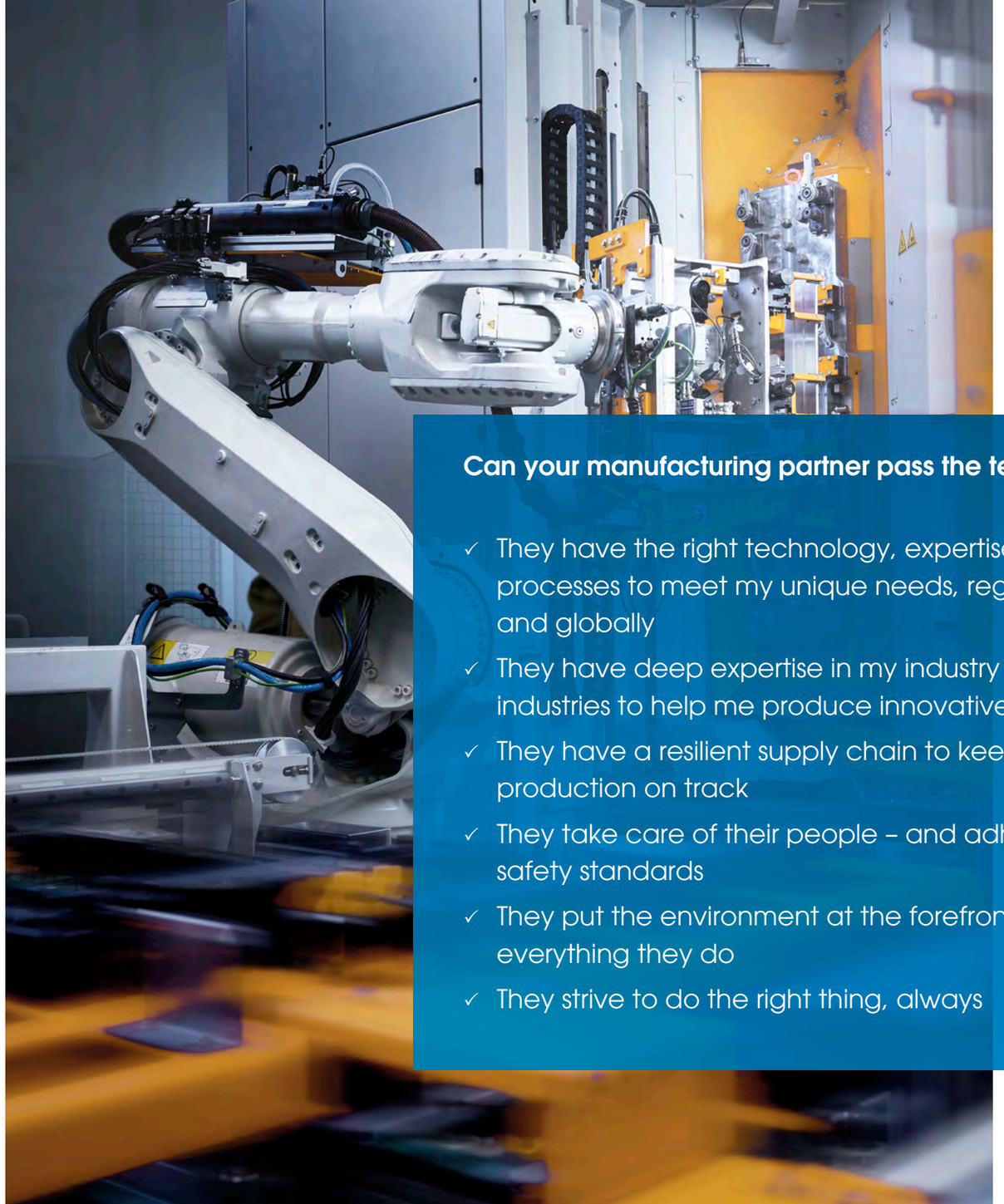
The seven questions you should ask before selecting your manufacturing partner

flex

In today's world, your customers want more, expect more and demand more. In the communications industry, for example, they expect to connect everything, faster. When it comes to healthcare, they demand quality – and trust is a matter of utmost importance. The same holds true for automotive, industrial and consumer products. Nothing stands still for long, putting enormous pressure on companies like yours to move quickly – with innovation and superior quality.

There's also a growing awareness and mandate among discerning customers to support sustainability. This includes reducing the impact on our environment, as well as upholding commitments to fair, safe labor practices, everywhere.

At the same time – with Industry 4.0 – you have an incredible opportunity to become more agile, increasing your time to market. With the right partner, you can also consistently boost quality to increase customer satisfaction. You can even support sustainability across your product line. All while being responsive to your customers' unique needs – and winning market share.



Can your manufacturing partner pass the test?

- ✓ They have the right technology, expertise and processes to meet my unique needs, regionally and globally
- ✓ They have deep expertise in my industry and across industries to help me produce innovative products
- ✓ They have a resilient supply chain to keep my production on track
- ✓ They take care of their people – and adhere to all safety standards
- ✓ They put the environment at the forefront of everything they do
- ✓ They strive to do the right thing, always

But how do you select the right partner?

The first step is to ensure you're partnering with a manufacturer who's adopted a portfolio of advanced capabilities and technologies to create a "smart" factory. A factory where predictive maintenance prevents shutdowns, where advanced analytics enable better decision making and where productivity is maximized. These are just a few of the benefits you'll realize by selecting a manufacturing partner who's an early adopter, and frequent investor, in Industry 4.0 technologies.

Other benefits you should look for include:

- FLEXIBLE, RESILIENT MANUFACTURING MODELS
- A TRUSTED SUPPLY CHAIN
- CONSISTENT QUALITY AND EFFICIENCY

Across the board, accept nothing less than disciplined, expert execution to ensure your manufacturing requirements are not only met but exceeded.

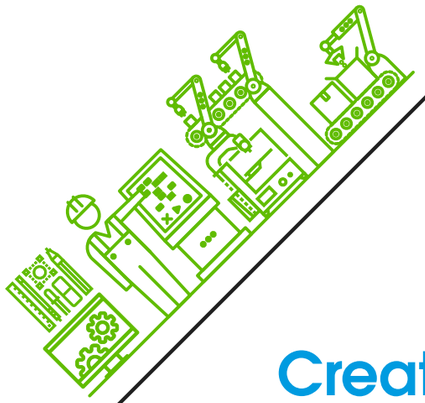
By selecting to partner with an advanced manufacturer, you have a powerful gateway to the expertise you need – today and into the future. As products become more complex, and your requirements shift and grow, you can take you products to the next level.

What it takes to build extraordinary products

Optimized manufacturing

- Access fast, flexible, resilient models
- Meet your unique needs, every time
- Realize your vision, achieve your business goals
- Maintain your progress and stay on target

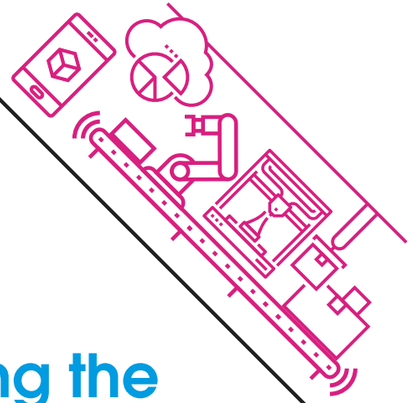
…no matter the market forces you face.



Industry 4.0 technologies

- Deliver industry-leading, customized products
- Speed your time-to-market and improve yields
- Gain visibility with real-time supply chain data
- Respond rapidly in a dynamic environment

…no matter the complexity of your products.



Creating the extraordinary. Together.

Customer value

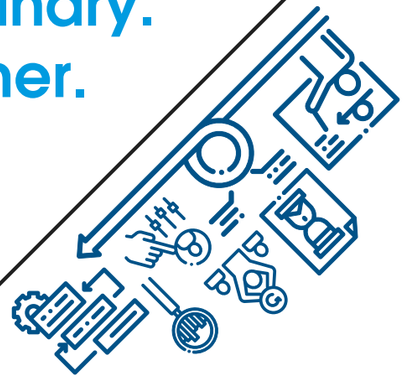
- Take advantage of design and innovation expertise
- Reduce your environmental impact
- Rely on fair labor practices, safe working conditions
- Ensure end-to-end product visibility and traceability

…no matter your region or market.

Quality and efficiency

- Experience a culture of continuous improvement
- Adhere to regulatory compliance with confidence
- Benefit from standards-based, disciplined execution
- Leverage certified quality management systems

…no matter your manufacturing requirements.



flex

Before making a multi-year commitment to a manufacturer, explore the following seven questions. And truly get to know the manufacturer you're considering. Do you feel confident they understand your needs, your values and your vision? This relationship building is an important part of a successful, long-term partnership.

Pre-screen prospective partners with the following seven questions:

1. How can my company remain competitive amid constantly changing environments?
2. Can my manufacturer help me design for excellence? How does this work and why is it important?
3. I want a partner who adopts the latest manufacturing technologies. What are the Industry 4.0 technologies that really matter?
4. How can I be sure my manufacturing partner can meet my complex needs?
5. Does my manufacturer support sustainability across the lifecycle?
6. What standards and methodologies should my manufacturing partner be an expert in?
7. How can I get to market quickly, without sacrificing product quality?

1

How can my company remain competitive amid constantly changing environments?

In today's highly volatile environment, it's critical to work with a manufacturer who understands your market and has optimized its manufacturing models for flexibility, time-to-market, resiliency and end-market requirements to deliver maximum value. A highly adaptable and resilient supply chain and manufacturing infrastructure enables you to meet product launch goals.

If you're looking to transition large-scale production to a single location, or need the ability to simultaneously manufacture complex products in multiple locations, your potential partner should be able to clearly demonstrate these capabilities.

1

The manufacturer you select should also have proven processes to ensure a seamless/optimized transition from design to manufacturing, both regionally and globally. Plus, support for reverse logistics services, so you can sustainably extend the lifespan of products, derive residual value and realize the savings that returns, repairs and recycling can bring to your business.

When it comes to supply chain, be on the lookout for flexibility. An extensive global and regional network of suppliers allows a manufacturer to react faster to global events such as trade wars, natural disasters, health crises and more. It also helps in planning ahead for surges or declines in product demand. You can check on this by making sure your manufacturer has the real-time data and know-how to make rapid supply chain and manufacturing adjustments to respond to a dynamic environment.

Knowing that your partner has visibility to real-time data and the ability to make rapid adjustments means you can confidently focus on your core competencies and competitive advantage.

2

Can my manufacturer help me design for excellence? How does this work and why is it important?

Design-for-manufacturing services help you realize the best possible manufacturing yield, quality and cost. The best manufacturing partners bring technical knowledge and processes that enable you to meet or exceed your desired product specifications and quality as you ramp and scale production.

In addition to offering these services, it's critical to consider where they're offered. They need to be available in the locations where you want to have your products built.

Design for excellence, including global reach, provides you vast access to systematic and cross-functional design methodology, tools, disciplines and capabilities. As a result, you can proactively optimize product design in the product creation process. It's ideal to be able to select from an array of services to make sure you have a seamless and optimized transition from design to the factory.

2

To boost your agility, look for a manufacturing partner who is an expert in:

- Advanced mechanicals
- Assembly and test technology
- Deep domain knowledge of material science
- Fiber optics and optical networking
- Miniaturization
- Reliability and failure analysis

As your product evolves, your requirements will change. To make sure you have access to the most flexible and deep "design for x" services possible, partner with a manufacturer offering a full suite of services, such as:

- DFAUT: Design for Automation
- DFC: Design for Cost
- DFM: Design for Manufacturing printed circuit and assembly board
- DFMA: Design for Mechanical Assembly for box build
- DFR: Design for Reliability
- DFT : Design for Test
- DFTSA: Design for Tolerance Stack-up Analysis
- FEA: Finite Element Analysis
- PCBA (Printed Circuit Board Assembly) Panel Array
- Tooling (Assembly fixtures) verification

flex

3

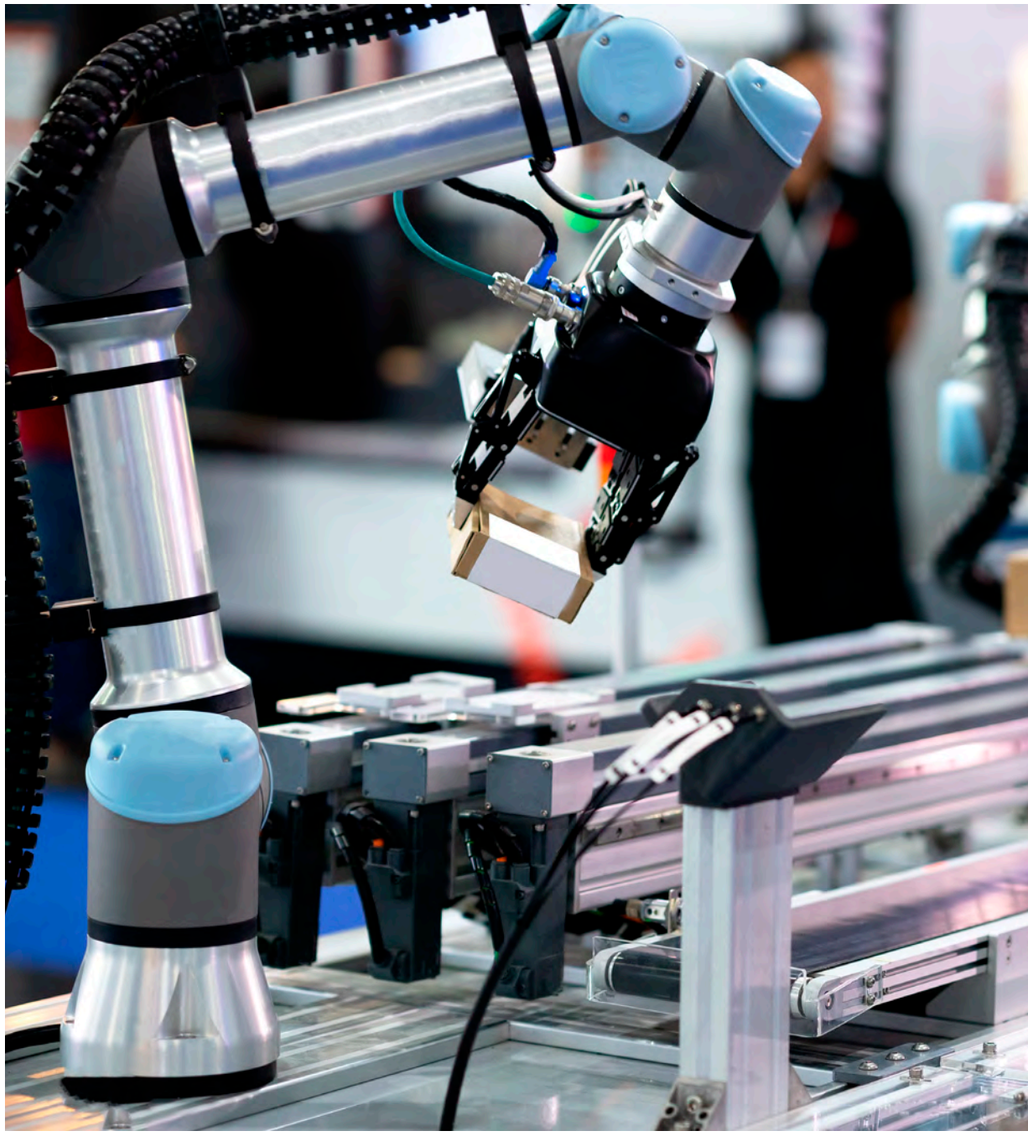
I want a partner who adopts the latest manufacturing technologies. What are the Industry 4.0 technologies that really matter?

Whether you need to reduce time-to-market, scale complex manufacturing processes, improve yields or streamline prototyping, advanced technologies and capabilities can help you realize your manufacturing goals.

The evolving Industry 4.0 landscape includes five essential advanced manufacturing technologies:

- ADVANCED SIMULATION
- DIGITIZATION
- ADDITIVE MANUFACTURING
- AUTOMATION AND ROBOTICS
- REAL-TIME SUPPLY CHAIN DATA

Look for a manufacturing partner who is deploying these technologies and has invested intellectual capital to establish proven processes and best practices.



3

ADVANCED SIMULATION

Real-time, advanced simulation capabilities accelerate customer product startup, improve yields and reduce ramp costs.

Simulation helps you get the answers you need that would otherwise be delayed until a real environment has been developed. This information helps reduce risk. It also helps you avoid problems that could slow the ramp or stop the production of your product completely.

In general, there are three types of advanced simulation: product, physical and industrial. Each of these disciplines has its own evaluation criteria; however, they each require a very detailed project scope to determine appropriate input variables. These variables are needed to successfully complete a simulation and deliver high-quality, cost-effective and optimal results.

For example, some basic operational data might be used to establish a baseline. This could include layouts, build of materials, capacity analysis, headcount allocation, machine layouts, sequence of events, desired production output and ramp plans.

Advanced simulation is the digitization of Lean manufacturing and Six Sigma methodologies. It does an incredible job of optimizing the manufacturing process. With advanced simulation, you get it right the first time.

3

Advanced simulation benefits

PROJECT MANAGEMENT BENEFIT

- Early understanding of the key parameters and complexity of a project, which helps with informed decision making prior to physical manifestation of a building, equipment and workflows.

TECHNOLOGY BENEFITS

- Complex manufacturing processes can be modeled and issues anticipated through Discrete Event Simulation (DES). While real-world systems with stochastic elements can't always be mathematically modeled and evaluated – or be represented graphically or with objects – they can be modeled and analyzed using DES. This can help with decision making and lead to improvements. In cases where a system is large and complex, DES is the only way to study it and make improvements.
- Try before doing. Since DES is a representative of a physical system, it allows the testing and experimentation under various scenarios.
- Advanced simulation allows the manufacturer to test "what if" scenarios, saving time, resources and capital.

OPERATIONAL BENEFITS

- Clear understanding of a project's scope.
- A drastic reduction in overall timelines.

BUSINESS BENEFITS

- Advanced simulation allows for planning related to layout stations, floorplans, layouts and supply chain models.
- As a customer, you can "see" the line that will manufacture your products. This can help give you the confidence about where, how and what will happen – and it's all mathematically, statistically and operationally reflective of what's actually happening in the manufacturing environment.
- Advanced simulation can help you understand the anticipated costs related to resources, time, equipment, space, material, transportation and logistics, processes and more.

flex

3

AUTOMATION AND ROBOTICS

Smart automation and robotics solutions optimize production efficiency.

Look for a full stack smart automation process, which allows your manufacturer to migrate and automate most of the operations work needed for applications, middleware, hardware and data-center infrastructure. This means they can quickly provide customized lines. When deployed in-region, they can increase value by optimizing investments, productivity and costs.

Also, look for a manufacturing partner who has deep expertise in smart automation and has integrated it into existing equipment and factories to optimize production and cut downtime.

Robotics are an essential part of smart automation processes in manufacturing. This technology is widely used to automate repetitive tasks, as well as tasks that are difficult for humans due to physical constraints, such as getting into a small place. Their use in tight spots has become increasingly popular as the market for miniaturized electronics has grown. While some robots perform independent tasks, many robots collaborate with humans to complete their work. Automating tasks through robotics has other benefits, too.

3

Automation and robotics benefits

CONSISTENT QUALITY AND REPEATABILITY

- Robots will repeat the same task over and over, in the exact same way, every single day.
- Production becomes more predictable and consistent because of the repeatability of the process.

REDUCED SAFETY RISK

- Manufacturing processes often involve situations that can be unsafe for humans, such as ergonomics issues or the release of gas, chemicals or fumes.
- Manufacturers that identify how robots can be used for these processes eliminate exposing their employees to risks and create a safer work environment.

IMPROVED PRODUCTIVITY AND INTELLIGENCE

- Robots, with an added layer of intelligence and automation, provide feedback and insight into the production process.
- This provides extended visibility and traceability into the process.
- Enables people to focus on job tasks requiring higher levels of dexterity and unique applications.

CONSISTENT PERFORMANCE AND OUTPUT

- Reduce variability in product and supply chain by adding intelligence.
- By adding data intelligence to your automation system through sensors for identification and measurement, the robot "knows" exactly what type of product is coming, at what position and location and any accommodations that must be made for it, such as picking up or scanning the product in a specific way.

3

DIGITIZATION

By connecting machines and data through the Internet of Things (IoT), your manufacturing partner can make decisions in real time, speeding development and shortening time to market.

A decade ago, a huge shift began in digitization. By adding more connected technologies via IoT to the manufacturing floor, an explosion of intelligence became available. But not for every manufacturer. IoT is showing the greatest benefits for those manufacturers who also have investments in the intellectual capital needed to establish, implement and maintain best practices.

Connected IoT technologies include sensors, machine learning, data repositories, analytical tools and more. Sensors can be used to collect measurement data, such as temperature, energy consumption and materials consumption.

Manufacturers are using IoT to also collect data on how their processes work in relation to overall quality performance. For example, by using intelligent video analytics, managers can see how people are actually performing their job tasks, which assists in improving processes and providing training.

3

Through digitization, manufacturers realize the following benefits:

REAL-TIME DATA

With manual data collection, there's a time lag for collecting and processing the information. With digitization, data collection is instant, which provides managers a real-time view of your products on the production floor.

ABILITY TO PROCESS LARGE VOLUMES OF DATA

Humans can consume only so much data. With analytics software, manufacturers have access to a much larger pool of data than humanly possible. This helps with predictive decision making, which improves the manufacturing process from end to end.

INSIGHTS THAT DRIVE IMPROVEMENTS AND SAFETY IN UNSAFE LOCATIONS

Sensors can be placed in locations where humans can't go for safety reasons, either due to fumes, high temperatures or unstable structures. These sensors give manufacturers access to data that was previously impossible to collect, transforming the vast amount of data into insights that can enable corrective actions either by operators or machines. This enables operations to identify potential problems before they impact the manufacturing process.

3

REAL-TIME SUPPLY CHAIN DATA

Providing end-to-end information, 24/7, every day.

Building and managing an efficient supply chain involves not just manufacturing goods, but also the ability to monitor and adjust the supply of individual components – often at a moment's notice. Many companies still run on manual information from enterprise resource planning (ERP) systems that are outdated or unreliable – leading to insufficient or excess inventory.

It's important to partner with a manufacturer who uses real-time supply chain data, because they can respond rapidly to changes, which increases efficiency across the value chain.

Does your potential partner have an established process where they can quickly identify anything that's causing friction within the supply chain and remove it? This is especially critical as every year thousands of events occur around the world that can drastically disrupt – or completely shut down – your supply chain. Natural disasters. Factory fires. New governmental policies. Health epidemics like COVID-19.

Leading manufacturers implement digital technology around the world to act as a 24x7 distributed decision-making system. This system integrates feeds from a wide range of sources, including their customers' supply chain and even from global news media, turning insights into actions to navigate a crisis. By working with a partner who has real-time collaborative insight, you can reduce risk, while improving supply chain efficiencies through increased visibility and velocity.

3

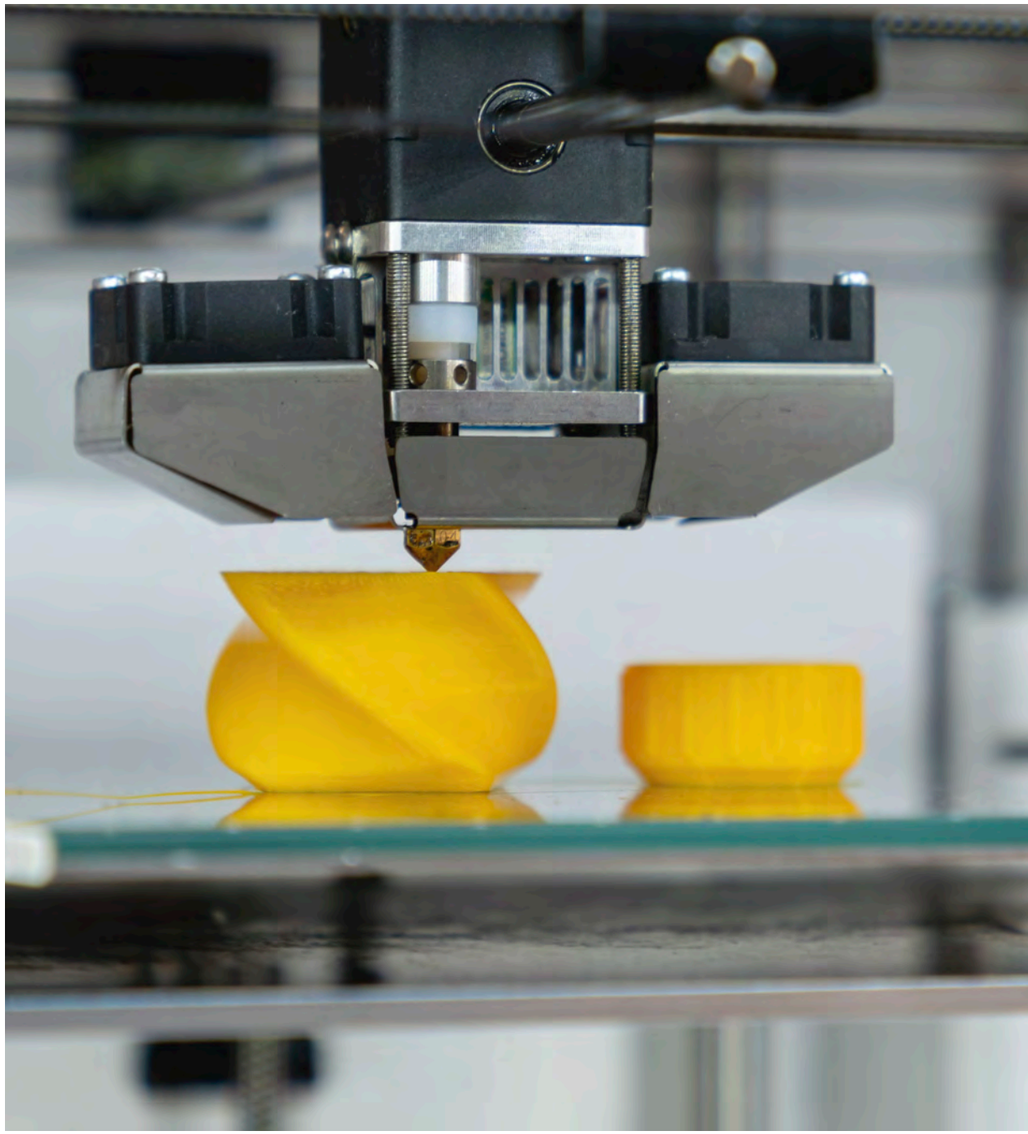
ADDITIVE MANUFACTURING

This technology disrupts the way products are designed, manufactured and distributed, enabling high-mix, low-volume production and short lead times.

Designing functional prototypes for additive manufacturing allows for fast design integration, drastically reduces development time and supports customers' time-to-market needs. As a result, you can gain an enormous competitive advantage.

By integrating additive manufacturing, you can:

- Produce functional prototypes in a short lead time, validating the design as soon as the full additive manufacturing process is finished
- Create optimized designs using the minimum material needed for the application required
- Build end-use parts with additive manufacturing, eliminating the use of expensive tooling, reducing the time to market
- Reduce physical inventory by building components as you need them



4

How can I be sure my manufacturing partner can meet my complex needs?

The first step is to demand an agile supply chain. That means your manufacturing partner has an established process where they can quickly identify or anticipate anything that's causing friction within the supply chain and remove it. This is especially critical during a supply shortage or a disaster – or even during a demand surge that could disrupt your ability to deliver to your customers.

Make sure the supply chain managers working on your behalf leverage digital, mobile and cloud-based technologies to access insights to solve your complex supply chain issues.

When you combine IT with manufacturing operations you get a "smart" factory capable of improving throughput. Visibility into what's working, what needs tweaking – and the expertise to make it happen to increase yields, improve quality and reduce waste.

Keep in mind that manufacturing partners who are always a step ahead can best meet your complex needs. Ask a potential partner where they're headed and what investments they're making and why? Look at what they have in place today. For example, design and innovation centers are invaluable for helping you create distinctive, high-value products to stay ahead of your competition and stand the test of time.

4

To meet your complex needs, ensure the partner you select has the domain expertise you need, such as:

- 5G and edge computing
- Autonomous driving technologies
- Clean energy
- Digital health
- Electrification
- Human machine interface (HMI)
- Internet of Things (IoT)
- Mechanicals
- Power systems
- Sensor fusion

As you continue to explore, ask these additional questions:

- [ ] What's your three-year plan?
- [ ] Do you have expertise in my industry and can you provide insights from across diverse industries?
- [ ] Do you have design and innovation centers to help me differentiate my products?
- [ ] In addition to having access to real-time supply chain data, can you help my organization manage regional trade and manufacturing dynamics to minimize risk?
- [ ] Can you help me understand the best region to manufacture my products?
- [ ] Is your company committed to safe working conditions and environmentally responsible practices in your own operations and across your supplier network?

5

Does my manufacturer support sustainability across the lifecycle?

Sustainable manufacturing is the creation of manufactured products through economically sound processes that minimize negative environmental impacts, conserve energy and natural resources, as well as support full product lifecycle management. Sustainable manufacturing principles also enhance employee engagement, community partnerships and customer trust.

Leading manufacturers have been on a multi-year, purpose-driven journey to set and achieve sustainability goals to build a healthier, cleaner, more equitable world.

It's reasonable to expect a leading manufacturer to set a goal and take action to reduce emissions significantly by 2030 and reach net zero by 2040.

5

To identify a likeminded manufacturer, ask about their commitments in three areas:

HOW DO THEY SUPPORT SUSTAINABILITY?

WHAT ABOUT THE CREATION OF SUSTAINABLE PRODUCTS?

WILL THEY HELP YOU REPAIR, REFURBISH AND RECYCLE PRODUCTS?

Their answers should include that they are:

- Significantly lowering emissions through science-based targets
- Investing in their communities
- Making safety, inclusion and diversity a top priority as they manage their workforce
- Helping customers select the right components to build sustainability into their products
- Working with suppliers who meet stringent requirements for responsible sourcing and labor practices
- Providing services to help companies repair, refurbish and recycle products (these types of services help to reduce waste – and extend the life of your products and add value to your brand

6

What standards and methodologies should my manufacturing partner be an expert in?

Your manufacturing partner should provide world-class quality and efficiency through global business excellence and disciplined execution. That means adhering to manufacturing standards and methodologies. They should also ensure the health and safety of their workers – both within their operations and across the supply chain.

Ask whether the partner you're considering adheres to the Responsible Business Alliance (RBA) Code of Conduct, the Global Business Initiative on Human Rights and other global standards organizations.

Have they established standards to ensure:

- Working conditions are safe and workers' health is protected?
- Workers are treated with respect and dignity?
- Business operations are environmentally responsible and conducted ethically?

Have they applied these same standards to their suppliers?

6

Your manufacturing partner should use Lean principles and Agile operations and be well versed in Kaizen best practices. This is how the very best manufacturers maintain strong teams and create a culture of continuous improvement. It's also a must that your manufacturing partner has the experience, systems and processes in place to help you meet compliance, quality and safety standards in regulated industries.

Other standards your partner should adhere to are:

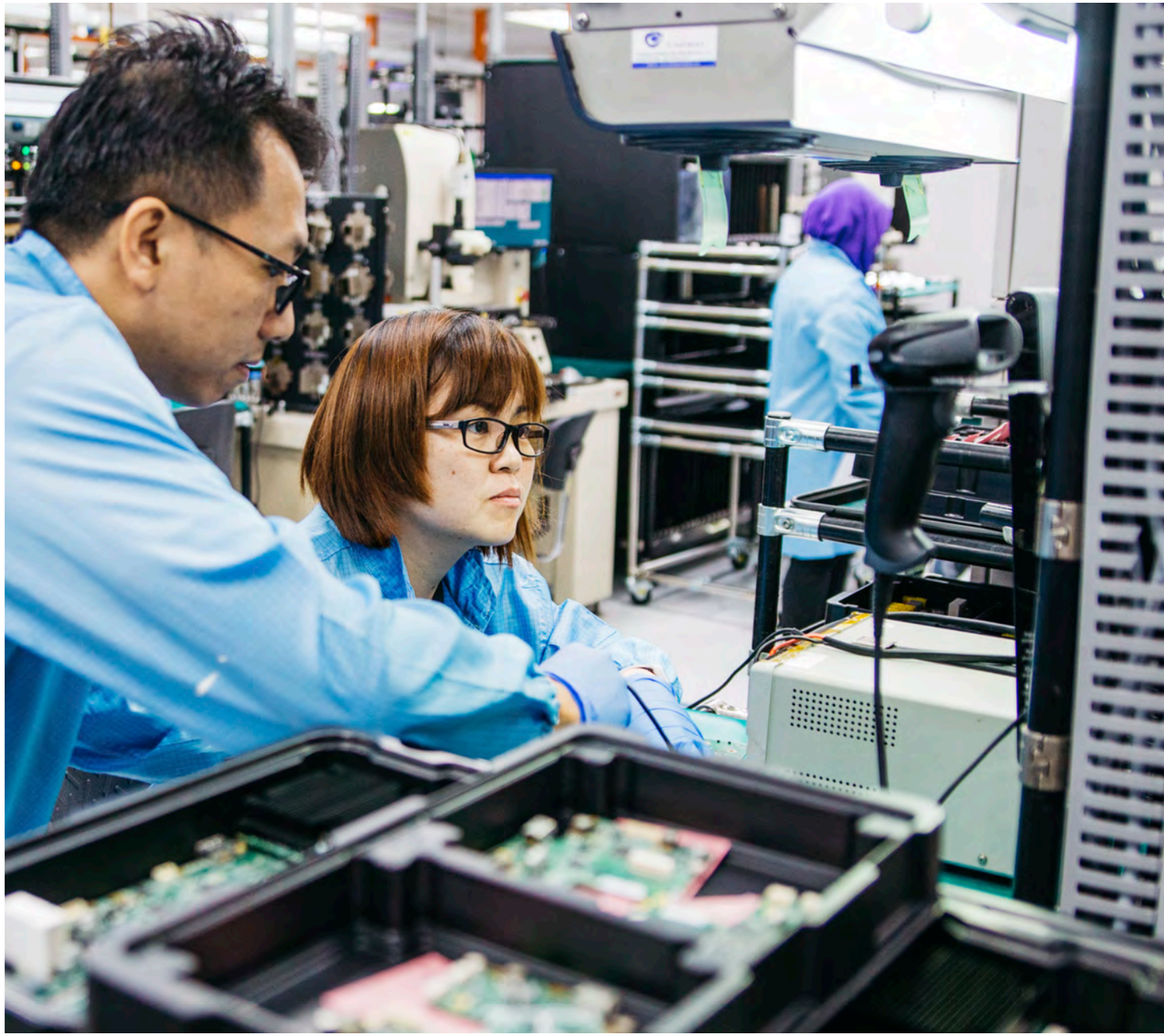
- AS 9100 (aerospace)
- Food Standard ISO 22000
- IATF 16949 (automotive)
- ISO 13485 (medical)
- ISO 9001/2015
- ISO14001 (environmental management)
- ISO45001 (health and safety management)
- IT Security Standard ISO 27001
- TL 9000 R6 (telecom)

6

WHAT ARE LEAN PRINCIPLES?

Lean manufacturing principles can lead to increased production, reduced costs, improved quality and increased profits. The five principles include:

1. **Identifying value by:**
   - Designing products to meet the needs of customers
   - Removing features that do not specifically meet those needs
2. **Mapping the value stream by:**
   - Visually mapping out the entire product flow to identify and minimize steps that don't add value
3. **Creating flow by:**
   - Strategically organizing the work floor to move from production to shipping without interruption
4. **Establishing pull by:**
   - Manufacturing items when orders are placed, signaling a need for supplies to reduce inventory, maximize workspace and eliminate overproduction
5. **Seeking perfection by:**
   - Continuously improving practices (one approach is Kaizen, a philosophy of continually making small, incremental changes)



6

WHAT ARE AGILE OPERATIONS?

Agile operations are the processes, tools and training that allow manufacturers to respond quickly to customers needs and market changes, while controlling costs and quality.

- Agile teams place an emphasis on communication, flexibility and functionality over time-consuming planning, process and documentation
- Agile teams deliver functional, competitive results more rapidly

WHAT ARE KAIZEN WORKSHOPS? WHY DO THEY MATTER?

The foundation of Kaizen focuses on making small, incremental changes. A Kaizen workshop accelerates this process, with the goal of making big changes in a specific high-priority area that needs improvement. Both approaches are targeted at:

- Eliminating waste, improving productivity and sustaining the change through standards implementation
- Unleashing the creativity of employees to design more effective processes – and inspire a culture of seeking perfection

7

How can I get to market quickly, without sacrificing product quality?

Select an advanced manufacturing partner who has the expertise to help you design, build and deliver innovative, high-quality products – at scale, faster. And delivered by people who are passionate about meeting and exceeding your needs.

Here's your must-have checklist for your manufacturing partner:

- ✓ Offers global and regional manufacturing flexibility
- ✓ Provides deep expertise in design for excellence and innovation
- ✓ Delivers disciplined, global execution across their trusted supply chain network
- ✓ Supports responsible manufacturing processes
- ✓ Optimizes every aspect of product development to meet unique targets
- ✓ Enhances their capabilities by investing in Industry 4.0 technologies
- ✓ Continuously increases efficiency and quality
- ✓ Commits to sustainably create products that improve the world

Leading brands partner with advanced manufacturers to make the good, great … and the best? Extraordinary.

flex

Why choose us?

We're the global manufacturer who can help you deliver the innovative products your customers want. We design and build high-quality products across a range of industries, including:

- Automotive
- Cloud and communications
- Consumer and lifestyle
- Energy
- Healthcare
- Industrial

As our partner, you benefit from our cross-industry expertise and our deep knowledge in each of these industries.

A commitment to excellence underpins everything we do – from the expertise of our people to delivering quality and efficiency across our entire operations. We achieve this by investing in our people, Industry 4.0 technologies, continuous process improvement and our resilient supply chain. And our customers? We always put their needs first.

We care about our people and the environment, and understand that our customers care, too. That's why we commit to sustainable manufacturing processes and to fair, labor practices, everywhere. We adhere to strict safety standards and strive to do the right thing, always.

As our partner, you can tap into our global footprint of more than 20 design and innovation centers, as well as manufacturing teams working to help you create high-quality products at sites in more than 30 countries. This provides you the flexibility to manufacture in the location that best suits your business and market needs.

We have the answers you need to all seven questions. We can help you:

1. Remain competitive amid constantly changing environments.
2. Design for excellence.
3. Leverage the benefits of the latest Industry 4.0 technologies.
4. Meet your complex needs.
5. Support sustainability – in our manufacturing processes and by extending the life of your products with our circular economy solutions.
6. Benefit from our expertise and adoption of fair labor practices, industry standards and methodologies.
7. Get to market quickly – without sacrificing product quality.

We're passionate about you – and your products. Your time-to-market. Your unique needs. Your success.

Let's talk.

Flex (Reg. No. 199002645H) is the manufacturing partner of choice that helps a diverse customer base design and build products that improve the world. Through the collective strength of a global workforce across 30 countries and responsible, sustainable operations, Flex delivers technology innovation, supply chain, and manufacturing solutions to diverse industries and end markets. For more information, visit **flex.com**.