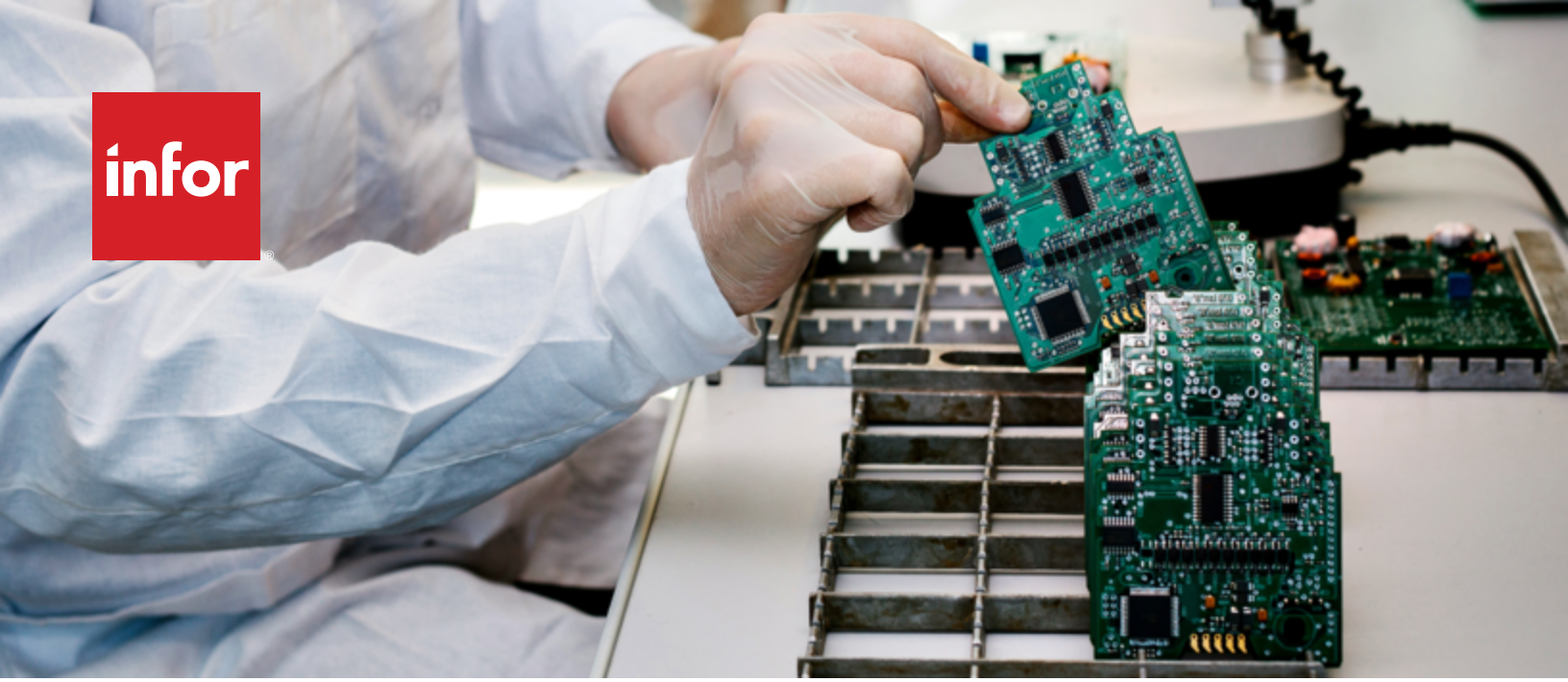

EXECUTIVE BRIEF

Waves of new smart products bring disruption and opportunities to high-tech manufacturers

In response to customers' fascination with high-tech capabilities, product designers are incorporating smart or digital components in a vast array of products, including ones that were never linked to the high-tech industry before. A decade ago, few would have predicted that designer shoes, beds, dog collars, and doorbells would now have smart capabilities built in. But today, these and thousands of other goods are connected to the internet, driven by artificial intelligence (AI), and equipped with programmable features. This growing demand for high-tech components is adding further stress to an industry already disrupted by a shortage of semiconductor chips. Fortunately, turning to modern software solutions will help manufacturers of goods and components keep pace with the emerging demands and take advantage of promising opportunities.

Defining new demands and growth

The demand for technology-enabled smart products spans from smartwatches, to tools, toys, factory-installed automotive technology, home automation systems, and health and fitness devices—to name a few.

The U.S. consumer technology industry is projected to exceed **$505 billion in retail sales in 2022**, its highest to date. Concurrently, Bluetooth enabled devices are expected to grow **1.5x, a 9% compound annual growth rate** (CAGR) between 2021-2026, with annual device shipments on track to exceed 7 billion in 2026.

This level of growth comes with unique pressures, such as bottlenecks in the supply chain. The shortage of chips has cost the automotive industry billions as automakers have been forced to sideline incomplete vehicles, waiting for delayed deliveries. Manufacturers and product development teams are not deterred and continue to add sensors, dashboards, and programmable features to products—often in pursuit of digital native Generation X, Y and Z consumers. The generations that grew up with smart phones, video games, and social media are now in decision-making roles in organizations. It's only natural that they would surround themselves with tools and products that match their comfort level with technology and desire to personalize settings, from alerts to connectivity to other devices.

The key to responding to these pressures and demands will be to adopt technologies and business practices that are agile and can be quickly adjusted based on new disruptions.

How should manufacturers react?

Outdated software solutions will interfere with modern strategies for embracing high-tech components. A new era in product design and assembly requires software that is highly agile, automated, and easy to deploy. Manufacturers looking to capture growth and protect long-term profitability must embrace automation and streamlined abilities, from the back-end financials and corporate functions to the supply chain and factory floor. Smart factories, including greenfield and brownfield investments, are the keys to driving competitiveness.

Tech-savvy manufacturers are already applying Industry 4.0 technologies, such as the Internet of Things (IoT) and AI-driven analytics, to speed up operations. Projects are evolving from proof-of-concept trials to system-wide adoption. To keep pace with the high demands, manufacturers in the high-tech industry need to step up their strategies to yet another level. To match the vision for advanced, reliable, and affordable products, manufacturers need the right mix of efficiency and productivity plus collaborative abilities and tools that support innovation, product launches, over-the-air updates, testing, quality control, and compliance with environmental mandates.

Focus on the product vision and innovation

There is pressure to level-up technology and functionality by adding more electronic features to products across a wide range of verticals, from consumer goods to medical devices and industrial equipment. The **Consumer Electronics Show** once primarily featured phones and televisions. Now, it showcases a wide range of products designed to improve convenience as well as safety and quality of life. Some examples include:

- **Body scan system**. Monitors several body measurements (weight, BMI, hydration level and heart rate) using a digitally-connected smart scale.
- **The 360 smart bed**. Uses integrated sensors and technologies that respond to the evolving needs of the sleeper and automatically adjusts heat, cooling, and tilt accordingly.
- **Smart washer and dryer**. Leverages intelligence to detect load size, fabric types and soil levels to adjust for the optimal wash cycle and determine how much detergent to dispense. The two machines also communicate so the dryer can be prepared and even preheat for quicker drying times.
- **Smart faucet**. Responds to voice commands and integrates with other smart water products.
- **Hero backpack**. Integrates with Apple's Find My technology to help locate the backpack from anywhere and is made from plastic bottles for eco-friendliness.

Collaboration and standards are key

Several vendors are working together to make the smart home more practical. They plan to release and update home technology to work with **Matter**, a new standard that enables smart home devices to talk to one another regardless of the virtual assistant or phone brand. More than 100 smart home products are expected to adhere to the standard, including smart plugs, door locks, dosage sensors, flow sensors, energy monitors, light bulbs, and more. This effort aligns with the **Connectivity Standards Alliance** that currently has more than 400 member companies across the globe, which are actively involved in furthering technical standards for smart devices. To date there are 4,000+ Alliance Certified Products.

Smart technologies also are being used in commercial and public facilities to manage electricity, security, and access. The commercial building automation market is expected to be one of the fastest growing applications for Bluetooth with IoT between 2021-2026, achieving a **CAGR of 76%** and growing to nearly 50 million annual device shipments. Commercial lighting is a front runner which is expected to help pave the way for wider adoption of newer products like environmental sensors that monitor and make adjustments based on air quality, temperature, humidity, and HVAC needs—providing up to a 70-75% reduction in energy costs.

Medical devices to support wellness and independent living for seniors are another growth area for high-tech components. As the population ages, the demand is increasing for products to help manage chronic health issues such as diabetes, high blood pressure, and congestive heart failure. Tools can also monitor for falls or changes in behavior. The needs of health-conscious consumers are also being met with fitness equipment and wearables that monitor heart and pulse rate, helping consumers make smart decisions about their fitness routines.

High-tech devices are also bringing breakthrough quality-of-life improvements to patients with mobility issues, artificial prosthetics, chronic pain, assistance with communication, and hand-control vehicles. These medical devices require extensive testing, compliance with standards, and quality control. Software helps manufacturers track these details—ensuring products are safe and reliable, while maximizing the benefits to patients and their medical teams.

Manufacturers turn to component suppliers to level up existing product designs

Innovation in the past was often unveiled once per year with the launch of a new product. Today, innovation is often software driven with incremental improvements made throughout the product's lifecycle, rather than linked to a certain product version. For example, vehicles may receive periodic OTA updates from the car manufacturer, adding new safety capabilities as they are developed or resolving small glitches as they are uncovered. OTA fixes can prevent the need for costly recalls.

In some cases, the innovation necessitates a new part, component, or device. For example, electric vehicles involve an entire ecosystem of batteries, electrical engineering, and chargers. Incorporating high-tech elements into existing products relies on building new supply chain relationships with extensive upstream and downstream visibility.

To minimize disruptions to production, some suppliers are chosen based on reliability and geography, not just by price. Transportation challenges likely will continue to impact the supply chain. Driver shortages in trucking and congestion at US container ports are just some of the issues to watch as global volatility continues.

Adopt a holistic strategy connecting operations and IT

The demand for high-tech products is driving the need for significant changes in manufacturing processes. The **Society of Manufacturing Engineers (SME)** explains: "Smart manufacturing bridges the gap between the design and manufacturing environments. It enables collaboration through open, intelligent data exchange formats. As a result, those organizations who commit to a digitalization strategy can lead their industries and thrive, even when faced with unexpected disruptions."

Examples of modern software solutions helping high-tech manufacturers:

- **Collaboration**. Tools help foster new partnerships/relationships with partners and suppliers, allowing business users, including those on the shop floor, to easily consult with managers, define specifications, clarify work orders, and verify a customer's personalized features.
- **Mixed mode manufacturing**. Engineer-to-order, configure-to-order, and assemble-on-demand are some of the strategies manufacturers might adopt as they strive to produce goods to meet customer expectations—while controlling costs and protecting margins.
- **Product innovation**. Product lifecycle management (PLM) solutions help plan the development and introduction of new products, including tracking and gating key milestones, such as testing and regulation compliance. Modern PLM solutions will manage the complete product lifecycle, from R&D, to testing and roll out while also managing quality and analyzing the impact on the supply chain.
- **Demand planning**. AI-driven analytics help managers more accurately plan for demand, forecasting the need for raw resource and components.
- **Manufacturing execution**. Coordinating the shop floor activities, including scheduling resources, is very important for productivity and efficiency. High-tech manufacturers need solutions that are highly flexible and can adapt to the changing product specifications and necessary workflows.
- **Optimized supply chain planning**. Solutions to help plan supply chain requirements are key. The availability of resources has become highly complex as chip shortages and other supply chain roadblocks continue to plague the industry. The classic "just in time" strategies are being reconsidered and ethical sourcing/sustainability are now among the top considerations that all procurement officers must thoroughly research before placing orders. Modern software for supply chain planning provides visibility upstream and downstream, giving managers the data they need to evaluate risks and make well-informed decisions. Modern solutions help synchronize planning, taking advantage of multisite, multi-logistics inventory planning.
- **Analytics**. ERP solutions with built in analytics help manufacturers monitor and understand the impact of process changes and new supply chain partners on margins and bottom line performance. Analytics help ensure the innovations and new services are profitable—especially in industries and regions with very tight margins.
- **Aftermarket warranties and service**. In industrial/commercial markets, complex high-tech products often require a third party logistics firm to deliver, set up, and train users. Warranties and after-market service may be other important considerations for high-tech manufacturing. Solutions to support field technicians, giving them access to data they need, will be valuable in building customer loyalty.
- **Platform as a Service**. Use low-code and no-code PaaS tools to create personalized screens, forms and reports, specific to the organization's needs.

Multitenant cloud solutions offer agility

In addition to the functionality enrichments that support high-tech manufacturing operations, the move to the cloud also brings many benefits, including:

Agile processes and connectivity. Easily connect production equipment and machinery to support Industry 4.0 strategies. Adopt agile business processes using dynamic workflows, extensibility, and no code/low code toolset to support innovation.

Simple support and capabilities. Preconfigured out-of-the-box localizations support global growth. Highly flexible solutions also support Build-to-Order and Configure-to-Order capabilities.

Reliable compliance and security. Solutions deployed in the cloud are highly secure, are automatically backed up and provide reliable continuity.

Quick deployment. Cloud solutions, using out-of-the-box functionality, are quick to deploy, helping high-tech manufacturers respond quickly to changing needs.

Concluding thoughts

The high-tech industry is in a current state of mass disruption with new products, product features, and environmental and regulation issues continually evolving. The challenges mount for manufacturers as they attempt to scale up and build new collaborative partnerships with suppliers and vendors. Some manufacturers and suppliers are opting to specialize in niche markets, concentrating on a single high-tech component or part. At the opposite end of the spectrum, some are opting to scale across many verticals and may acquire or merge with other companies to expand production capacity.

While the challenges vary, the solution is often the same: modern software. Highly flexible ERP solutions deployed in the cloud provide the next generation capabilities manufacturers need today. The opportunities emerging in the high-tech industry indicate investing in modern tools will pay off quickly. With the right IT infrastructure in place, manufacturers and suppliers will be able to step up production, focus on innovation, automate routine tasks, and deliver goods and products that bring meaningful impact to customers. High-tech products are more than gadgets and gizmos. They are often sophisticated equipment and devices that bring insight, safety, convenience, and better well-being to users. Investing in the technology is a smart move.

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