



KENTUCKY DEPARTMENT OF EDUCATION

MANUFACTURING

FUTURING PANEL REPORT

May 6, 2025

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Introduction and Project Overview

On May 6, 2025, the Kentucky Department of Education and MBA Research and Curriculum Center partnered together to convene a Futuring Panel in Louisville, Kentucky. Participants included manufacturing professionals in leadership roles with at least three years of experience in their career field.

Futuring Panel participants were asked to provide their perspectives on forward-thinking trends and issues affecting their specific industry sectors. They also provided input on related skill sets, emerging occupations, and ethical dilemmas in the workplace. Lastly, they reviewed and validated ethical leadership traits as well as certifications of value.



Manufacturing Workforce Data

As a part of developing this report, MBA Research conducted extensive research on the current and future Kentucky workforce to assess the demand for manufacturing-related occupations in the state. The Kentucky Workforce Innovation Board, in partnership with the Kentucky Center for Statistics, identified the five most in-demand sectors in Kentucky. Currently, [manufacturing and logistics](#) is the 2nd most in-demand sector in Kentucky demonstrating the critical need to further bolster Kentucky's manufacturing pipeline. Wage and employment data in Kentucky tell a story of upward growth and momentum for manufacturing following steep declines across all sectors during the pandemic. The four graphs below outline employment and wage data for Kentucky compared to all employees in the state. It is important to note when looking at the data that manufacturing was one of the [most impacted industries](#) in terms of job losses during the pandemic.

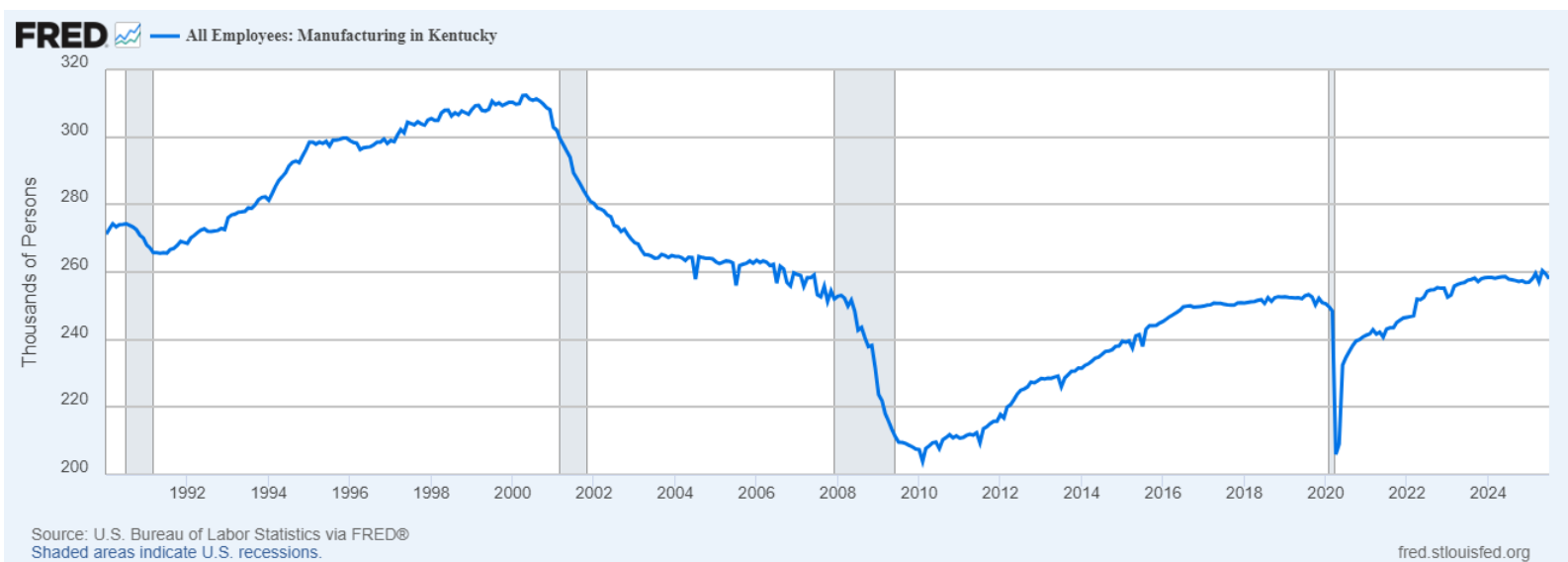
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Manufacturing Employment Data

The decline from the peak of manufacturing employment in the 1990s, both in Kentucky and nationally, is attributed in part to an increase in [offshore production](#) of inputs such as [semiconductors](#). [Federal Reserve](#) data shows that Kentucky manufacturing employment dipped from 252,000 to 206,000 in April 2020 when pandemic lockdowns became widespread. Since then, manufacturing employment has rebounded and continues to trend upwards. As of July 2025, Kentucky manufacturing employment is at 258,000, which marks a 25% increase since the pandemic. Current manufacturing employment in Kentucky now matches or exceeds pre-pandemic and pre-Great Recession numbers. Total employment in Kentucky was 1,697,831 in April 2020 and is now at 2,014,917 as of July 2025, which marks an 18% increase in employment statewide.

Kentucky Manufacturing Employment History (1990–2025)



Kentucky Employment History (All Occupations 1990–2025)



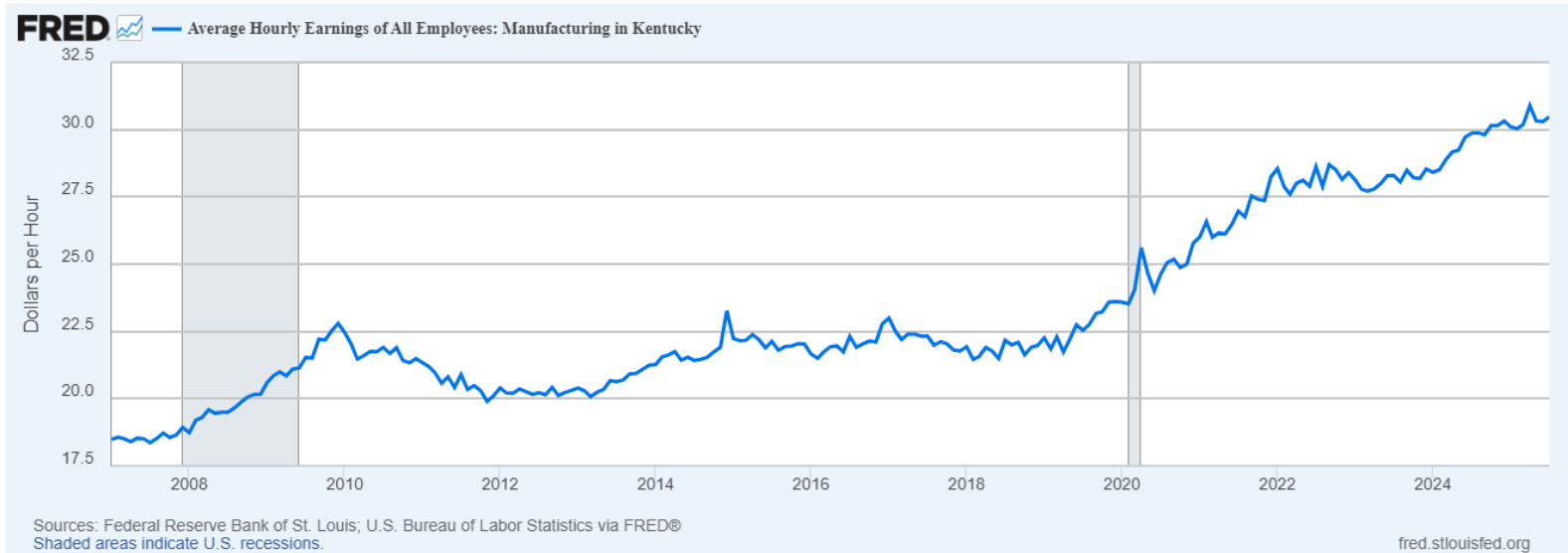
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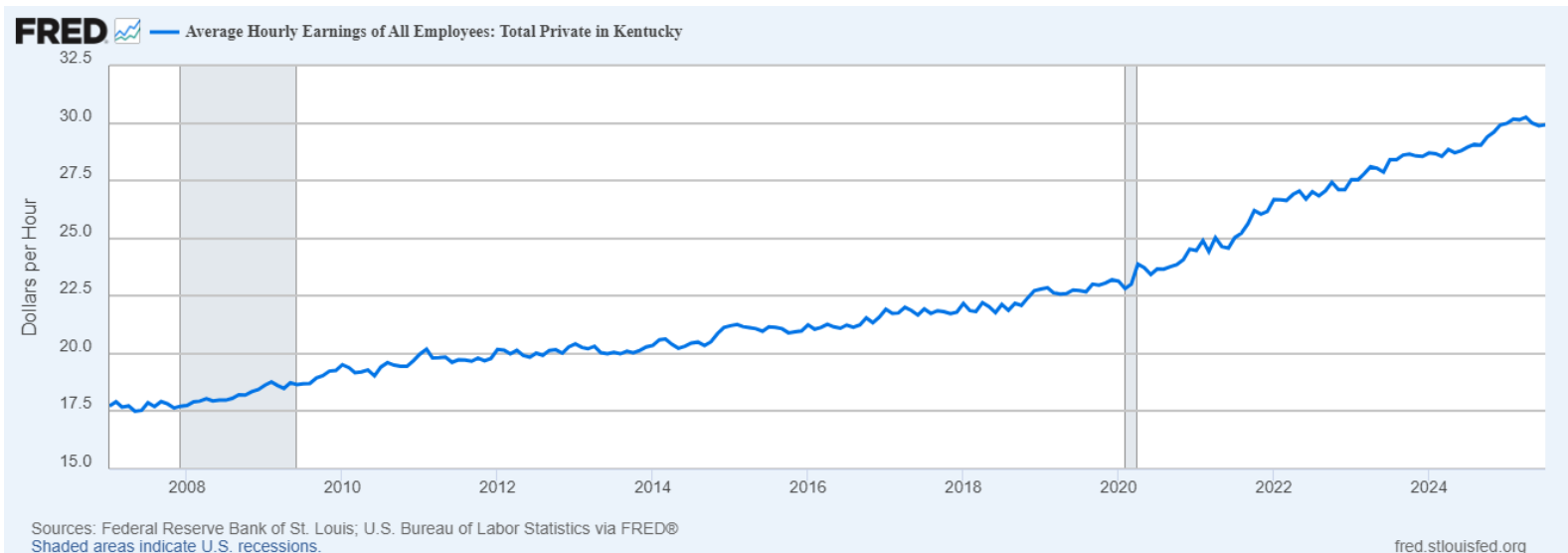
Manufacturing Hourly Wage Data

Manufacturing wages in Kentucky have been steadily climbing, with July 2025 data putting the average hourly earnings at \$30.47. The average hourly wage for manufacturing in Kentucky exceeds both the average for [all employment](#) (\$27.07) as well as all private sector employment in the state (\$29.92).

Kentucky Manufacturing Hourly Earnings History (2007–2025)



Kentucky Private Sector Hourly Earnings History (2007–2025)



Trends Discussion

Panelists were asked to identify trends that are affecting the way they do business or how they plan for the future. Group facilitators stressed the importance of identifying trends evident in the participants' industries and any related skill sets needed to address the trends.

Futuring panel members were also encouraged to think about trends from a business/workplace perspective rather than from an educational/teaching perspective. Participants were given six general trend categories to think about as they identified trends.

Trend Categories

Cultural: The major elements of culture, including material culture, language, aesthetics, education, religion, attitudes, values, and social organization

Environmental: Any forces that impact how businesses interact with the environment and use their natural resources (e.g., fresh water, air, living organisms, metal ores, oil, most forms of energy)

Global/Political: The impact of a political ideology (e.g., capitalism, socialism, communism), nationalism, stability, and international relations on business

Governance: Factors that impact the principles and standards that govern business decision-making and business oversight. Governance refers to all processes and decisions that seek to define actions, grant power, and verify performance.

Regulatory/Legal: The full breadth of laws, rules, and regulations that businesses are subjected to by governing bodies, whether through civil or common code, domestic or international law, or governmental entities, agencies, or jurisdictions

Technological: The direct and indirect impact of technology on any aspect of business, from strategy to operations to tactics

Kentucky Trends

In addition to reporting the top trends identified by Futuring Panel participants, actionable insights and resources are included for several trends. Panelists were also asked to share the skills needed in a changing workplace based on the trends identified. Those skills can be found following the full trends list.

As a reminder, Kentucky teachers have free access to all MBA Research LAP modules via their [Learning Center account](#) (login required). Simply search in Commons for the LAP titles that you would like to use. Don't have an account set up? [Contact MBA Research](#) to get started.

Full Trends List

Trend: Workers Out of School Leaning Toward Automation and Programming Versus True Manual Labor Roles

Currently, newer workers are choosing to specialize in machine and computer numerical control (CNM) software, rather than manual tool and die. In the next 10 years, Kentucky is predicted to lose approximately 200 entry-level manual tool and die makers, with no one projected to fill those gaps.

Further Reading and Resources

- IndustryWeek: [Toyota Kentucky Tackles a Tool-and-Die Worker Shortage](#)
- Jeelix: [US Tool and Die: The State of the Industry](#)

Trend: Need for True Manual Tool and Die Makers

Even as newer workers are shifting away from manual roles, panelists highlighted the need for true manual tool and die makers with the requisite troubleshooting skills. For example, a machinist may take a block inside the die, see what is wrong with it, and make a new one using software. On the other hand, after seeing an error with the block, true tool and die makers will take it to their workstations and make manual repairs, thereby reducing the waste of tossing out the block and replacing it. Hence, in troubleshooting and fixing problems as they occur, manual tool and die makers play an important role in reducing costs and growing sustainability.

Additionally, panelists explained that most true tool and die makers work toward a journeyman certificate, which takes approximately three to five years to obtain. Unfortunately, few new employees have a true tool and die journeyman certificate. Instead, they are opting for a certification in machining, which takes much less time than a journeyman certificate to earn.

Trend: Skill Misalignment Entering the Workforce

Industrial maintenance technicians are increasingly joining the workforce with automation skills such as programmable logic controllers (PLCs) and robotics. However, some roles in industrial maintenance, such as press technicians, don't necessarily require those skills. Notably, automation skills seem to be the very skills that today's schools are focusing on and encouraging young people to learn.

Further Reading and Resources

- Tulip: [A Critical Look at the Skills Gap in Manufacturing](#)
- Warren Averett: [Six Strategies for closing the Manufacturing Skills Gap](#)

Trend: Assembly Worker Shortage

Changing demographics in the workforce and technological advancements have contributed to a shortage of assembly workers. Panelists noted that the average age of an assembly worker is increasing, indicating that fewer young workers are coming in to replace outgoing baby boomers. Technological advancements around automation have contributed to the displacement of assembly roles, even as the need for human oversight and troubleshooting skills over these automated processes remains.

Trend: Misperception of the Manufacturing Workplace

Findings from the [Bureau of Labor Statistics](#) indicate that the manufacturing workplace is safer than it has ever been. Injuries in the manufacturing sector decreased by [21,400 or 6.5%](#) in 2023. Additionally, [72%](#) of respondents from a 2024 survey indicated that they believe AI will make manufacturing plants safer. Yet panelists noted that it can sometimes be difficult to recruit new employees because some people envision manufacturing workplaces as being “dark, dirty, and dangerous.” Methods to combat this negative image include, but are not limited to, facility tours and pre-/post-surveys to measure individuals’ perceptions of manufacturing workplaces.

Actionable Insights

Combating misperceptions about the manufacturing workplace being “dark and dangerous” is crucial. Keeping students connected to manufacturing workplaces, both with in-person visits and virtual tours, is key to overcoming outdated perceptions about the industry as a whole. Connecting students to the latest innovations in automation can also help reassure both students and parents that the manufacturing workplace will continue to grow even safer as manufacturing technology and processes evolve.

Further Reading and Resources

- Manufacturers Alliance: [Technology Improves Safety for Manufacturing Workers](#)
- U.S. Bureau of Labor Statistics: [Employer-Reported Workplace Injuries and Illnesses, 2023](#)

Trend: Automation Considerations in the Workplace

Keeping Automation In-House

Although numerous businesses have outsourced automation due to increased expenses, some companies are creating internal teams specializing in automation. By automating repetitive tasks and workstreams in a cost-efficient manner, companies can upskill employees who may have otherwise been displaced. Employees can be cross-trained in a variety of roles, including technicians, mechanics, and machinists, leading to pay increases for many employees.

Further Reading and Resources

- Window + Door: [Going All in on In-House Manufacturing](#)

Automation as a Response to Labor Shortages

While some experts identify automation as a reason for labor shortages, some panelists proposed the exact opposite. They posited that ongoing labor shortages have led to greater use of automation in some manufacturing spaces. For example, because of a shortage of experienced welders in the workforce, companies are increasingly using automation in their vehicle assembly lines.

Striking a Balance Between Automation and Human Oversight

Employers must carefully consider how incorporating automation will impact employees, especially those whose job responsibilities are being absorbed by automation. Panelists noted that while automation has come a long way, certain processes still require human oversight to identify errors and troubleshoot issues.

Further Reading and Resources

- MBA Research: LAP-NF-003 TECH-tastic (Technology's Impact on Business)
- Wevolver: [Industrial Process Automation: The Future of Manufacturing](#)
- Oracle, NetSuite: [Manufacturing Automation Explained](#)

Trend: Transition to Smart Manufacturing

Panelists discussed the shift to smart manufacturing, also commonly referred to as Industry 4.0, within their respective organizations. They highlighted examples of smart manufacturing, including cloud computing for data storage and processing, as well as human-machine collaboration involving human operators working alongside automated systems.

Further Reading and Resources

- JAGGAER: Embracing the Future: [How Manufacturing 4.0 is Transforming Industry](#)
- Lav Vantage: [Manufacturing 4.0: Transition Challenges and the Role of Technology](#)

Trend: Rising Potential for AI to Weaken Foundational Knowledge and Skills

Panelists outlined concerns over the use of AI, as it seems to result in a loss of foundational knowledge and poor troubleshooting skills. AI uses patterns to predict output, helping to improve efficiency and yields, but workers need to be able to verify the quality of that output and troubleshoot accordingly if problems arise. Research has also indicated that [long-term reliance on AI](#) could erode essential cognitive skills such as memory retention, analytical thinking, and problem-solving. Research from [Microsoft](#) found that those who most trusted the accuracy of AI assistants thought less critically about those tools' conclusions. Survey respondents included workers ranging from coders to social workers, indicating that concerns about AI weakening fundamental knowledge and skills extend beyond manufacturing.

Further Reading and Resources

- MDPI: [AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking](#)

Trend: Growing Importance of Sustainable Manufacturing

Sustainable manufacturing is growing as a means of reducing costs and the impact on the environment, and preserving scarce but valuable resources. Sustainability is also becoming an increasingly important factor to manufacturing organizations, shareholders, and customers. A [2025 survey](#) of manufacturing professionals found that 21% of respondents identified aligning materials and processes with sustainability goals as a top priority. This figure is nearly identical to the number of respondents identifying expanding AI tools as a top priority (22%). For shareholders, [multiple studies](#) (Wolters Kluwer, Toader, and Ciobanu) have indicated that higher ESG scores are tied to stronger financial metrics such as higher equity returns. [Customer preference](#) for sustainability is tied to a variety of environmental concerns, including conservation of resources, protecting ecosystems for the future, and reducing their carbon footprint.

Actionable Insights

Provide resources to teachers to help them better understand the role of environmental sustainability and how it impacts the workforce. Shareholders and customers are not the only ones concerned with sustainability. A growing body of surveys details the top concerns of Gen Z and younger millennials and the importance they place on working for companies that match their values and social beliefs. One survey noted that [64%](#) of its Gen Z respondents prioritized climate change as a top concern. Another found that [73%](#) of job seekers aged 18–34 would not apply to a company unless its values aligned with their own. Understanding what causes motivate the workforce is key to maintaining a strong manufacturing recruitment pipeline.

Further Reading and Resources

- United Way: [Gen Z Activism Survey](#)
- Employer Branding News: [The Power of Career Activism: Why Some Employers Are Winning and Others Lose](#)

Trend: Shift Away From Craft-Based Manufacturing

Many companies are shifting away from craft-based manufacturing (creating [customized goods](#) by hand) to more standardized manufacturing processes. Nevertheless, craft-based manufacturing roles are still essential in many shops. Panelists noted difficulty recruiting students for craft-based roles typically requiring manual labor, such as tool and die.

Further Reading and Resources

- VKS: [Why Craftsmanship is Still Pivotal in Industrial Manufacturing](#)
- Jeff Winter: [The Evolution of Manufacturing: From Craft to Personalization](#)

Trend: Supply Chain Challenges and Uncertainty

Panelists identified supply chain challenges that started during the pandemic and have only intensified with growing political and economic uncertainty. They shared that to hedge against socioeconomic uncertainty in any one area, their organizations have begun diversifying the regions from which they source materials and products. However, sourcing from new regions comes with its own challenges. One challenge that companies face, for instance, is finding new sources that meet their organization's own compliance standards. Different countries may have varying regulations, with some being more stringent than those in the U.S. and others being more relaxed.

Curriculum Resources

Resources to facilitate learning about this trend are available in the following LAP modules:

- LAP-OP-443 Deliver the Goods (Concept of Supply Chains)
- LAP-OP-303 Top of the (Supply) Chain (Nature of Supply Chain Management)
- LAP-OP-477 Chain Reaction (Impact of Supply Chains on Business Performance)
- LAP-OP-677 The Supply Chain Standard (Ethics in Supply Chain Management)

Trend: Lack of Succession Planning

Unfortunately, some companies are struggling with succession planning to capture and pass on the knowledge and insights of the most veteran parts of their workforce. At present, when experienced manufacturing professionals retire, their replacements, typically mid-career employees, are expected to seamlessly assume the retiring workers' roles and responsibilities without receiving sufficient higher-level training.

Trend: Smaller Companies Digitizing Their Work

Smaller manufacturing companies are following in the footsteps of the largest organizations in the industry by automating more pencil and paper processes that were traditionally completed manually. Panelists noted that smaller companies are more likely to experience growing pains in this process, partly because they lack expertise in enterprise resource planning (ERP) technology. [High initial costs](#) and [steep learning curves](#) are a few barriers to digitizing that are more difficult for smaller manufacturers to overcome than larger manufacturers. A 2024 survey found that [70% of manufacturers](#) still collect data manually. So, while smaller manufacturers have greater barriers to entry for digitizing, larger manufacturers are not immune to challenges with digitizing.

Further Reading and Resources

- Augmentir: [What is Digitization in Manufacturing](#)
- Forbes: [Three Steps to Digitalization that Will Keep Manufacturing From Getting Left Behind](#)

Manufacturing Skill Sets

Throughout the trends discussion, panelists identified the following skills as beneficial across different parts of manufacturing:

- Systems integration skills
- Programming, PLC programming, I&E, robotics
- Forms of automation
- Robotics engineering
- Machine vision systems
- SCADA (data communication sensor integration)
- Data analysis
- Drone technology
- Troubleshooting automated equipment
- Flexibility with technology
- Ability to evaluate the best use of tools for a situation
- Statistical analysis
- Machine learning
- Data visualization
- Problem-solving
- Supply chain management and sourcing of materials
- Understanding of regulations and compliance requirements
- Enterprise resource planning
- Knowledge of careers and career paths in manufacturing
- Awareness of certifications available in manufacturing
- Continuous learning
- Change management skills
- Adaptability and openness to change

Feedback on Kentucky Manufacturing Programs and Pathways

Panelists briefly touched on manufacturing programs and [pathways](#) in Kentucky and provided the following feedback on Industrial Maintenance Technology (IMT) and Metal Fabrication.

IMT: Cross-Functional Training Necessary to Compensate for Hiring Gaps

One panelist noted that they train their electrical technicians to be more well-versed in automation and PLCs because they struggle to find more automation technicians. They noted low exam passage rates as the primary challenge for finding and hiring automation technicians.

Additional Feedback

- Welding is needed under maintenance machinists
- Learning opportunities for stamping presses and stamping molds

Metal Fabrication: Highlighting Modernization in Metal Fabrication to Combat Outdated Perceptions

Panelists indicated that there are still perception issues around metal fabrication. In particular, it is still seen as less glamorous than other areas within manufacturing. While some may still view metal fabrication as being labor-intensive and involving much cutting and sawing, there have actually been tremendous strides with automation in metal fabrication. Part loaders and sheet loaders are just a few systems and equipment within metal fabrication that have been automated.

Additional Feedback

- Exposing students to automation and integration as quickly as possible
- Learning opportunities for stamping presses and stamping molds

Career Exploration

The following feedback was provided for career exploration in manufacturing.

KDE Developing Additional Manufacturing Resources for School Counselors

School counselors are the educators primarily tasked with guiding students through career exploration, including manufacturing. However, most school counselors are not necessarily experts in manufacturing. KDE is currently developing guidance for counselors to better understand manufacturing pathways.

Workshop Career Simulations

Panelists suggested partnering with manufacturing companies to create workplace career simulations, exposing students to different pathways. These career simulations could take place at regional career fairs or even on-site at schools.

Connecting Businesses to Schools

Panelists provided the following feedback for connecting businesses to schools.

Leveraging Opportunities to Increase Company ESG Scores

Panelists recommended that KDE should leverage company Environmental, Social, and Governance (ESG) scores for identifying businesses to connect with. ESG scores act as a publicly available report card indicating a company's commitment to sustainability and ethical practices. Many companies are eager to raise their ESG score as it is a significant sticking point for some investors. Working alongside KDE would offer an opportunity for many businesses to increase their ESG score, which can establish a mutually beneficial partnership for both parties.

Using Younger Employees to Tell the Story of Manufacturing

Panelists have had success with bringing recently graduated students (19–21 years old) back to their high schools to share their experiences in the manufacturing workforce. Panelists noted that students are more likely to listen to and engage with younger members of the workforce who were recently in the same school environment.

Are High School Graduates Becoming Gainfully Employed With No Degree and No Experience?

KDE is making significant strides in developing opportunities for students to enter the manufacturing workforce straight out of high school. Some panelists, however, expressed concerns that not every manufacturing organization has been keeping up with this development. Some manufacturing companies only have opportunities for individuals with at least an associate's degree or several years of experience.

Actionable Insights for Connecting Businesses to Schools

In addition to staying connected with panelists, there are other organizations in Kentucky that may be able to partner with KDE to further manufacturing education. Organizations that came up during the outreach and recruitment process include those listed below:

Further Reading and Resources

- [Kentucky Manufacturing Extension Partnership \(KY-MEP\)](#)
- [Kentuckiana Works](#)
- [National Association of Manufacturers](#)

Barriers to Entry for Manufacturing Companies Participating in Work-Based Learning (WBL)

Panelists and KDE discussed work-based learning (WBL) in Kentucky. According to [Kentucky's WBL manual](#), WBL is used to immerse students in real-life work experiences. For example, WBL activities are integrated into the curriculum, allowing a student to apply knowledge and skills from the classroom in the workplace. WBL also allows students to engage and connect with employers at an early age, while learning to demonstrate technical skills and workplace norms necessary for today's workforce. Throughout the discussion, panelists asked questions about WBL in Kentucky and also identified barriers to entry for businesses wishing to participate in WBL outlined below.

- Union facilities not allowing non-union workers
- Parental resistance
- Stigma around factories

Additional Feedback

Key Skills and Struggles With Automation and Air Systems

One panelist stated that in their organization, automation requires electronics, pneumatics, some hydraulics, PLCs, and maintenance mechanical parts working in tandem. Panelists noted that newer employees struggle the most with pneumatics and understanding how air systems work.

- Looping in tech centers to get original equipment manufacturers (OEMs) to help with training to get a certificate program in place
- Pathways are now pushed down to high school that used to be two-year postsecondary degrees, such as CAD and CMM
- Open businesses for tours every October as part of National Manufacturing Month

Cross-Cutting Skills for Manufacturing Professionals

The need for skills across industries has always been recognized but has been growing as careers are becoming increasingly complex and interdisciplinary. Advance CTE's [National Career Clusters Framework](#) looks at industry-aligned skill-building based on 14 career clusters organized by industry. The framework features cross-cutting clusters which highlight essential functions and transferable skills that are distinct to their industry sector, but also foundational to success across all industries. There are three cross-cutting clusters in the modernized framework:

- Digital Technology
- Management & Entrepreneurship
- Marketing & Sales

Panelists examined cross-cutting clusters and identified skills of interest across marketing and sales and management and entrepreneurship that would be beneficial for manufacturing professionals.

Marketing & Sales

- Understanding the customer
- Partnership building
- Communication
- Sales

Management & Entrepreneurship

- Team leadership
- Human resources management
- Payroll
- Business Law
- Project management
- Accountability

Business Ethics/Ethical Leadership

At the time of the Futuring Panel, MBA Research and Curriculum Center and the [Daniels Fund](#) had a grant-based partnership to promote the teaching and learning of business ethics at the high school level. As part of our research to help strengthen our curricula and instructional materials in the business ethics realm and to learn firsthand about issues in business ethics within workplaces, we asked Futuring Panel participants to review and rank the importance of ethical leadership traits, suggest additional ethical leadership traits, and talk about ethics generally within their career area.

Manufacturing Futuring Panel: Ethical Leadership Traits Validation

The traits are listed in the order that panelists reviewed and validated them.

| Ethical Leadership Traits | Critical | Recommended | Not Needed |
|---|----------|-------------|------------|
| 1. Describe the nature of emotional intelligence | 62% | 38% | 0% |
| 2. Recognize and overcome personal biases and stereotypes | 62% | 38% | 0% |
| 3. Assess personal strengths and weaknesses | 58% | 42% | 0% |
| 4. Assess personal behavior and values | 54% | 46% | 0% |
| 5. Demonstrate honesty and integrity | 92% | 8% | 0% |
| 6. Demonstrate responsible behavior | 92% | 8% | 0% |
| 7. Demonstrate fairness | 85% | 15% | 0% |
| 8. Assess risks of personal decisions | 62% | 38% | 0% |
| 9. Take responsibility for decisions and actions | 92% | 8% | 0% |
| 10. Build trust in relationships | 62% | 38% | 0% |
| 11. Describe the nature of ethics | 54% | 46% | 0% |
| 12. Explain reasons for ethical dilemmas | 46% | 54% | 0% |
| 13. Recognize and respond to ethical dilemmas | 75% | 25% | 0% |
| 14. Explain the use of feedback for personal growth | 54% | 46% | 0% |
| 15. Show empathy for others | 50% | 50% | 0% |
| 16. Exhibit cultural sensitivity | 33% | 67% | 0% |
| 17. Explain the nature of effective communications | 62% | 38% | 0% |
| 18. Foster open, honest communication | 69% | 31% | 0% |
| 19. Participate as a team member | 62% | 38% | 0% |
| 20. Explain the concept of leadership | 54% | 46% | 0% |
| 21. Explain the nature of ethical leadership | 54% | 46% | 0% |
| 22. Model ethical behavior | 100% | 0% | 0% |
| 23. Determine personal vision | 23% | 62% | 15% |
| 24. Inspire others | 46% | 54% | 0% |

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|--|------|-----|----|
| 25. Develop an achievement orientation | 38% | 54% | 8% |
| 26. Enlist others in working toward a shared vision | 31% | 69% | 0% |
| 27. Treat others with dignity and respect | 100% | 0% | 0% |
| 28. Foster positive working relationships | 62% | 38% | 0% |
| 29. Assess long-term value and impact of actions on others | 54% | 46% | 0% |
| 30. Set personal goals | 54% | 46% | 0% |
| 31. Follow rules of conduct | 92% | 8% | 0% |
| 32. Make decisions | 83% | 17% | 0% |
| 33. Demonstrate problem-solving skills | 92% | 8% | 0% |

Discussion on Ethics in the Workplace

Employee Knowledge Becoming Company Knowledge

Panelists noted that workstreams, research, and processes that individual employees created and innovated can become proprietary knowledge of the company and not the person who created it. As a result, employees may find themselves in trouble for sharing information outside of the company that they thought was their own. Additionally, an employee leaving the company may find themselves being flagged for stealing proprietary knowledge when they thought they were simply taking something they worked on as a portfolio piece.

Actionable Insights

Provide students with guidance on what constitutes proprietary knowledge. Educating students on what work is their own versus what becomes company knowledge can help them better navigate the workplace. Understanding the ins and outs of proprietary knowledge can help ensure that students are more readily adhering to company guidelines and maintaining positive relationships. Providing students with examples of different knowledge frameworks can help them develop a better sense of what knowledge is their own and what belongs to their organization. [Anecdotes](#) from workers who have been hesitant to share their information can also provide insights into pitfalls and considerations with individual knowledge versus company knowledge.

Further Reading and Resources

- Reliable Plant: [Why Workers Are Reluctant to Share Their Knowledge](#)
- Bloomfire: [Definitions of Knowledge Types for Business](#)

Reflecting on Unconscious Biases

Attendees stressed the importance of recognizing the potential of one's own potential biases and how they can impact workplace interactions. Addressing unconscious bias has a variety of benefits, including improved team dynamics and [reduced legal risk](#). In some workplaces, unconscious bias recognition begins as early as the recruitment process to allow for fairer hiring.

"In recruitment you have to do some work within yourself to say it's not a bias that I'm having intentionally. Whether it's how I was brought up, what I was taught, I would want to learn and make sure that you're being fair in an interview or with your team members."

— Madeline Poirier, Metalsa

Additional Points of Emphasis

- Ethical dilemmas raised by having friendships or other personal relationships with vendors and contractors
- Taking ownership of mistakes
- Data privacy and security
- Ethical concerns over waste management and how your organization deals with it

Gaps/Recommended Changes

- Taking ownership of mistakes
- Unconscious bias
- Courage

Manufacturing Certification Validation

Manufacturing panelists were asked to rate certifications of value provided by KDE across the following areas:

- Computer-Aided Design
- Computerized Manufacturing and Machining
- Industrial Maintenance Technician
- Metal Fabrication
- Welding Technology
- Wood Manufacturing

The table on the following two pages presents the full certification validation results.

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| Manufacturing Industry Certification Validation | Critical | Need | Nice | Unaware |
|--|----------|------|------|---------|
| Computer-Aided Design (CAD) | | | | |
| Autodesk: 3ds Max | 0% | 27% | 27% | 46% |
| Autodesk AutoCAD Certified User | 46% | 18% | 36% | 0% |
| Autodesk Inventor Certified User | 9% | 36% | 27% | 27% |
| Autodesk Revit Certified User | 9% | 18% | 36% | 36% |
| Certified Solid Works Associate | 18% | 9% | 27% | 46% |
| Autodesk Fusion 360 Certified User Exam | 0% | 36% | 36% | 27% |
| NOCTI – CAD Foundations | 0% | 9% | 64% | 27% |
| Computerized Manufacturing and Machining (CMM) | | | | |
| Autodesk Inventor Certified User | 9% | 27% | 18% | 45% |
| Certified Solid Works Associate | 9% | 18% | 36% | 36% |
| MasterCAM Associate Level Certification | 27% | 27% | 27% | 18% |
| MSSC – Certified Production Technician (CPT) | 9% | 27% | 27% | 36% |
| NIMS – Machine Tool Certification | 18% | 36% | 18% | 27% |
| Autodesk Fusion 360 Certified User Exam | 9% | 36% | 18% | 36% |
| Industrial Maintenance Technician (IMT) | | | | |
| Advanced Manufacturing Technical Education Collaborative (AMTEC) – Emerging Technician: Electrical | 27% | 18% | 45% | 9% |
| MSSC – Certified Production Technician (CPT) | 9% | 18% | 63% | 9% |
| NIMS – Industrial Maintenance | 9% | 27% | 54% | 9% |
| FCR-O1 FANUC Certified Robot Operator-1 | 27% | 27% | 36% | 9% |
| National Center for Construction Education Research (NCCER) – Industrial Maintenance Electrical and Instrumentation Technician Level 1 | 0% | 36% | 45% | 18% |
| (NCCER) – Electrical Level 1 | 0% | 36% | 36% | 27% |
| (NCCER) – Industrial Maintenance Mechanic Level 1 | 9% | 27% | 36% | 27% |
| (NCCER) – Core Curriculum | 0% | 27% | 45% | 27% |
| (AMTEC) – Emerging Technician: Maintenance Mechanic | 18% | 36% | 36% | 9% |
| EPA 608 Universal Certification | 9% | 27% | 45% | 18% |
| (NCCER) – HVAC Level 1 | 0% | 36% | 27% | 36% |
| Industrial Maintenance Electrical and Instrumentation Technician Level 1 | 0% | 36% | 45% | 18% |
| Autodesk Fusion 360 Certified User Exam | 0% | 27% | 54% | 18% |
| Certified Solid Works Associate | 0% | 18% | 82% | 0% |
| MasterCAM Associate Level Certification | 0% | 18% | 73% | 9% |
| NIMS - Machine Tool Certification | 9% | 18% | 64% | 9% |
| AWS Sense Certification (Level 1) | 9% | 18% | 54% | 18% |

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|---|-----|-----|-----|-----|
| KY Department of Transportation 3-G | 0% | 9% | 36% | 54% |
| (NCCER) – Welding Level 1 | 0% | 36% | 27% | 36% |
| Metal Fabrication | | | | |
| Metal Fabrication [National Center for Construction Education Research (NCCER) – Core Curriculum] | 0% | 18% | 45% | 36% |
| (NCCER) – Sheet Metal Level 1 | 9% | 18% | 36% | 36% |
| TRACK Pre-Apprenticeship Certification | 0% | 36% | 36% | 27% |
| OSHA 10 | 18% | 36% | 36% | 9% |
| OSHA 30 | 9% | 36% | 36% | 18% |
| Welding Technology | | | | |
| AWS Sense Certification (Level 1) | 27% | 18% | 18% | 36% |
| KY Department of Transportation 3-G | 0% | 27% | 27% | 45% |
| National Center for Construction Education Research (NCCER) – Core Curriculum | 0% | 27% | 27% | 45% |
| (NCCER) – Welding Level 1 | 0% | 36% | 18% | 45% |
| TRACK Pre-Apprenticeship Certification | 0% | 27% | 45% | 27% |
| OSHA 10 | 18% | 36% | 36% | 9% |
| OSHA 30 | 9% | 36% | 45% | 9% |
| Wood Manufacturing | | | | |
| MSSC – Certified Production Technician (CPT) | 9% | 18% | 27% | 45% |
| WCA Woodwork Career Alliance (Green Credential) | 0% | 36% | 27% | 36% |
| OSHA 30 | 9% | 36% | 36% | 18% |

Additional Certifications of Value

Panelists were asked to name additional certifications of value beyond the ones provided by KDE.

- [Certified Manufacturing Engineer Certification \(CMfgE\)](#)

Thank You and Recognition of Contributors

MBA Research and the Kentucky Department of Education would like to thank the participants of the Manufacturing Futuring Panel who shared their expertise with us. Panel participants presented their own views based on their professional experiences and not necessarily those of their companies.

We are always grateful to meet with and hear directly from business and industry about what's going on in the workplace. Thank you for your time and commitment to Kentucky workforce development and business administration education.

Futuring Panel Participants

Alejandro Altamirano, Division Manager, Nucor Corporation

Joe Arkenau, Manufacturing Engineer, FORTNA

Steven Cross, Plant Utilities Reliability Team Leader, Logan Aluminum

Zak DuGla, Manufacturing Production Manager, Zilani Group

Carlos Herrera, Papa Johns

Sara Johnson, Talent Acquisition Specialist, Metalsa

Tyler Jones, Multifacility Talent Acquisition Recruiter, Metalsa

Michael Kane, Chief Manufacturing Officer, Framebridge

Mark Maloney, Vice President of Manufacturing, Fechheimer

Jesse Megenhardt, Senior Plant Manager, Holcim Building Envelope

Jimmy Miles, Machining Manager, Bluegrass Manufacturing

Jennifer Phillips, Senior Director Americas Operations, The Lubrizol Corporation

Madeline Poirier, Talent Acquisition Coordinator, Metalsa

Dinesh Vasandani, Operating Partner, MiddleGround Capital

Kentucky Department of Education

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Kentucky Partnership

MBA Research and Curriculum Center would like to acknowledge our strong partnership with and support from the Kentucky Department of Education, a member of the MBA Research and Curriculum Center consortium.

Kentucky Department of Education & Observers

Barry Bond, Manufacturing Program Consultant, Office of Career and Technical Education

Sherri Craig, System Consultant - CTE EOP Assessment, Office of Career and Technical Education

Coy Hall, Administrative Consultant, Office of Career and Technical Education,

Cathy Hoehn, Education Academic Program Manager, CTE Programs & Pathways Branch, Office of Career & Technical Education

Morgan Lovitt, Program Consultant, Office of Career & Technical Education

Lisa M. Oakes, Chartered Association Advisor for Kentucky DECA, Division of Student Transition & Career Readiness, Office of Career & Technical Education

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Kentucky Society of Certified Public Accountants (KyCPA)

MBA Research and Curriculum Center would like to thank Darlene Zibart, President & CEO of KyCPA, and the rest of her wonderful team for being such great hosts, and graciously allowing us to use their space for the Manufacturing Futuring Panel.

MBA Research and Curriculum Center

Holly Atha, President/CEO

Rick Mangini, Executive Vice President

Aadil Khan, Business Engagement Manager