3DEXPERIENCE® Works

TACKLE TALENT SHORTAGES BY CAPTURING INTELLECTUAL CAPITAL WITH CNC MACHINING

Quick-start guide to closing the skills gap using your own corporate knowledge base

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The manufacturing industry is facing an ongoing talent crisis with most businesses now dealing with a serious shortage of skilled workers. According to a recent Deloitte report, the talent deficit is projected to persist, with an estimated 2.1 million unfilled manufacturing jobs in the United States alone by 2030. The same report pointed out that the U.S. Bureau of Labor Statistics noted more than 500,000 open manufacturing positions at any time during the previous six months.

Meanwhile, in Europe, Industry 4.0 is rapidly revolutionizing manufacturing, demanding workforces with advanced skill sets. The skills gap in manufacturing is a significant contributor to this workforce shortage. Globally, this has already led to 10 million manufacturing jobs worldwide remaining unfilled, affecting the industry's ability to meet global demand and grow efficiently.

THE SKILLS GAP MAY LEAVE AN ESTIMATED 2.4 MILLION POSITIONS UNFILLED BETWEEN 2018 AND 2028

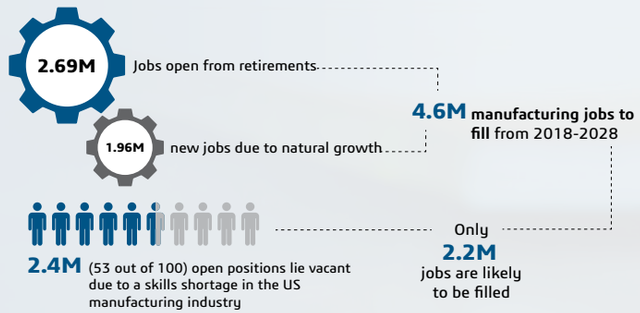

Photo credt: Deloitte and The Manufacturing Institute

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Exponential industrial demand, rising geopolitical tensions, post-COVID losses, and an education gap are some of the factors that contribute to the current and lasting labor force shortages.

1. High industrial demand

As of March 2023, the manufacturing industry had 693,000 skilled labor vacancies, which is 75% of the industry's total labor shortages.

2. Supply chain disruptions

Rising gas prices and increased costs of supplies contribute to the shortage, worsened by ongoing global conflicts affecting the supply chain.

3. Post-COVID losses

About 1.4 million manufacturing jobs were lost during the COVID-19 pandemic, exacerbating the pre-existing labor crisis.

4. Education gap

The education system is not adequately preparing individuals for manufacturing jobs, contributing to a substantial skills gap.

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RESHORING INDICATES PARADIGM SHIFT FROM GLOBAL TO LOCAL

Reshoring is the process of moving manufacturing from one country to another country where the products are sold. Reshoring to the U.S. from other countries has been gaining momentum in recent years, but it's also happening globally. This uptick in reshoring is due to factors such as supply chain disruptions, rising transportation costs, geopolitical conflicts, rising offshore wages, increased national legislative support, as well as state and local economic incentives.

In fact, new research reveals that 25% of global trade will relocate within three years, creating a fundamental shift in the distribution of global suppliers from being mostly global to mostly local by 2026. A 2023 study of U.S.-based manufacturing executives by "Forbes", Xometry, and Zogby found that "82% of executives polled said they'd either moved overseas factories back home or were in the process of doing so."

Kearney's most recent Annual Reshoring Index Report indicates that reshoring initiatives have largely been a success. The report also highlights that the process of reshoring is more challenging than anticipated, emphasizing the need for comprehensive preparation and strategic planning to navigate the complexities involved.

The upside is that reshoring can reduce supply chain volatility so small- to mid-sized companies (SMBs) in manufacturing can respond more quickly to market demand, offer faster deliver times, and capitalize on the premium associated with domestically made products.

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The CNC machining sector is particularly affected by the skills gap, with a shortage of manpower to fill various roles, hindering the production of precision parts and components. Operating and programming CNC machines require skilled labor, and in certain regions, this expertise is in short supply. Over 92% of manufacturing decision-makers are actively seeking and hiring machine operators.

Couple that statistic with the fact that the CNC programming market is booming, growing at an annual rate of 6.5%, due to growth in demand for automation and increased digitization in the manufacturing industry. In fact, advanced 5-axis machining is growing even faster, at a 20% annual rate.

Some of the needed knowledge and skills require specialized training and work experience, such as the ability to use CAD and CAM software and the ability to create machining programs, to name but two. Machine programming is another specialized skill in the value chain. The scarcity of qualified professionals has made it challenging for manufacturers to meet their production demands and adapt to new technologies.

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HOW MACHINE SHOPS CAN OVERCOME SKILLS GAP

1. **Pay well.** Start by paying competitive wages and benefits to attract the best skilled machinists; incent with performance-based metrics to encourage skills development and growth.

2. **Remember work-life balance.** Today's workers understand the value of a healthy work-life balance and you should too. Provide flexible schedules and reasonable workloads and hours to make sure you retain your skilled talent.

3. **Get smart**. Partner with local schools and community colleges to increase awareness and foster interest in CNC machining careers. Be your best champion and others will follow.

4. **No need to get dirty.** It's imperative to dispel myths around working in a manufacturing environment. Today's machine shops are highly automated and require operators who want to learn about tech advancements and how they can advance their careers.

5. **Build a diverse workforce.** Diversity is an essential ingredient of innovation because people from diverse backgrounds see and solve challenges differently. Hiring people from diverse backgrounds also broadens your talent pipeline.

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WHY KNOWLEDGE CAPTURE IS KEY TO MITIGATING LABOR SHORTAGES

Let’s take a look at a rather common scenario happening in today’s machine shops and production facilities. You have a veteran expert machinist who is set to retire; however, you don’t have a replacement, and finding one in the short term does not look promising. This happens every day in machine shops all over the world and can lead to potentially serious production issues and/slowdowns.

Let’s look at some of the ways to start capturing your own business's expert knowledge for reuse.

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DEFINE MACHINING OPERATIONS AND KNOW-HOW

What if you could store their expert knowledge into standardized programs that can be accessed, replicated, or tweaked by the broader team? In the world of digital product design and programming, the ability to capture what your respective experts know and use already, and then leverage it for your work, can be a game-changer. Being able to reuse information and make changes to multiple elements can dramatically boost productivity.

CNC experts can define machining operations for specific features on a given part with all details, including toolpaths, cutting tools, macros, and more, which can then be stored for reuse. Once saved as manufacturing cells on the platform, they can then be revised and lifecycle-controlled based on any changes that may be required.

This capability is not restricted to standard CAD features. Users can define any machinable geometry on a given part and identify that feature as a template. For instance, power features coming from engineering can be templatized for machining, shaving off programming time, increasing the quality of the machined part, mitigating user errors, and cutting the time required to program a quality part.

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AUTOMATE FOR INCREASED PRODUCTIVITY

Once your CNC experts have their know-how organized, they can share these setups through an integrated platform, such as the **3D**EXPERIENCE® platform, for reuse by other CNC programmers. A CNC expert knows what type of toolpath, parameters, cutting conditions, and macros are needed for specific feature materials or a given geometry to the machine (such as pocket or stiffener).

Once these different pieces of knowledge are saved and shared through the platform, CNC programmers can capitalize on them by searching for the right knowledge, applying it to their current process, and computing it to complete the toolpath.

This knowledge base also lays the groundwork for easier onboarding for new machinists because it lets them hit the ground running by leveraging the expertise and best practices of your CNC experts.

The end goal is that CNC programmers will have a database of the company's various best practices, reducing potential errors for CNC programmers and significantly improving their productivity.

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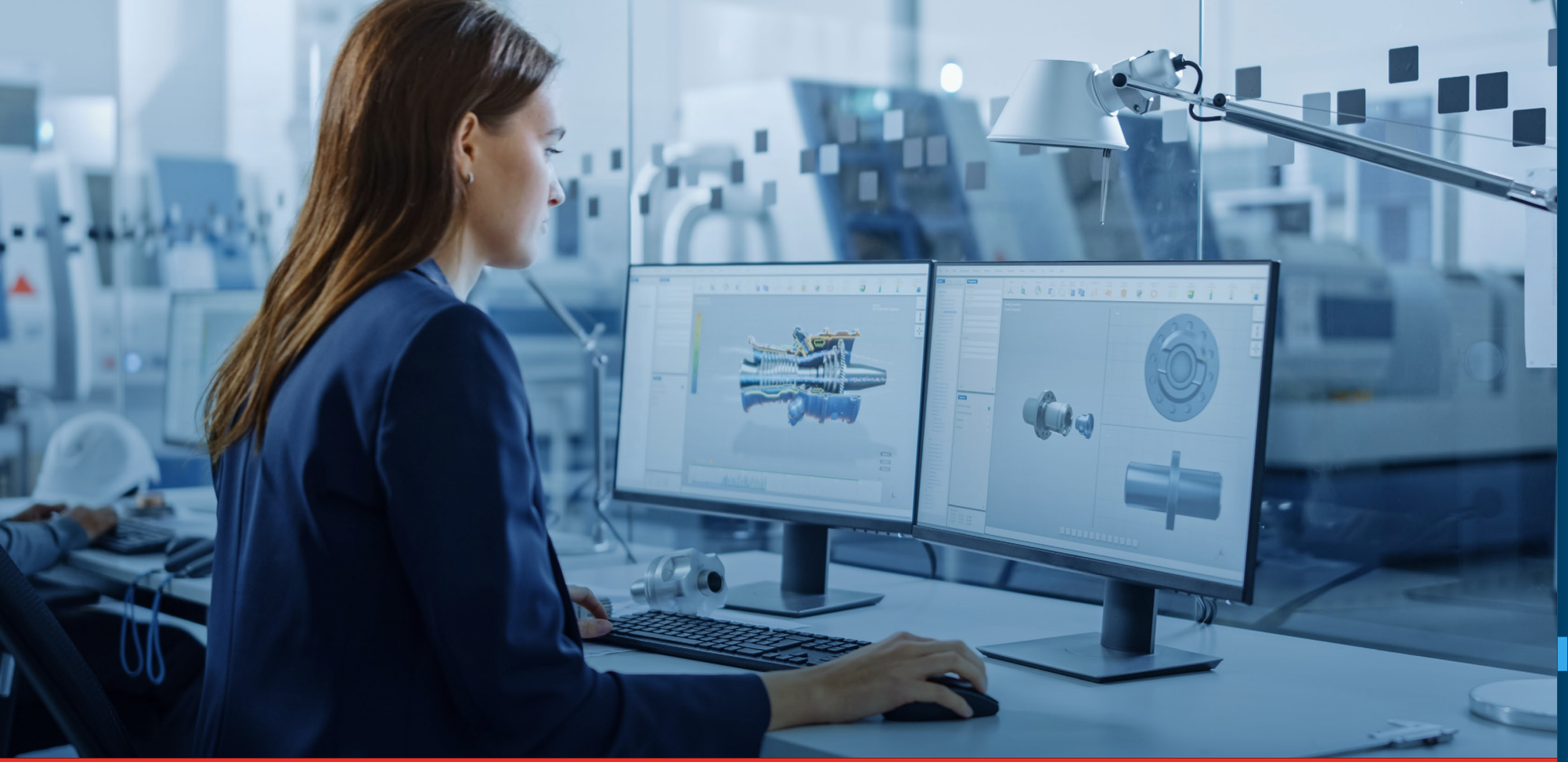

CREATE PERSONALIZED ACTIVITIES

Using DELMIA® machining solutions on the **3D**EXPERIENCE platform, CNC experts can customize all operation panels using NC Knowledge Manager. This solution allows them to set the visibility, sensitivity, default parameter values, and strategy tab management, just like an administrator.

These customized operations are saved and shared through the **3D**EXPERIENCE platform in the Machining Cell to all CNC programmers, granting direct access to the customized operations in their workbench, like any default operation.

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These are challenging times for manufacturers globally with tenuous supply chains, global political unrest, increased reshoring, and a continuing quest to find skilled workers. With growing adoption of Industry 4.0 initiatives and increased digitization of manufacturing, the impetus on small to mid-sized businesses in manufacturing to adapt new technologies is escalating.

The ability to tap into your well of machining know-how, built through the hard work and expertise of your seasoned CNC experts, is a game-changer. This knowledge base can greatly facilitate the onboarding of new machinists by enabling them to leverage the expertise—and well-established best practices—of your NC experts. You can also use the platform to save a database of your own corporate best practices so adherence to quality standards is always maintained.

3DEXPERIENCE Works Machining solutions from DELMIA have been used by some of the largest, most successful companies in the world for over 20 years. That same functionality is now available and affordable to small to mid-sized manufacturing companies.

It's time to revamp your manufacturing with the tools of tomorrow today. Do more with less by adopting a cloud-based approach that simplifies software deployment, speeds production, reduces errors, facilitates collaboration between engineering and manufacturing, and makes better-informed decisions easier with real-time data—all while safeguarding your IP.

If you are interested in learning more about **3D**EXPERIENCE Works Machining solutions, please contact your local reseller.

To learn more, visit www.solidworks.com/domain/manufacturing-production or contact your local SOLIDWORKS reseller.

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