

Reasons for this vary, and include:

- Limited understanding of digital transformation, including where to start;
- High switching costs to transfer legacy documents to a new system;
- Lack of available capital dedicated to digital transformation; and
- Limited access to skilled workers and workforce training.

Without additional support, SME manufacturers are likely to fall further behind, burdened with old machines and processes. The U.S. cannot afford to leave them in the 20th century. Investment in SME digital transformation is an investment in the revitalization of American manufacturing competitiveness.

Governments can support SME manufacturers' digital transformation efforts in numerous ways, including:

- Matching funds, grants, and tax incentives for SME digital transformation, such as those in Massachusetts, Indiana and Michigan;
- Providing extra points in competitive manufacturing grants for applicants with digital transformation proposals;
- Establishing or increasing workforce training support for digital tools and new manufacturing techniques, both for students and mid-career workers;
- Encouraging industry data standards that improve interoperability of the many hardware and software tools used in the manufacturing process. Open standards will make it possible for SME manufacturers to more easily and affordably upgrade their technology solutions and/or combine technology solutions from multiple providers to best meet their needs;
- Creating special projects at Manufacturing Extension Partnerships (MEPs) and Manufacturing USA institutes on SME Digital Transformation.

About Autodesk

Autodesk is changing how the world is designed and made. Our technology spans architecture, engineering, construction, product design, manufacturing, media and entertainment, empowering innovators everywhere to solve challenges big and small. From greener buildings to smarter products to more mesmerizing blockbusters, Autodesk software helps our customers to design and make a better world for all.

For more information, please visit autodesk.com and follow Autodesk on:

LinkedIn Facebook X (Twitter) Instagram

AUTODESK