

# Charting Indiana's Path from Early Adoption to Widespread Application of Industry 4.0 Technologies

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Industry 4.0 Technology Adoption Survey Report



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## Executive Summary

The advanced manufacturing and logistics (AML) industries have deep and strong roots in Indiana, serving as Indiana's leading employer and contributing more than any other industry to Indiana's gross state product.

Throughout history, these industries have continually re-invented themselves – from the introduction of the first systems to support mass production to the digital age of computer numerical controlled (CNC) machines and process automation – to increase productivity, efficiency and quality. **Today, we are on the cusp of another revolution.**

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**The Fourth Industrial Revolution** – commonly referred to as Industry 4.0 – is the move toward smart manufacturing that has the potential to change AML industries in dramatic ways as technology, data and new processes offer a digital transformation of all aspects of making and moving products. These technologies include the Internet of Things (IoT), additive manufacturing, cloud computing, big data analytics, advanced modeling, artificial intelligence, augmented reality, autonomous machines and more.

**AS A GLOBAL AML INDUSTRY LEADER, INDIANA HAS THE OPPORTUNITY TO BE ON THE FOREFRONT OF INDUSTRY 4.0 TECHNOLOGY ADOPTION AND APPLICATION.**

Conexus Indiana, in partnership with Indiana University Kelley School of Business Center for Excellence in Manufacturing, set out to measure Indiana's manufacturing and logistics industries' readiness and early adoption of Industry 4.0 technologies. Understanding where Indiana companies are positioned on the technology adoption curve is a first and necessary step in developing strategies to support Indiana's successful journey into and through the digital transformation of Industry 4.0.

Key findings from “Charting Indiana’s Path from Early Adoption to Widespread Application of Industry 4.0 Technologies” show that Hoosier firms are in various stages of adoption toward smart manufacturing with larger, more established companies more likely to be implementing Industry 4.0 than smaller companies. This adoption by larger, more established companies suggests that they have greater tolerance and appetite for experimenting with technologies earlier in the Gartner Hype Cycle<sup>1</sup>, a widely cited graphical representation of how maturity and acceptance of technologies tends to progress over time. While there are some companies with a dedicated budget and detailed Industry 4.0 roadmap for digital technology transformation, there are many more companies piloting digital technologies on a more ad hoc basis such as when customer needs arise. Findings such as these indicate that Indiana is in the

***“A recent addition at Aisin was the utilization of an IR camera system to take team member temperatures as they enter work. This allows us to efficiently screen all of our more than 2000 team members in a short amount of time while also maintaining social distancing. The Aisin culture of embracing new technology helped us implement this change quickly. As operational technology is ever-changing, we have to be ready to take any opportunity to meet customer expectations and continuously improve our competitiveness.”***

***Jeff Nordman, Executive Vice President,  
Aisin USA Mfg., Inc.***

early stages of digital technology adoption and has a significant journey ahead to widespread adoption.

Just as the survey portion of this study was concluding, the COVID-19 pandemic was beginning to take hold in the United States. In fact, the survey closed on March 6, 2020, on the same day that Indiana confirmed its first case of COVID-19. In the months that followed, numerous Indiana manufacturers stepped forward and swiftly deployed resources and technologies to shift from automotive parts to ventilator assembly, and face mask and other personal protective equipment (PPE) production, while supply chains and logistics firms adapted to ensure that critical items were delivered safely and on-time further down the supply chain. Similarly, many Hoosier manufacturers adjusted to dramatic disruptions in their supply chains with reduced workforce, decreased product demand, and re-imagined factory floors and employee safety as workers re-enter the workplace. COVID-19 has pulled the curtain back and heightened awareness of the digital tools and infrastructure needed to respond to major unplanned disruption, and it may yet prove to be the turning point that accelerates digital transformation.

“Charting Indiana’s Path from Early Adoption to Widespread Application of Industry 4.0 Technologies” provides a snapshot of what type of companies are adopting Industry 4.0 technologies, where companies are in the journey, the motivations driving technology adoption and its impact on the workforce. The results of this report will serve as a foundation for programs and initiatives that Conexus Indiana will champion to ensure Indiana sustains its leadership in manufacturing and logistics.

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<sup>1</sup> Gartner. “Gartner Hype Cycle. Interpreting technology hype.” Accessed May 20, 2020. <https://www.gartner.com/en/research/methodologies/gartner-hype-cycle>

# Study Methodology

Indiana is an advanced manufacturing powerhouse, consistently outpacing the nation in manufacturing employment, productivity and output. Recognized as the most manufacturing intensive state in America, accounting for more than \$100 billion of Indiana's economy, Indiana's manufacturers employ more than 520,000 Hoosiers, or 17 percent of the Hoosier workforce – the largest share of any industry sector<sup>2</sup>. With the addition of the logistics industry, which works hand-in-glove with the manufacturing base, these two industries are responsible for more than one in five Indiana jobs<sup>3</sup>.

There are more than 7,100 manufacturing firms in Indiana, with the largest manufacturers (those with 5,000 workers) employing 35 percent of manufacturing workers and contributing 41 percent of payroll. Manufacturers that employ fewer than 5,000 employees make up more than 64 percent of the workforce and contribute nearly 60 percent of payroll<sup>4</sup>. Indiana also has a diverse industry base, with manufacturers producing automobiles and automotive parts, chemical products, medical devices and pharmaceuticals, aerospace and defense equipment and industrial goods<sup>5</sup>.

Earlier this year, Conexus Indiana, in partnership with IU Kelley School of Business Center for Excellence in Manufacturing, collected data from 380 Indiana AML companies, most of them manufacturers, to identify trends in Industry 4.0 technology adoption. Those who participated in our study were from a wide cross section of businesses across the state including:

- **More than a dozen different manufacturing sectors, including aerospace and defense, automotive, food/beverages, healthcare, hi-tech and industrial products, with a composition that well represents Indiana's sector mix (CHART 1);**
- **Small, medium and large enterprises (as determined by both revenue and number of employees), were all well-represented in the responses (CHART 2A & 2B); and**
- **An overwhelming majority of responses were from well-established organizations with a long track record of operation, which represents the mature businesses that have traditionally been the core of Indiana's manufacturing economy (CHART 3).**

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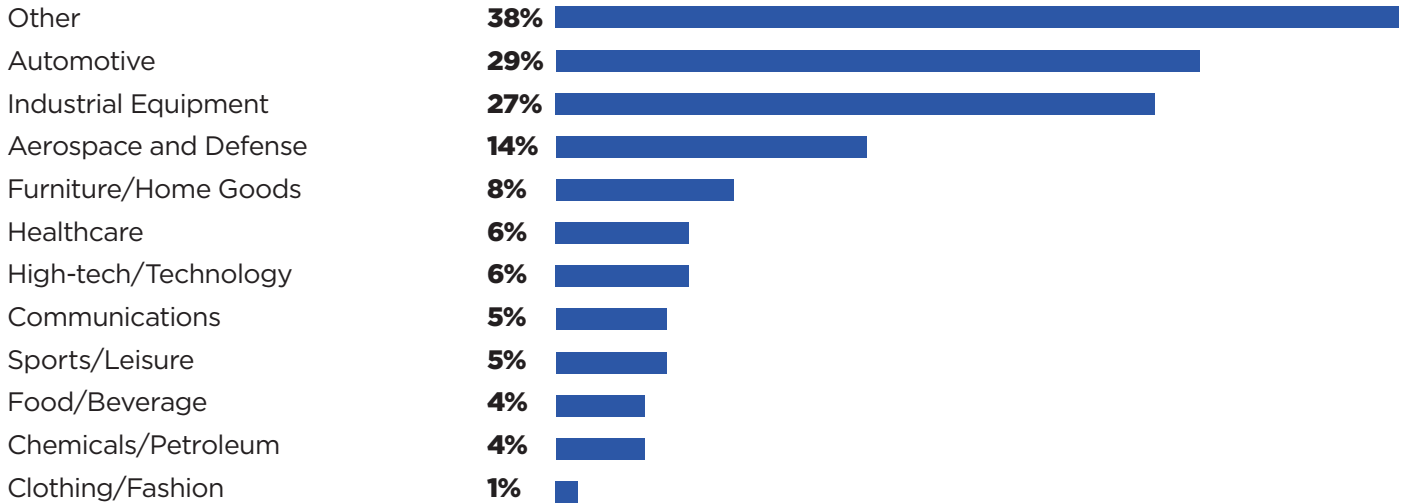
<sup>2</sup> <http://www.incontext.indiana.edu/2017/mar-apr/article2.asp>

<sup>3</sup> Fourth Economy. "Powering Industry 4.0: Strategic Plan 2019-2021." March 27, 2019. <https://cicpindiana.app.box.com/s/7g30am260t8rt2onbvhr7butlqOeikf>

<sup>4</sup> Fourth Economy. Ibid.

<sup>5</sup> "2019 Indiana Manufacturing Facts." Accessed May 20, 2020. <https://www.nam.org/state-manufacturing-data/2019-indiana-manufacturing-facts/>

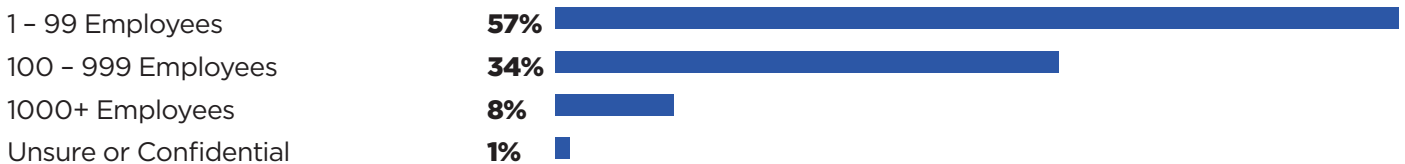
### CHART 1 SECTOR MIX RESPONDENTS



### CHART 2A COMPANY SIZE BY REVENUE



### CHART 2B COMPANY SIZE BY EMPLOYEES



### CHART 3 COMPANY AGE



# Technology Adoption: Technologies That Lead and Technologies That Lag

In the next decade, many of the technologies that once sounded farfetched will become reality for Indiana manufacturers. Tools that allow companies to pool data from a variety of different sources and predict and model different scenarios, as well as build machine learning into the factory, set up exponential opportunities in the near term.

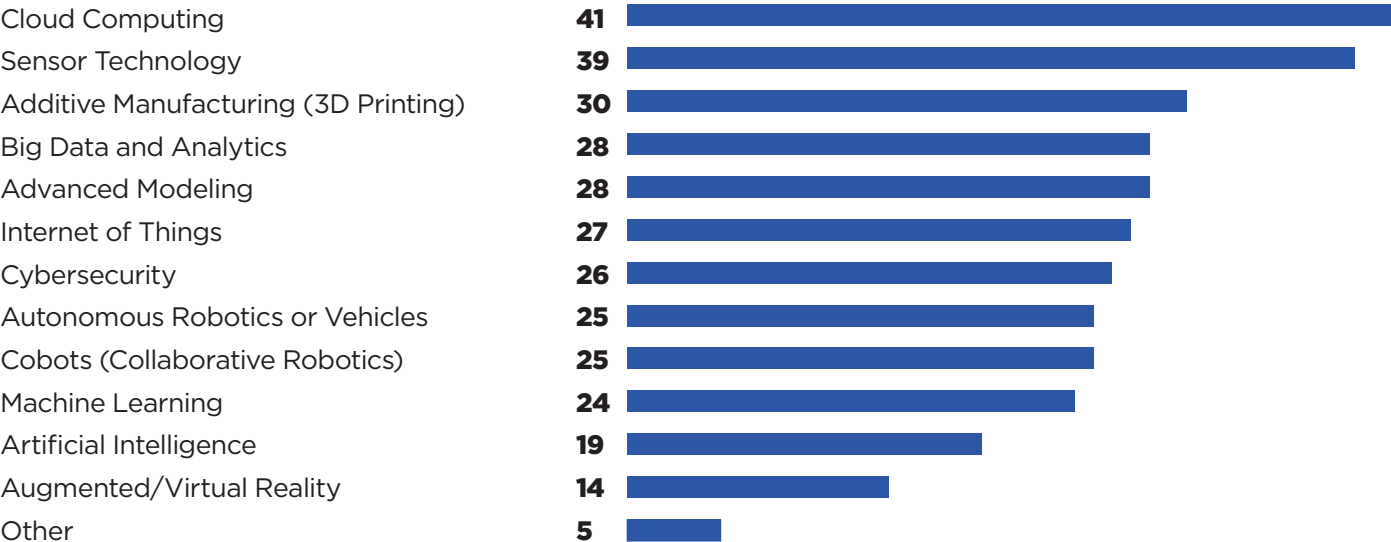
Just as mass production and assembly lines were supplemented with CNC machining and automation during the Second and Third Industrial Revolutions, we are well on our way into the Fourth Industrial Revolution – commonly referred to as Industry 4.0 – where autonomous technologies, smart systems and data and machine learning promise to significantly improve manufacturing operations.

When manufacturers were asked what Industry 4.0 technologies they expect to adopt first or which technologies they believe will be most in demand, they point to technologies that have experienced early success. **(CHART 4)**

Participants said that Cloud Computing, Sensor Technology, Big Data and Analytics, and Internet of Things are most anticipated. However, Additive Manufacturing also represents significant interest among manufacturers, despite its lack of prevalence and prominence to date. Several other technologies that have been slow to show benefit, including COBOTs, Machine Learning, Artificial Intelligence and Augmented and Virtual Reality, remain the least anticipated in the 5-year outlook among manufacturers.

Cloud Computing has a favorable outlook among manufacturers surveyed likely because of its enterprise-wide applications. Information technology (IT) departments are moving a number of functions to the cloud with software platforms for

**CHART 4 INDUSTRY 4.0 TECHNOLOGIES RESPONDENTS EXPECT TO IMPLEMENT BY 2025**



sales and business development (CRM), human resources (HR) and payroll, office productivity, accounting and Enterprise Resource Planning (ERP), among other functions.

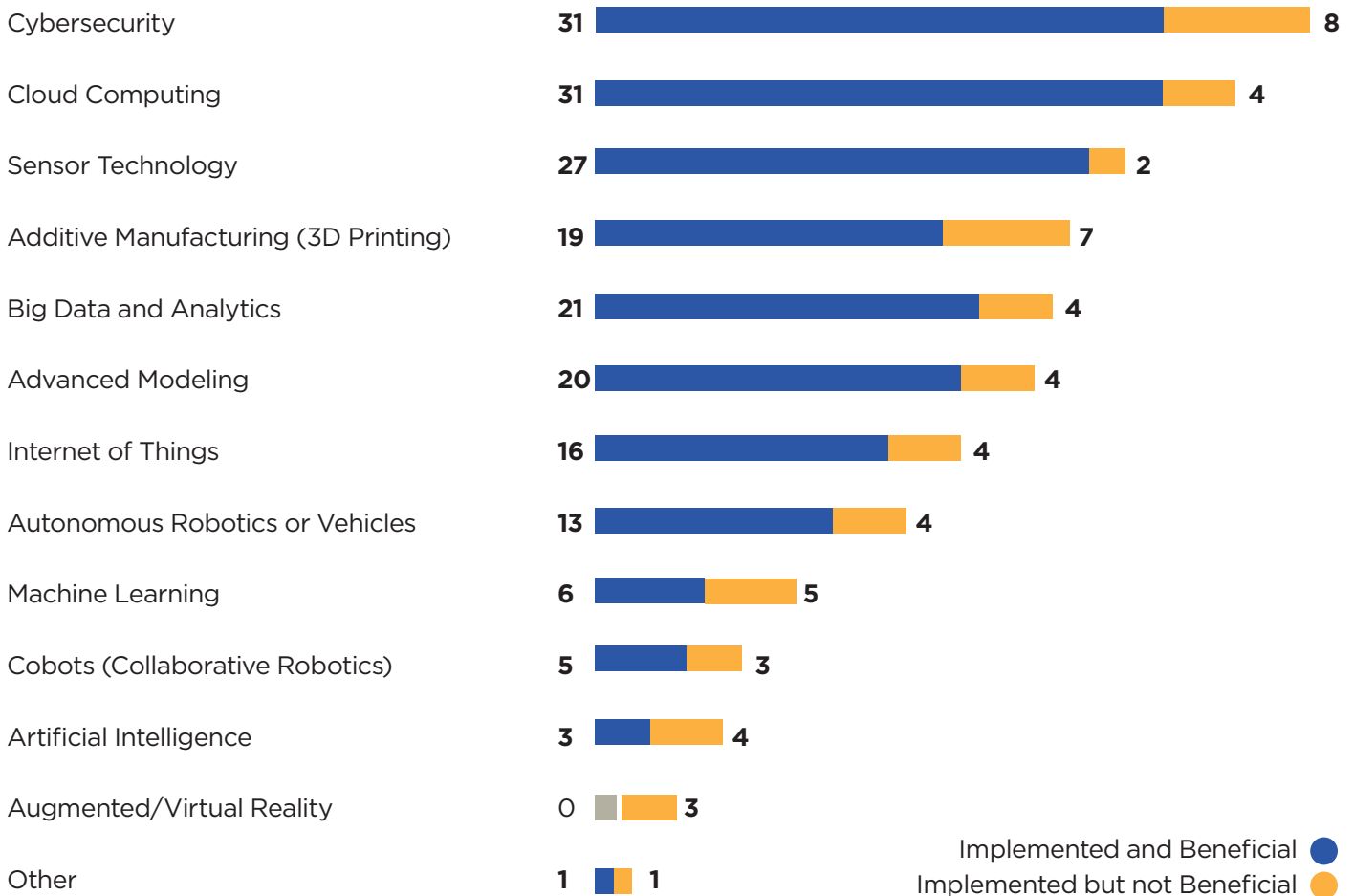
Operations technology (OT) departments within the manufacturing facility are gaining traction and may drive certain technology adoption trends. OT professionals bridge the gap between IT, who may have had limited exposure to the production floor, and the frontline production personnel, who are seeing a technology surge. OT management

are increasing or expanding manufacturing operations to the cloud.

Many technologies listed in the survey were rated as having been beneficial as opposed to not.

All eight of the most implemented technologies were overwhelmingly rated beneficial by manufacturers. These include: Cybersecurity, Cloud Computing, Sensor Technology, Additive Manufacturing, Big Data and Analytics, Advanced Modeling, Internet of Things, and Autonomous Robotics or Vehicles. **(CHART 5)**

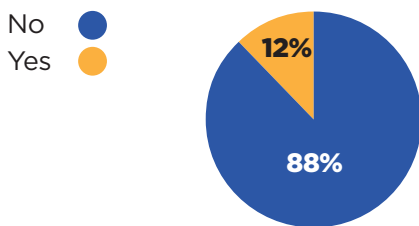
**CHART 5 INDUSTRY 4.0 TECHNOLOGIES IDENTIFIED AS BENEFICIAL**



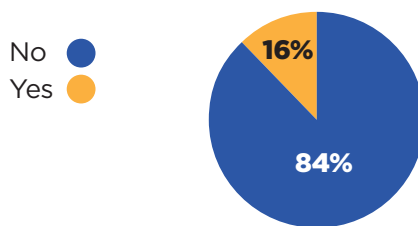
There was a far less distinguished difference between a technology being ranked as beneficial or not for the four least-implemented technologies (Machine Learning, COBOTS, Artificial Intelligence, and Augmented Reality/Virtual Reality). Two potential reasons: 1) these technologies have limited implementation because it's not as obvious that they will be beneficial, or 2) simply not enough implementations have occurred for manufacturers to make a benefit claim.

Interestingly, two of the most touted, potentially society-changing advanced technologies, Machine Learning and Artificial Intelligence, show very few instances of implementation among survey respondents. In instances of actual implementation, there is a nearly even split on whether implementations were beneficial. This could signal that Indiana manufacturers are still rising toward the "peak of inflated expectations" on the Gartner Hype Cycle<sup>6</sup> with relatively few Indiana manufacturers so far being early-adopters of these new and largely untested technologies.

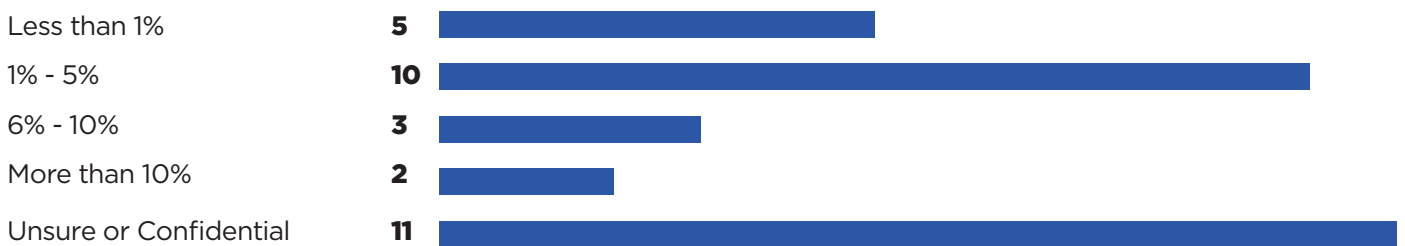
**CHART 6 STRATEGIC ROADMAP**



**CHART 8 DEDICATED BUDGET FOR TECHNOLOGY ADOPTION**



**CHART 7 PERCENTAGE OF REVENUE ALLOCATED FOR INDUSTRY 4.0**



**CHART 9 DEDICATED BUDGET FOR INDUSTRY 4.0 (BY EMPLOYEES)**



<sup>6</sup> Gartner. Op.Cit.



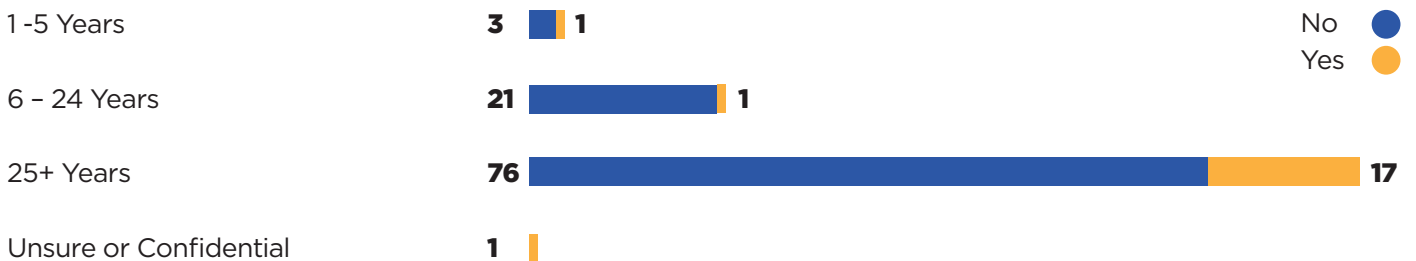
# Charting Indiana's Technology Adoption Rate

Because manufacturers have their own unique strategy for the markets in which they sell their product, there is no one universal approach to adopting new technologies. Companies adopt new technologies at various points throughout the evolution of their business. Some manufacturers have developed an Industry 4.0 roadmap (CHART 6) and invested a significant part of their R&D budget to new technologies (CHART 7), while others adopt technology ad hoc – for example to meet a customer’s specific need.

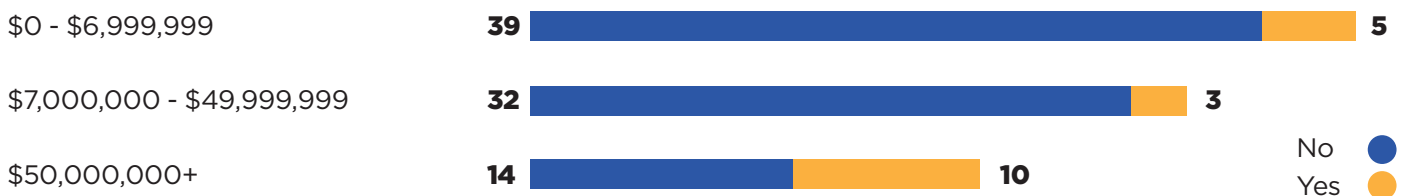
Larger, legacy manufacturing companies are more likely to dedicate a budget to technology adoption, with those expenditures often representing a significant portion of their total capital investment budgets.

Of the companies surveyed, 16 percent reported that they have budgeted for digital transformation. (CHART 8) Those with a dedicated budget are almost exclusively large, mature companies and budgeting progressively occurs with increasing company size measured by workforce, age and revenue. (CHARTS 9, 10 AND 11)

**CHART 10 DEDICATED BUDGET FOR INDUSTRY 4.0 (BY COMPANY AGE)**



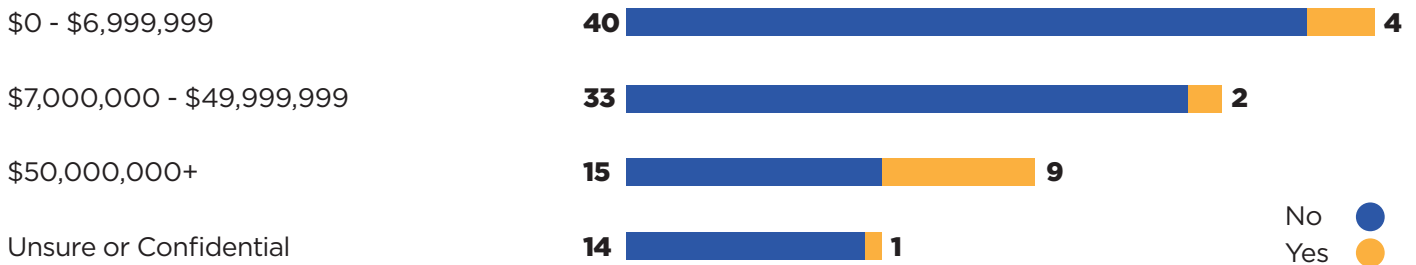
**CHART 11 DEDICATED BUDGET FOR INDUSTRY 4.0 (BY COMPANY REVENUE)**



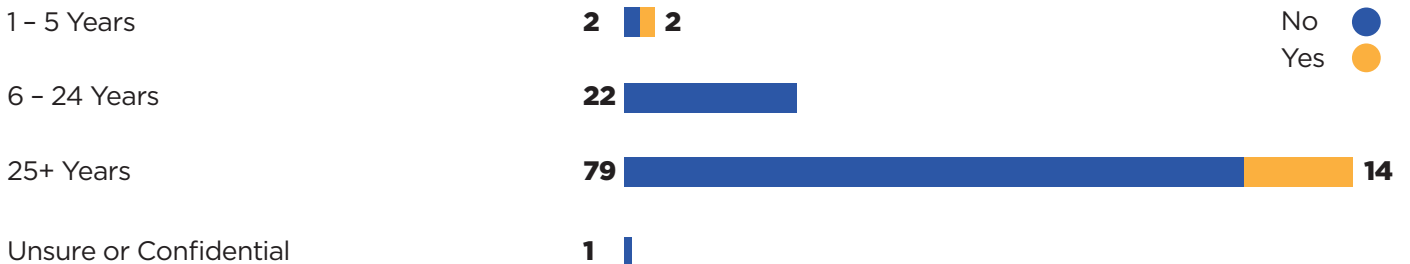
Larger, legacy companies are also the most likely to develop an Industry 4.0 roadmap toward adopting new technologies. (CHARTS 12, 13, 14)

It's apparent from the data that many companies beyond the 16 percent dedicating budget are successfully implementing technologies and seeing benefit from those implementations. (CHART 15)

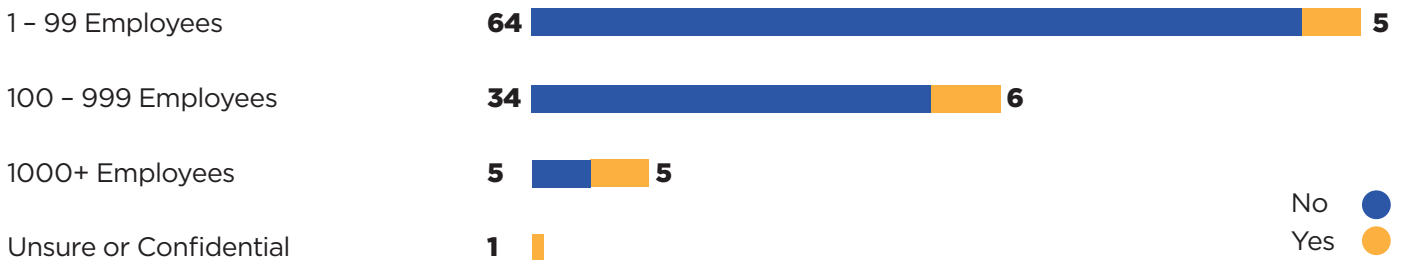
**CHART 12 STRATEGIC ROADMAP (BY COMPANY REVENUE)**



**CHART 13 STRATEGIC ROADMAP (BY COMPANY AGE)**



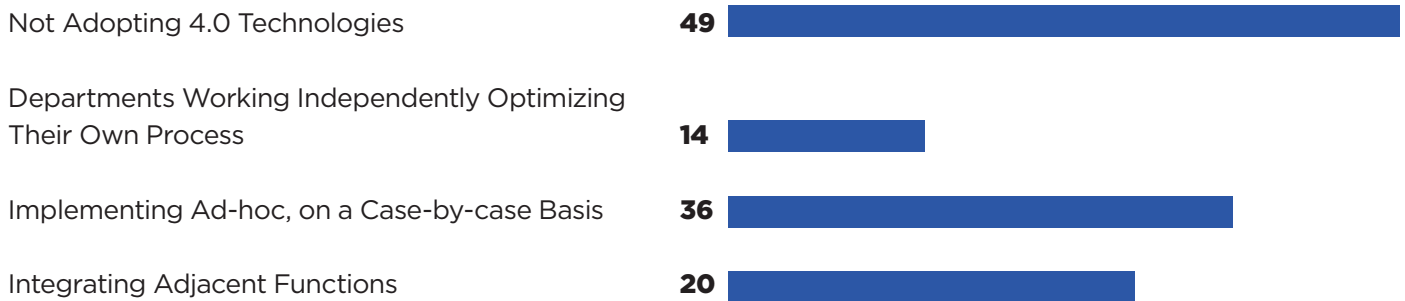
**CHART 14 STRATEGIC ROADMAP (BY EMPLOYEES)**



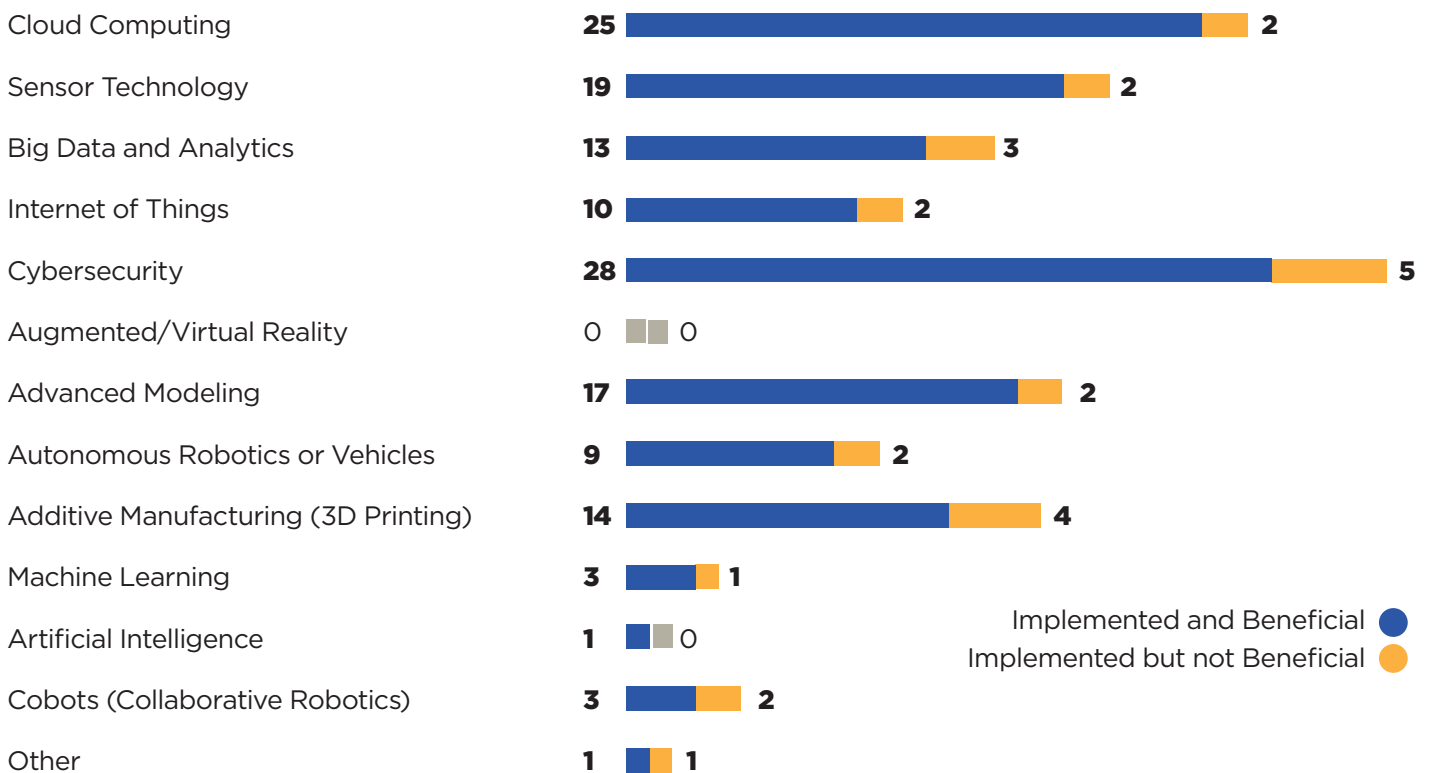
When the data is filtered to exclude those that have dedicated budgets or developed roadmaps, there are still a substantial number of successful and beneficial technology implementations across a wide array of technologies. (CHART 16) However, companies that are budgeting for technology implementation are generally

the same companies that have developed a roadmap for digital transformation. This suggests that Industry 4.0 roadmaps are perhaps an important part of the business case and return on investment (ROI) justification necessary to secure a dedicated budget. Further, the roadmaps may enhance the likelihood of success, thus

**CHART 15 INDUSTRY 4.0 STRATEGIES WITHOUT A ROADMAP**



**CHART 16 BENEFITS OF INDUSTRY 4.0 AMONG RESPONDENTS WITHOUT A ROADMAP OR BUDGET**



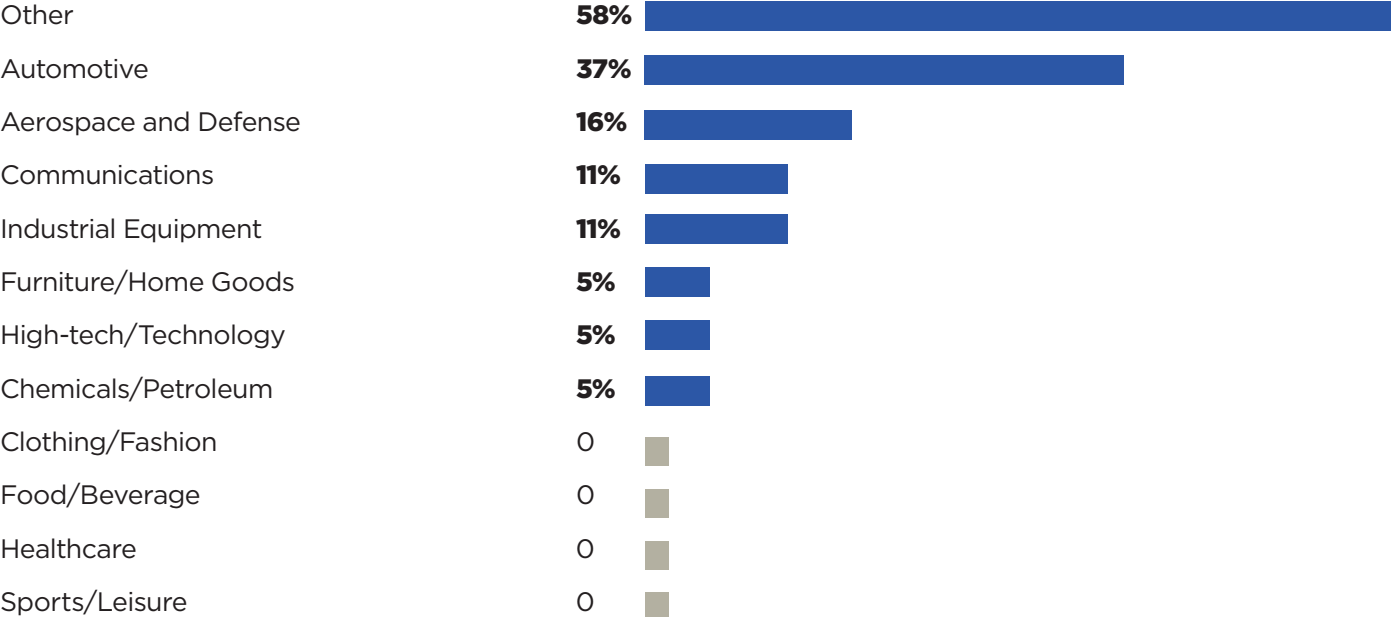
reinforcing and accelerating a cycle of digital transformation. There are signs, however, that very small operations (<\$7M revenue) are being more aggressive about budgeting for digital transformation while mid-revenue operations (\$7M - \$50M) are perhaps in a wait-and-see mode. This is different than when size is measured by number of employees. It's unclear as to why exactly this is the case, but it's easy to speculate. Companies strive for more revenue and not for more employees. Perhaps the smallest by revenue are the hungriest for growth and at least some of them see technology adoption as an opportunity path.

Some of the largest and most mature companies in Indiana include automotive and aerospace and defense companies. Those companies were also well-represented in the survey results, and it's no surprise

that they are among the industry sectors reporting a dedicated budget for technology adoption. In addition, manufacturers in the communications sector and those who do not associate themselves with one of the categories listed in the survey say they are dedicating a budget toward technology adoption.

Surprisingly, all other sectors indicated that they are tending to not invest in Industry 4.0 technology transformation, although those companies were well represented as survey respondents. For example, 27 percent of respondents produce industrial equipment, yet that important Hoosier manufacturing sector represented only 11 percent of those budgeting for technology adoption. **(CHART 17)**

**CHART 17 SECTOR MIX WITH DEDICATED BUDGET**



# Technology Adoption: The Business Case

Companies are adopting – or are considering adopting – new technologies for three distinct reasons:

## 1) Enhancing/Optimizing Workforce Productivity

## 2) Eliminating/Reducing Errors

## 3) Improving Customer Experience

Clustered right behind those top priorities are Increasing Efficiency, Supply Chain Integration and Automation, which in

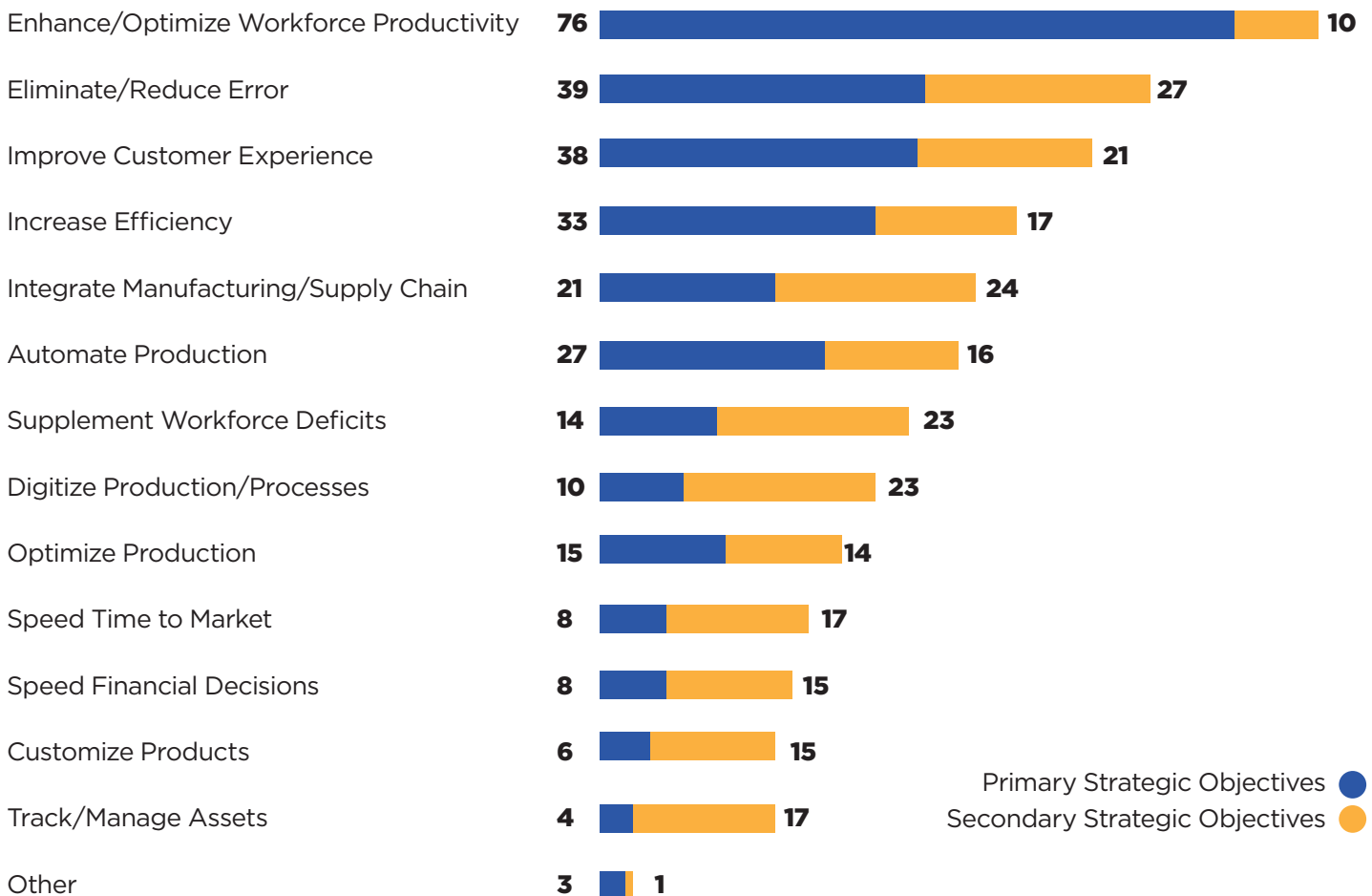
various ways all relate to the top priority of productivity. (CHART 18)

However, no objective in the list of more than a dozen received less than 20 responses as either a primary or secondary rationale for implementation.

This illustrates and emphasizes that today’s advanced manufacturer is juggling a complex set of demands with high (and growing) expectations for meeting all of them.

In fact, the low-hanging fruit of focusing on just a few objectives is passing; hence the business case for adopting Industry 4.0 is complex.

**CHART 18 PRIMARY/SECONDARY OBJECTIVES OF INDUSTRY 4.0**



*“The Caterpillar Lafayette Engine Center has had a tremendous run over more than 35 years. The new technologies we are implementing now are complementary tools that we didn’t have before. Technologies, like additive that we are utilizing, allow us to do our work with fewer resources, fewer quality issues and overall increased efficiency. For example, additive allows us to manufacture parts that are difficult to make using traditional methods and make them faster without any external help. We are improving our competitive advantage to meet customer needs.*

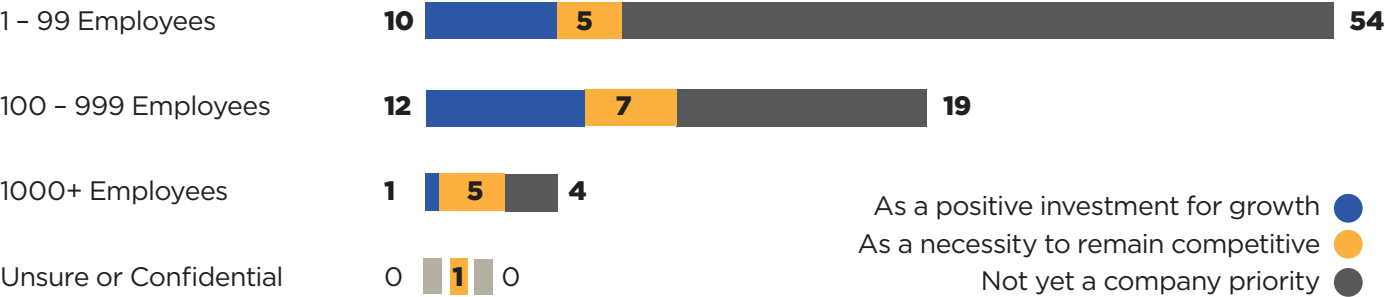
*Don’t chase the shiny object. Unless there’s a business case for it, don’t do it. Also, do it at the pace that you can absorb both financially and culturally.”*

**Alpen N. Patel, Technical Services Manager,  
Caterpillar – Lafayette Engine Center**

There is a clear difference in participant responses based on company size as to why technology is being adopted. Large companies are implementing Industry 4.0 technology because they say it’s necessary to stay competitive, while smaller companies see it as an investment for growth, if they see it as important at all.

While a majority of large companies indicate that Industry 4.0 technology is a priority, it becomes progressively less of a priority with smaller and smaller companies. However, smaller companies that do see such technology as a priority are more interested in its potential than view it as a threat, and that is true by a 2:1 ratio. Mid-sized companies see more potential as well, but not quite to the same ratio. **(CHART 19)**

**CHART 19 COMPANY PERCEPTION OF INDUSTRY 4.0 (BY COMPANY SIZE)**



# Barriers to Technology Adoption

Previous Conexus Indiana research showed that 65 percent of Indiana firms with fewer than 500 employees considered technology disruption a medium- to large threat and identified the lack of resources to support technology and innovation adoption as a barrier to their success<sup>7</sup>.

Manufacturers identified similar barriers in this study with lack of budget clearly indicated as the biggest obstacle to Industry 4.0 technology implementation. This is

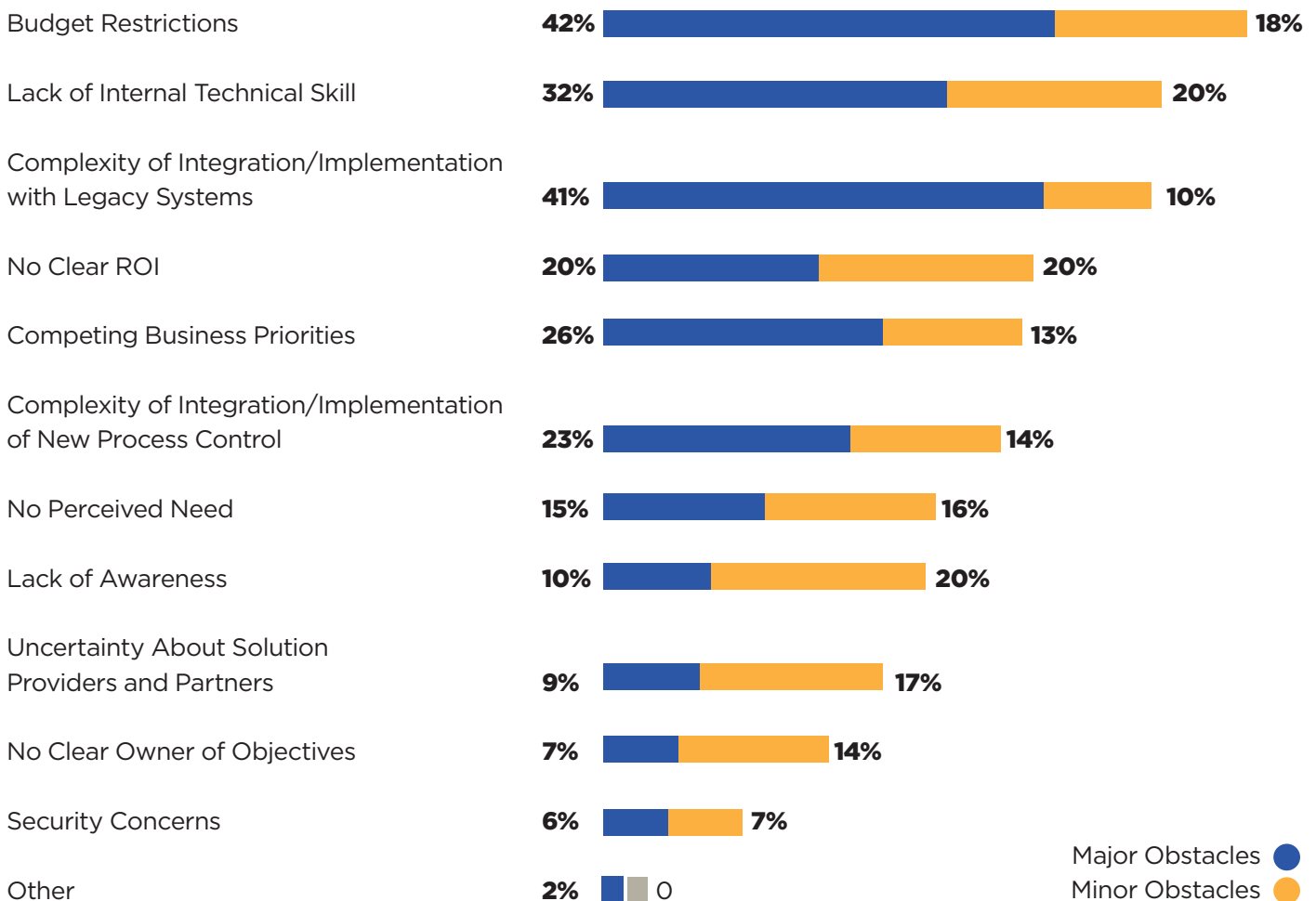
not surprising, given that only 16 percent of respondents said they have a budget.

## (CHART 20)

Why is that so?

The most obvious answer is that many are simply unaware that 1) these futuristic sounding technologies have actually progressed to a point where they are commercial ready with implementation friendly solutions targeted at manufacturing use cases, and 2) the technologies are converging under a broad phenomenon commonly referred to as Industry 4.0.

**CHART 20 OBSTACLES TO ADOPTION (ALL RESPONDENTS)**



<sup>7</sup>Fourth Economy, Op.Cit.

This is supported by comments from survey respondents that include:

**“THIS IS THE FIRST WE’VE HEARD OF INDUSTRY 4.0.”**

**“WE DO NOT KNOW WHAT INDUSTRY 4.0 IS.”**

**“I DON’T KNOW WHAT THIS IS. FIRST I’VE HEARD OF IT.”**

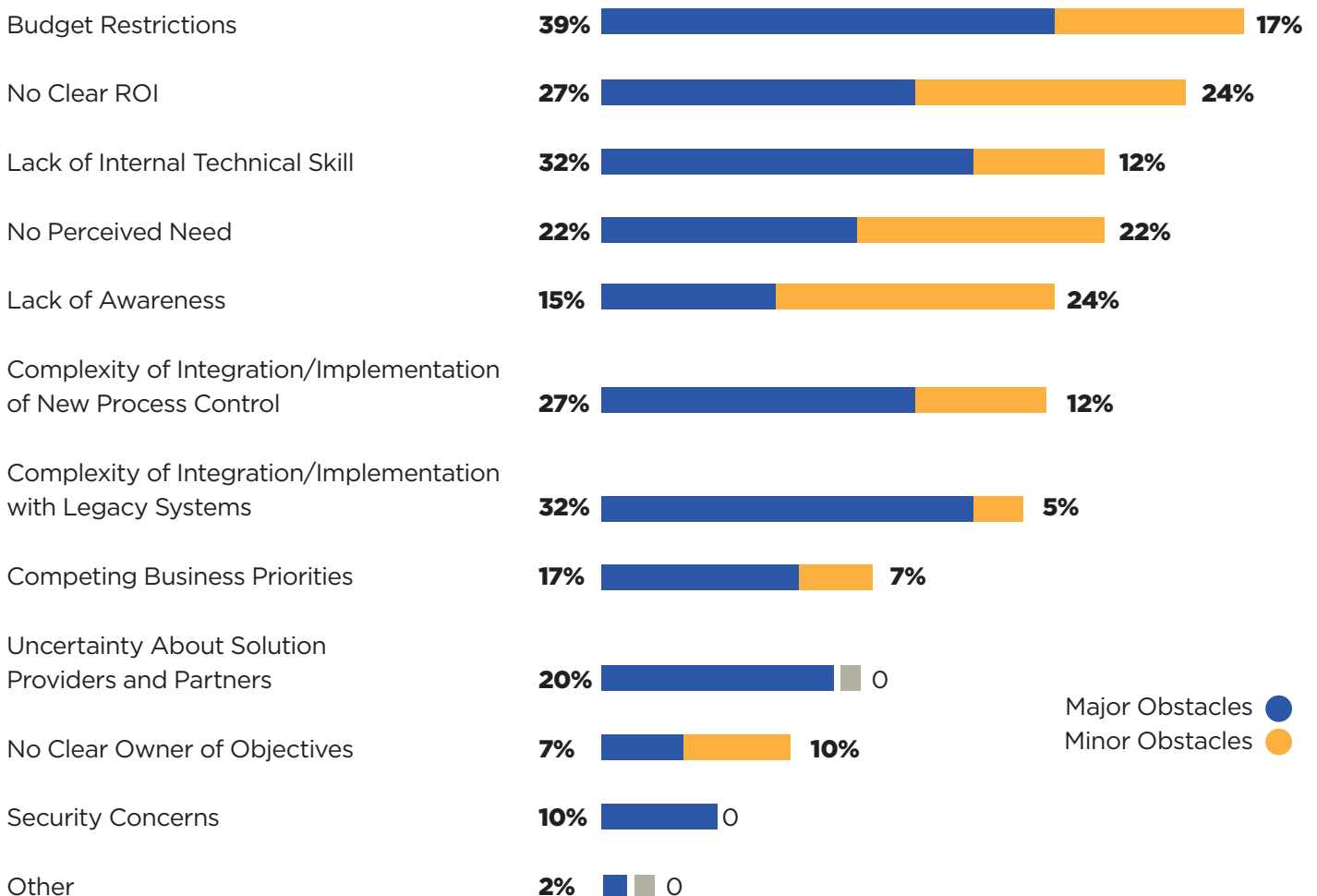
**“(WE) HAVE NOT ADOPTED ANY OF THESE.”**

**“(WE) NEED TO KNOW MORE ABOUT (INDUSTRY 4.0) TECHNOLOGY TO MAKE (A) GOOD EVALUATION.”**

This is further compounded by a confusion of terminology as advanced manufacturing and logistics (AML), Industry 4.0, smart manufacturing, and digital transformation are often interchanged as synonyms. One way to think about it is that Industry 4.0 is a collection of technologies relevant to AML’s, digital transformation is the process of applying those technologies and smart manufacturing is the end state that is achieved.

Even for those who are aware and interested in making technology investments there are still serious barriers related to complexity

**CHART 21 OBSTACLES TO ADOPTION (SMALL COMPANY)**



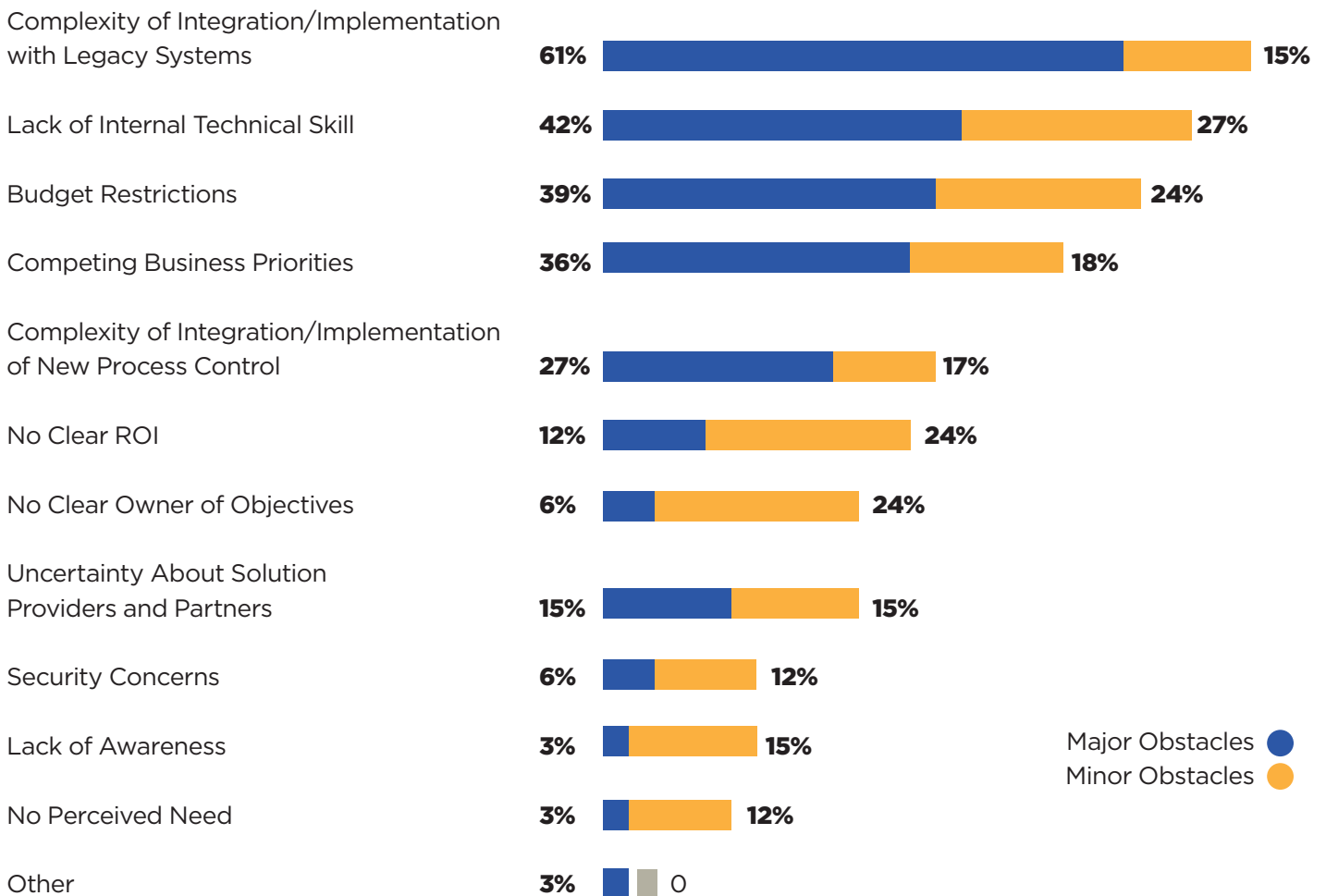


and lack of technical skill, both of which were also highly rated in the survey as obstacles. Further, complexity seems to be related to the maturity of the Indiana landscape. There is a significant difference in the number of times complexity was cited for integrating with legacy systems as opposed to being cited for implementing new process control. This is expected as it's easier to tackle a greenfield project than a modernization project. It indicates that Indiana might be at some degree of disadvantage to other less manufacturing centric regions that have lower barriers to entry. The number of legacy companies and the intensity of

the industry in Indiana suggest that more companies would adopt technology through modernization.

Security concerns were the least cited barrier. This could be due to companies having no problem justifying implementation when security is the driver, or perhaps they have a false sense of security and plan to act only when an issue arises. Alternatively, because many manufacturers have upgraded their cybersecurity systems and protocols in recent years, they may not be that worried now about securing Industry 4.0 technologies.

**CHART 22 OBSTACLES TO ADOPTION (LARGE COMPANY)**

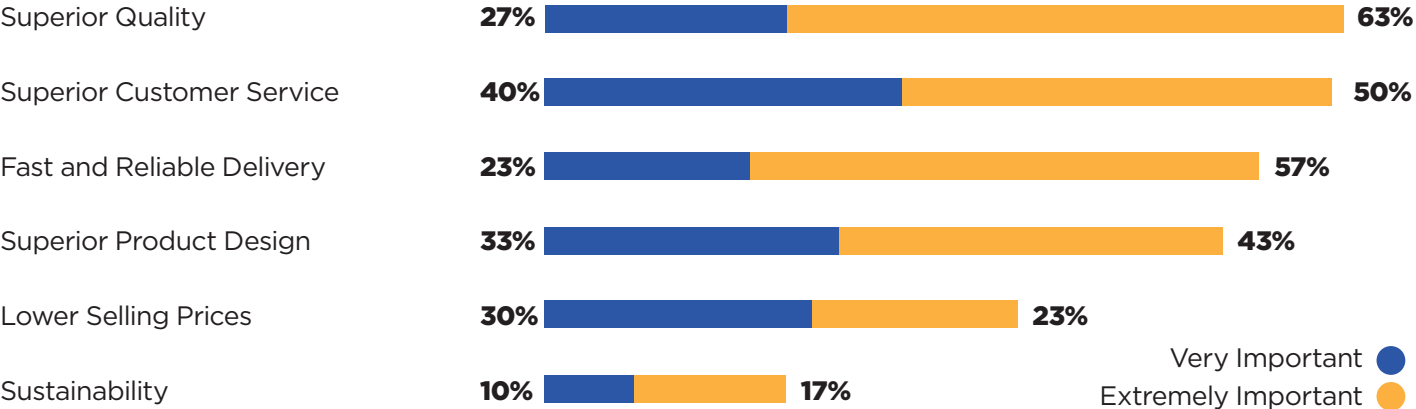


Responses varied slightly, as well, between small and larger companies. **(CHART 21, 22)** Large companies indicated transitioning to digital technologies is complex because of legacy systems and they lacked the skilled talent to make the transition. For small companies, the primary hurdle was a relative lack of budgetary funds and a perceived lack of return on investment.

The good news for those small companies citing ROI as a barrier is that a business case justification might be easier to overcome

than the very real challenges of updating or retrofitting legacy systems. The survey showed that customers care about service, quality, speed and product design; in that order. **(CHART 23)** Technology adoption, if properly executed, almost always offers immediate positive impact on quality, speed, and service (the top three priorities) even if it is costly in the near-term to implement. Fortunately, capital investment is a distant fifth on the list of hurdles; perhaps leaving room for investment if the ROI case is carefully constructed.

**CHART 23 ATTRIBUTES IMPORTANT TO SECURE CUSTOMER ORDERS**



# Industry 4.0 Impact on Hoosier Workforce

We have all seen headlines like these; “Robots ‘to replace up to 20 million factory jobs’ by 2030<sup>8</sup>”? Or, will “hundreds of millions of people worldwide ... have to find new jobs or learn new skills”?<sup>9</sup> It’s hard not to be concerned about how technology may impact the workforce in the not too distant future, but there have been some positive findings from the manufacturers on the leading edge of digital transformation.

The report: *Fourth Industrial Revolution: Beacons of Technology and Innovation in Manufacturing*,<sup>10</sup> by the World Economic Forum, in collaboration with McKinsey & Company, states that Lighthouse Manufacturers or those global firms that are providing “real-world evidence to dispel widespread myths and misunderstandings

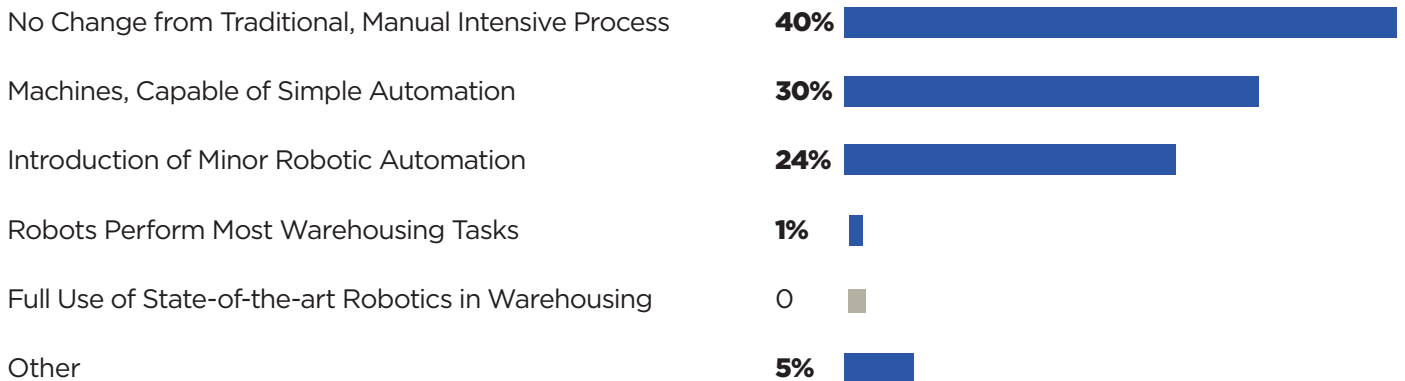
posing obstacles to innovative technology adoption at scale” are “not deploying Fourth Industrial Revolution technology to replace operators...[the] report suggests that less than 5% of occupations consist of activities that are 100% automatable with today’s technology, while 62% of occupations have at least 30% of automatable tasks. Consequently, employees in production enjoy a working routine which is becoming less repetitive, but more interesting, diversified, and productive.”

Suffice it to say that machines are not wholesale replacing workers, but workers’ jobs are certainly changing and they will continue to evolve. It’s a story consistent with manufacturing’s history.

Among companies responding to the survey, automation is starting to take over the simplest of tasks, but there remains a very high reliance on human-machine interactions. **(CHART 24 & 25)**

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## CHART 24 ROBOTIC AUTOMATION



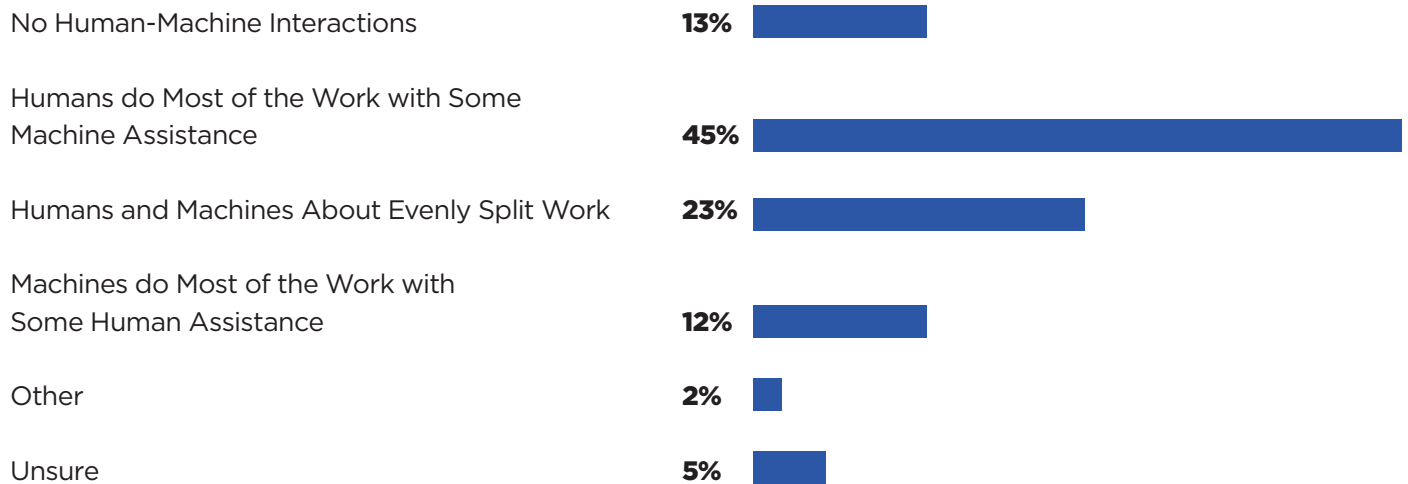
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<sup>8</sup> BBC News. “Robots ‘to replace up to 20 million factory jobs’ by 2030.” June 26, 2019. <https://www.bbc.com/news/business-48760799>

<sup>9</sup> CNN politics. “The robots are coming for your job, too.” September 3, 2019. <https://www.cnn.com/2019/08/24/politics/economy-us-workforce-automation/index.html>

<sup>10</sup> World Economic Forum and McKinsey & Company. “Fourth Industrial Revolution: Beacons of Technology and Innovation in Manufacturing.” Accessed May 20, 2020. <https://www.cnn.com/2019/08/24/politics/economy-us-workforce-automation/index.html>

## CHART 25 HUMAN-MACHINE INTERACTION IN PRODUCTION



The more worrisome trend is that most Hoosier manufacturers have yet to start a journey toward leveraging automation, which could ultimately put all of their employees at risk should their business' competitiveness erode.

Automation is anticipated to continue freeing workers from the most mundane and repetitive of tasks and improving safety, but as it proliferates it will require better trained and more highly skilled workers to interact with and maintain it.

As advanced technologies get more affordable and capable, Indiana's manufacturers should continue investing in these to remain competitive. While the heart and soul of Hoosier manufacturing is always going to be its workforce, without an Industry 4.0 strategy and the tools to help them succeed in their markets, our state risks falling behind increasingly tougher global competition. In short, Industry 4.0 investments in technology and automation as well as workforce development are indispensable to Indiana's competitiveness.

If even a fraction of the broad spectrum of anticipated technology actually materializes, then the skill sets for many in the workforce will be very different 5 years from now.

Conversely, if Industry 4.0 technology doesn't materialize in Indiana but does elsewhere, then the largest contributor to Indiana's GDP will lose ground in global competitiveness.

The COVID-19 crisis puts this into sharper focus as Brookings predicts that "any coronavirus-related recession is likely to bring about a spike in labor-replacing automation." Additionally, "employers [may] shed less-skilled workers and replace them with technology and higher-skilled workers." This economic crisis may increase technology adoption, and in turn speed up the need for current workers to "upskill" to remain competitive in the labor market .

This implies a possibility that while the COVID-19 crisis may shed a tremendous amount of jobs, it may not significantly free up much capacity in the very tight labor market for highly skilled workers. If a large mismatch grows and persists between the skills that are in demand and the skills that are available then it is to be expected that the next wave of technology adoption may start to focus on technologies that can either augment skills or accelerate skill acquisition.

# Conclusion

There is little doubt that Industry 4.0 is here to stay and will dramatically change how products are made and moved. Indiana manufacturers are in varying stages of technology adoption with larger companies the most likely to have a dedicated budget and roadmap for Industry 4.0. Smaller and mid-sized companies are embracing digital technologies, but not with the necessary budget and detailed plans to standardize enterprise-wide adoption.

Key findings from this report include:

- **Companies are pursuing new Industry 4.0 technologies to enhance workforce productivity, eliminate/reduce errors, and improve customer experience;**
- **The labor market will be impacted by Industry 4.0 technology, but not by displacing workers. Instead, jobs are going to change and workers will need different and higher-level skills; and**
- **Access to capital is a major impediment to technology adoption, especially among smaller companies that haven't yet created an Industry 4.0 roadmap or budget for this type of technology adoption.**

Since its inception in 2007, Conexus Indiana has served as a catalyst, convener and champion for the advanced manufacturing and logistics industries with a focus on preparing workforces and helping Hoosier companies seize opportunities to strengthen Indiana's "Crossroads of America" advantage. Conexus Indiana and its industry, education and public-sector partners are in a unique position to help ensure Indiana manufacturers – large, mid-size and small – adopt Industry 4.0 technologies to stay competitive and maintain a national industry leadership position.

This study's results reinforce Conexus Indiana's role in leading its stakeholders toward collective impact in an Industry 4.0 environment.

Specifically:

- **Conexus Indiana has built a robust network of industry leaders for collective action. This platform supports knowledge exchange among peers and helps companies make decisions about future operations. Conexus Indiana will use its networked community to allow manufacturers to share Industry 4.0 best practices.**
- **Conexus Indiana will elevate the conversation around Industry 4.0 and encourage its partners to do the same. The goal will be to increase familiarity and fluency with new technologies and drive widespread adoption of the technologies.**
- **Conexus Indiana will work to identify funding streams and pathways to access funds for small and medium sized manufacturers looking to take their first step(s) with Industry 4.0 technology adoption.**

**This includes the manufacturing readiness grant program established in partnership with the Indiana Economic Development Corporation (IEDC) to provide matching grants of up to \$200,000 to companies committing to modernizing their operations or integrating smart technologies and processes in order to improve capacity, or to companies investing in health care manufacturing technology supporting critical COVID-19 response efforts.**

- **Conexus Indiana will identify ways to ensure its talent development programs upskill today's workforce for tomorrow's technologies.**