# TABLE OF CONTENTS

Findings Summary .................................................................................................................. 3

Executive Summary ............................................................................................................... 4

IoT Adoption is Slow, but Awareness is Increasing ............................................................ 5

Talent Acquisition Remains a Priority... and a Challenge ................................................... 7

Robotics are Poised for Growth Amid Workforce Issues ................................................... 10

Time for Action: Systems are Vulnerable to Cyber Threats ............................................ 13

Domestic Activity and R&D Investment Drive Growth .................................................... 14

More Business Leaders are Writing Exit Plans ............................................................... 16

Manufacturing Outlook: 2018 and Beyond .................................................................... 17

Methodology ....................................................................................................................... 18
Our survey of more than 200 participants highlights how the Internet of Things (IoT) and other key trends are transforming manufacturing. The numbers speak for themselves, and we’ve highlighted just some of the many hard-hitting findings that came out of our survey:

**Do your manufactured goods gather useful data?**

- **Only 20%** have active plans to include sensors

**+75% experienced cybersecurity incidents over last 12-18 months**

**However, only 19% are very ready to address cybersecurity risk**

**Investing in our future**

- **46%** source skilled labor through vocational schools

-- **40%** are still not using the credit

-- **52%** in 2017, **60%** in 2018

**While on the rise from 2017 still only 1/4th of the respondents have a written exit strategy**
EXECUTIVE SUMMARY

Industry 4.0 is more than a buzzword. It’s a competitive differentiator. It’s a term that’s often used interchangeably with smart or advanced manufacturing. They’re all appropriate because they describe a wide range of game-changing technologies that enable increased productivity, smarter decision-making and improved service levels.

More than half of manufacturers and distributors responding to the fourth annual Sikich Manufacturing Survey say they’re at least monitoring developments related to the Internet of Things (IoT). That’s significant because smart technologies, such as IoT, robotics and automation, can help manufacturers address many of the top challenges cited in the survey.

Once again, “addressing workforce challenges” received the most responses as a top priority. Smart-manufacturing technologies reduce reliance on manual labor while helping organizations attract skilled, highly engaged workers. Unfortunately, many participants indicate they’re missing opportunities to fully leverage the power of Industry 4.0.

According to the survey, 39 percent of manufacturers and distributors are not using robotics in their facilities, and 30 percent have no clear understanding of IoT.

| **SOME OTHER KEY FINDINGS TO NOTE:** |
| 63 percent of respondents believe they’re only “somewhat ready” to address cybersecurity risks. |
| 64 percent say they have no written plan for exiting the business. |
| 60 percent are using R&D tax credits, up from 52 percent in 2017. |
| 43 percent say their optimism about the global economy is unchanged from 2017. |

IN THIS REPORT, SIKICH EXPERTS WILL OFFER INSIGHT INTO THESE FINDINGS AND DESCRIBE STRATEGIES MANUFACTURERS AND DISTRIBUTORS CAN ADOPT TO OVERCOME COMPETITIVE BARRIERS.
IoT ADOPTION IS SLOW, BUT AWARENESS IS INCREASING

IoT spending will increase at a compound annual growth rate of at least 20 percent through 2020, with manufacturing accounting for the greatest demand.¹ But less than 10 percent of survey respondents are already using IoT (see Figure 1). One possible reason for the low adoption rate is a lack of awareness among organizations.

Larger manufacturers typically have bigger budgets and are willing to accept more risk. However, many small and midsize manufacturers may not realize their current IT systems are IoT-ready. “Most ERP systems already have gateways to receive information from sensors installed in equipment,” says Evert Bos, an ERP consultant at Sikich.

Within the next year, expect more small and midsize manufacturers to adopt IoT technologies as they become more educated about its potential benefits, Bos says. “With the proliferation of the cloud, we’ll see this catch up with all companies, regardless of size.”

---

¹ Boston Consulting Group, “Winning in IoT: It’s All About the Business Process,” 2017
The Internet of Things is already helping many manufacturers and distributors improve customer service, maintenance, inventory management and market performance. Knowing where to get started can seem overwhelming. “The lean manufacturing concept of kaizen is a good first step,” says Evert Bos. “Kaizen typically involves team members from different parts of the organization collaborating to drive targeted improvements.”

“IoT is a targeted initiative,” Bos says. “You need to talk to your customers and suppliers because it’s not just an internal project. It’s about your supply chain. You need to find out what your customers would like or expect.”

Here’s a closer look at some of the key areas organizations should consider for IoT initiatives:

**FIELD SERVICE/WARRANTY TRACKING**
Customers traditionally call a customer-service center to report problems with their equipment. But IoT-connected products can send performance data to the manufacturer in real time. In this scenario, sensors affixed to the product send information about operating conditions directly to the ERP system. In many cases, the equipment will generate its own service orders, which greatly increases efficiencies, reduces the duration or number of service calls, cuts response time and improves customer service.

**PLANT MAINTENANCE**
Organizations can use IoT to monitor machine performance from any location and perform predictive maintenance on equipment. IoT devices automatically generate maintenance work orders when certain conditions exceed safe operating limits. IoT-enabled devices may also send information about when a machine might fail or needs to be serviced. This helps organizations optimize service intervals and resolve problems before they lead to downtime.

**INVENTORY MANAGEMENT**
With more ERP systems connected to the cloud, manufacturers and distributors can share more information with supply chain partners. Supply chain transparency is particularly useful for inventory management. For example, organizations can ask their vendors to join their networks and provide access to their inventory systems. Sensors connected to shelving units can send a signal to a vendor in the network that a shelf is empty and needs to be restocked.
TALENT ACQUISITION REMAINS A PRIORITY... AND A CHALLENGE

How do manufacturers attract skilled workers? It’s a question hiring managers throughout the industry are still trying to answer. Respondents selected “lack of qualified workers” as the top barrier to growth in 2018 (see Figure 2, next page).

The search for skilled workers who know how to operate, manage and maintain smart technologies starts at the top. Talent acquisition must be a strategic priority for organizations. That means ensuring human resource departments are adequately staffed to manage the companies’ hiring needs. “There should be one human resource professional per every 50 employees, and I’ve seen some organizations that have a ratio of one to 200 or one to 300,” says Joy Duce, partner-in-charge, Sikich Human Resource Consulting Services.

Understaffed HR departments may not have the time they need to conduct comprehensive talent searches. In fact, 77 percent of respondents say it takes them anywhere from three to eight-plus weeks to fill an hourly position. Many organizations also say they are not taking proactive approaches to developing skilled workers, another indication that talent acquisition lacks resources (see Figure 3, next page). Most organizations rely on offsite recruiters to find employees rather than developing in-house talent or recruiting at the high school level.

Surprisingly, only 3 percent of respondents recruit employees at the high school level. This indicates manufacturers are missing a major opportunity to educate the next generation of workers about modern manufacturing.

“It’s an opportunity for them to lay the foundation, show people that manufacturing is high tech and an exciting career opportunity,” says Jerry Murphy. “Reaching out to those schools early and trying to get the next generation interested in manufacturing is something I think all manufacturers need to do to fill those positions.”

“There should be one human resource professional per every 50 employees, and I’ve seen some organizations that have a ratio of one to 200 or one to 300.”

- Joy Duce, partner-in-charge, Sikich Human Resource Consulting Services
FIGURE 2
How do manufacturers rank their top barriers to growth in 2018? Here’s a breakdown of the top five responses.

1. **LACK OF QUALIFIED WORKERS**
2. **COMPETITION**
3. **HEALTH CARE COSTS**
4. **PRESSURE FOR INCREASED WAGES**
5. **CAPITAL CONSTRAINTS**

FIGURE 3
When asked what actions manufacturers and distributors are taking to address recruiting challenges, most reported not taking proactive approaches to attracting talent, including building a talent pipeline before a position opens.
The days of filling skilled industrial jobs through help wanted ads are waning. Manufacturers and distributors should consider taking more proactive steps to fill open positions. Some of the more effective approaches organizations can take include:

**HOSTING PLANT TOURS:**
For example, the Valley Industrial Association in Geneva, Illinois, hosts manufacturing awareness tours, including visits to plants during its annual Manufacturing Day. “The goal is to show young people that robotics, computers, math and science are part of manufacturing,” says Jerry Murphy. “It also shows students who may not have an interest in attending a four-year college that manufacturing is a very good option for them.”

**OFFERING INTERNSHIPS:**
Consider offering internships as early as high school. They don’t have to be jobs that require certifications or specialized skills. They can be other tasks on the plant floor or distribution center that provide some exposure to modern industrial environments.

**UPDATING DIGITAL FOOTPRINTS:**
Younger workers, particularly millennials and Generation Z candidates, are web savvy and will view an organization’s digital footprint as a representation of the company. “I had a manufacturer who came to us because they were having trouble recruiting talent,” recalls Joy Duce. “Since online efforts now lead the way in hiring, we first examined their website. We noted the company culture was not showcased. Visitors did not get a sense of what it was like to work for their business.” A website should convey both the business and employment brand, Duce says. This includes an accessible careers page and straightforward application process. A complicated application process with too many steps can dissuade candidates. The website also must be mobile friendly so candidates can navigate on smaller screens, including smartphone displays.
Global spending on robotics is expected to reach $87 billion by 2025, up from a previous projection of $67 billion. In many cases, robots are not replacing workers, but actually working alongside them. These collaborative robots, or “cobots,” can perform manual and precision tasks much faster and more consistently than human workers. Freeing workers from physically demanding, repetitive tasks can improve their productivity and job satisfaction.

But, much like IoT and other smart-manufacturing technologies, many Sikich survey respondents say they’re not taking advantage of robotics (see Figure 4). More than half of organizations say they’ve adopted “some” or “moderate” use of robotics. Still, nearly 40 percent of respondents say none of their manufacturing operations are performed by robotics.

In fact, much of the growth in the robotics sector is being driven by the seasonal consumer market. A lot of myths still exist around robotics, and many organizations don’t understand how robots work or they believe they’re too costly. “Businesses think buying a robot is a complex technology they can’t handle and a six-figure investment,” says Gregg Hague, partner, Sikich’s Supply Chain group. “You can acquire a simple-to-install robot for under $20,000.”

One industry projection shows per-unit costs of industrial robots dropping to less than $11,000 by 2025.

---

2, 3, 4 Boston Consulting Group, “Gaining Robotics Advantage,” June 2017
5 ARK Investment Management, “Industrial Robot Costs Decline,” August 2017

**FIGURE 4**
More than half of manufacturers are using robotics in at least some of their operations. But nearly 40% say none of their operations are performed by robotics.
The lower prices should make robotics more appealing to many organizations as they seek new workforce solutions. Robots can potentially complete manual tasks typically performed by humans, such as sorting and pick-and-place. Cobots work safely next to human operators and are not locked behind cages like traditional heavy industrial robots. They employ sensing and vision technologies that send signals to slow down or stop if someone gets in the way.6

Some manufacturers have already realized increases in workforce productivity using cobots. Stenner Pump, a peristatic pump manufacturer in Jacksonville, Florida, has cut manual handling on a parts feeding line by 75 percent.7 The company also reported a significant reduction in cycle times.8

Miami-based Creating Revolutions turned to cobots to improve quality.9 The company makes communications technologies for the hospitality industry. The startup was seeking ways to reduce a double-digit reject rate on its “hockey-puck sized” hospitality service pager. The company deployed a cobot that handles soldering, drilling, silicone dispensing and light assembly. The robot has increased efficiency fivefold and reduced the reject rate to less than 1 percent, says company CEO Einar Rosenberg.10

9,10 Universal Robots, “Universal Robots Solves Production Challenges in Creating Revolutions’ Assembly Line”
Adopting any new technology can seem intimidating. Cost, safety and quality are always concerns. Here are some ways manufacturers and distributors can determine whether their operations could benefit from robotics.

**EVALUATE THE ROI POTENTIAL:** Look at areas where robots might make sense, including quality control, packing/picking operations, assembly or dangerous work areas. For example, a quality audit might reveal a high defect rate. Robots with 3-D vision capabilities can pick parts, present them to the vision system and determine whether they pass or fail. This increases efficiencies by automating the inspection process and reduces or eliminates human error. Safety is another common consideration. Robots can perform repetitive or dangerous tasks that often result in injuries. Identify hazardous areas that could benefit from robotics.

**DO YOUR RESEARCH:** Read industry trade publications and visit OEM websites to understand which robotics manufacturers are suitable for your industry and applications. Also, explore white papers, case studies and YouTube videos.

**ATTEND TRADE SHOWS:** Exhibit halls and seminars are excellent opportunities to see live demos and gain firsthand information on how robots operate and their applications.

**KNOW YOUR GOALS:** Performance targets will determine critical factors, such as robot speed, precision and payload. Some key performance indicators to consider include desired takt time, cycle time and part quality or consistency and precision.

**CHOOSE THE RIGHT SYSTEMS INTEGRATOR:** This is critical because OEMs typically sell robots to systems integrators rather than delivering them directly to plants. Select an integrator who understands your industry and can tailor the system to your needs. Also, make sure the integrator is focused on safety and security to minimize risks after implementation. An integrator should be able to perform simulations and time studies that demonstrate how the robot will work in a real-world environment.

Consultants can help manufacturers and distributors work through these steps. A well-planned buying and implementation process can help maximize ROI and minimize risks. Seek consultants who can educate you on robotics, conduct research, and provide an application assessment to determine if robotics are a justified investment.

---

13,14 Robotics Online, “How to Implement Robotic Automation Solutions in Your Industry,” June 2017
IoT connectivity comes with some inherent risks, especially around cybersecurity. As organizations connect more devices, they also increase the security footprint they need to protect. Only 19 percent of respondents say they’re “very ready” to address a cybersecurity risk (see Figure 5). More than three-fourths of survey respondents say they did not experience a cybersecurity incident in the past 12 to 18 months.

“What’s interesting to note about the security incident statistic is that it’s very likely that a number of the respondents have actually been breached and simply aren’t yet aware of it,” says Brad Lutgen, partner, Sikich Security and Compliance. “Studies have found that the average time it takes for a U.S. company to detect a breach of their systems is almost seven months.”

Organizations can ensure their environments are secure by practicing due diligence when selecting IoT vendors. Manufacturers and distributors should verify that vendors regularly test their devices for vulnerabilities, ideally using an independent testing company. Organizations also should inquire about a device’s ability to receive regular security updates once it’s in service. After installation, security and risk consultants suggest organizations conduct internal testing and continuously monitor their environments for IoT-related risks.

“It’s one thing to have a device tested independently by the vendor in an ideal environment that the vendor has configured and set up, but oftentimes we see issues when those devices get implemented in the real world,” says Lutgen. “That’s why we suggest manufacturers have penetration testing and vulnerability assessments performed against their full environment, so they can validate that these devices are implemented properly and running in a secure manner.”

In the event of a security breach, a manufacturer should have an incident-response and forensics company on retainer to quickly respond to an incident. It’s also important to have a dedicated security expert who reports to someone outside the conventional IT structure. This dedicated individual could be an in-house resource or an outsourced chief information security officer.

“Studies have found that the average time it takes for a U.S. company to detect a breach of their systems is almost seven months.”
- Brad Lutgen, partner, Sikich Security and Compliance

“Commonly, the IT function and the security function within a business have a natural conflict,” Lutgen says. “An IT director has traditionally been measured on how efficient the IT operation is, how easy it is to use IT within the business, and how much uptime they have in a given year, for example. Security can oftentimes be at odds with those goals. For this reason, a successful organization will give each group an equal voice and then allow the business leaders to make informed decisions based on their risk appetite for the business.”

---

**FIGURE 5**
When asked how prepared their company is to address cybersecurity risk, most manufacturers say they’re at least “somewhat ready.”

![Figure 5](image-url)
Manufacturers and distributors appear to be focused on growing in existing domestic markets. Nearly 41 percent of respondents said organic growth in an existing domestic market presents their greatest opportunity for growth in the next 12 to 18 months (see Figure 6). Five percent of organizations responding to the same question cited organic growth in an existing foreign market.

The focus on domestic growth may be related to challenges finding talent or partners overseas who can help grow the business. “It’s often difficult to find someone overseas, where you don’t have relationships and contacts, to help you grow in that market,” Murphy says.

This doesn’t mean manufacturers should ignore foreign markets. Global expansion can help organizations hedge against maturing domestic markets and pressure from increasing competition. Government and consulting resources are available for manufacturers that need help entering new markets. For example, the U.S. Commerce Department’s Gold Key Service as well as Sikich’s associated memberships and alliance partners can help potential exporters establish relationships with prospective overseas agents, distributors, sales representatives, business partners and other local entities.

Another resource that can help manufacturers increase competitiveness is the use of tax incentives or deductions.
Manufacturers qualify for R&D tax credits if they're developing a new product or improving an existing product. R&D tax credits typically equal 5 percent to 7 percent of manufacturers' R&D expenses. That means a manufacturer spending $1 million on R&D could save approximately $50,000 by applying for the tax credit. This does not include R&D tax credits offered by more than two-thirds of the states.

Results from this year’s Sikich survey indicate more manufacturers are realizing the benefits of the tax credits. Sixty percent of respondents say they're using R&D tax credits compared with 52 percent in 2017. "The tax credit makes you more competitive because you can pour that money back into the business and develop new products," Murphy says. "It will help many of the respondents do what they say they want to do, which is develop new products and increase their competitive edge."

Tax reform provides additional investment opportunities for organizations. The Tax Cuts and Jobs Act, which was signed into law last year, allows businesses to expense 100 percent of capital expenditures for equipment put into service from Sept. 28, 2017 through Dec. 31, 2022 (or Dec. 31, 2023, for certain property with longer production periods). After 2022, the bonus depreciation deduction will be reduced annually by 20 percent over a five-year period. The deduction also applies to any pre-owned equipment that a company purchases.

This is significant because 67 percent of survey respondents say they plan to invest in manufacturing equipment in 2018. More than half of the respondents also plan computer hardware and software investments. Manufacturers that take advantage of the reforms are in a stronger position to invest in technologies that increase productivity. But many companies lack knowledge of tax reform. For example, 83 percent of small business owners say they don't have a complete understanding of the impact tax reform will have on their businesses, according to a survey by the National Association for the Self-Employed.16 Organizations should meet with their tax advisors prior to year-end to understand their options and potential savings.

67 percent of survey respondents say they plan to invest in manufacturing equipment in 2018.

16 National Association for the Self Employed, “NASE 2018 Tax Survey,” April 2018
MORE BUSINESS LEADERS ARE WRITING EXIT PLANS

One of the most overlooked yet critical business strategies is succession planning. Business owners know circumstances can change quickly. Economic trends, health issues and buyout offers can catch owners by surprise. That’s why an exit plan is essential. Most business owners still lack an exit strategy, but more leaders are beginning to realize the value of a succession plan.

In this year’s survey, 25 percent of business owners said they have a written plan to exit the business compared with 18 percent in 2017. A written exit plan documents an owner’s intentions if an unexpected event occurs and addresses any issues prior to a transition.

The most common exit strategy is selling the business to a third party (see Figure 7). It’s typically a less risky strategy than other common options because owners can complete the sale faster and secure more cash upfront than they could from a family member, manager or an employee stock ownership plan (ESOP). “Right now, in the M&A market there’s a plethora of buyers out there falling all over each other to buy businesses, so you can get more favorable terms and higher pricing upfront,” says Ray Lampner, a Sikich partner and certified exit planning advisor.

An ESOP is a trust that buys the company from the owner. The employees are the beneficiaries of the trust who purchase an interest or 100 percent of the business over time. This allows owners to remain active in the business as they gradually transition the business to their management team. Company contributions to the ESOP have significant tax advantages. But ESOPs create additional compliance burdens and could result in a lower overall purchase price.

Advisors can help manufacturers and distributors decide which option makes the most sense. They also can help manufacturers determine the value of their businesses by assessing several factors, such as future potential profit, competition, intellectual property, customers and any potential risks.

Owners should seek ways to make their businesses more attractive to buyers. Investments in new technologies, decreases in working capital, business growth and cost-cutting measures can help manufacturers and distributors increase their value.

FIGURE 7
When asked about the method being considered for an exit strategy, the most common response was “not applicable,” which indicates that many organizations need help selecting an appropriate exit plan.
MANUFACTURING OUTLOOK: 2018 AND BEYOND

Fewer manufacturers and distributors say they’re more optimistic about the U.S. economy than respondents from the previous year. The number of manufacturers saying they’re more optimistic about the U.S. economy fell to 66 percent, down from 75 percent last year. In addition, 11 percent of respondents say they’re “less optimistic” about the U.S. economy, up from 5 percent last year.

However, respondents indicate they’re more optimistic about the global economy. The reasons for declining optimism in the U.S. could be related to various factors, including trade policies and the ongoing workforce shortage. Tariffs ordered on steel and aluminum imports could create some winners and losers.

For example, major steel makers should benefit from the tariffs, but sectors that use metal components, such as auto, aerospace and canning industries, could feel the pinch.\(^{17}\)

In addition, a tightening labor market means manufacturers are even more pressed to find skilled workers.\(^{18}\) The uncertainty is another reason why organizations must implement technologies and strategies that increase efficiency and competitiveness. This includes IoT, robotics and other smart technologies as well as proactive talent-development approaches. Investment in product development will also be critical to attract new markets. Consultants with expertise in trade, finance and human capital can help manufacturers develop strategies to meet competitive challenges in 2018 and beyond.

\(^{17}\) Bloomberg, “Winners and Losers From Trump’s Tariffs on Aluminum and Steel,” March 2018

The Sikich 2018 Manufacturing report includes responses from more than 200 participants across a wide range of industrial sectors, including metal fabrication, industrial equipment food and beverage, OEM equipment, chemicals and petroleum, automotive, plastics and wholesale/distribution. The majority of respondents had 50 to 250 employees (see Figure 8).

**FIGURE 8**
How many employees does your company have worldwide?

- **1 - 50**: 19%
- **51 - 100**: 16%
- **101 - 250**: 21%
- **251 - 500**: 11%
- **501 - 1,000**: 10%
- **1,001 - 2,500**: 9%
- **+ 2,500**: 15%

Percentages as they appear in some charts may not equal 100% due to rounding.
ABOUT SIKICH

Sikich is a leading professional services firm specializing in accounting, technology, investment banking* and advisory services**, servicing clients across the country. Founded in 1982, Sikich now ranks as one of the country’s Top 30 Certified Public Accounting firms and is among the top 1% of all enterprise resource planning solution partners in the world. From corporations and not-for-profits to state and local governments, Sikich clients can use a broad spectrum of services and products that help them reach long-term, strategic goals.

* Securities offered through Sikich Corporate Finance LLC, member FINRA/SIPC.
** Investment advisory services offered through Sikich Financial, an SEC Registered Investment Advisor. Securities offered through Triad Advisors, member FINRA and SIPC. Triad Advisors and Sikich Financial are not affiliated.