



## EXECUTIVE BRIEF

# Only the smartest will survive an era of disruption

## Data-savvy manufacturers manage to thrive despite fierce competition

Charles Darwin famously theorized that natural evolution depends on the survival of the fittest. In today's high-tech industry, it's the **smartest** who have the best odds of surviving challenging conditions, fierce competition, and supply chain battles for microchips. In the high-tech industry, where pandemic-related supply chain disruption has been especially brutal, data-driven insights are critical to adapting, thriving, and outlasting shortages of raw materials. Business intelligence drives resilience and supports companies as they evolve to keep pace with innovation and the demand for high-tech components.

## Challenges persist

Manufacturers worldwide have had their endurance abilities tested in the wake of the COVID-19 pandemic. Global volatility, political unrest, and shortages of critical resources, like microchips, contribute to the disruption. Buying habits have drastically changed, with consumers demanding new experiences, personalized products, value, and sustainability.

The outlook is mixed. The disrupted supply chain is slow to rebound, as rising fuel costs make land transportation prices exorbitant, and cross-ocean shipping routes are being redrawn to favor political allies and suppliers closer to the consumer. Every manufacturer with high-tech components requires microchips and must compete with other manufacturers to win contracts for the critical parts. Shortages are likely to persist for years until new foundries start producing and supply catches up with demand.

## The digital framework

The recent market challenges have accelerated the need for technology and digitalization, forcing manufacturers of high-tech products or components to up-level their technology investments. **McKinsey** explains: “The pandemic’s disruptions have underscored that integrating advanced technologies better equips organizations to achieve operational excellence—the foundation of long-term resilience to and sustained competitive advantage.”

Digital strategies help manufacturers cope with challenges, from shortages of key resources to global volatility. Meanwhile, technology supports agility and gives leaders a taste of just how powerful digitalization can be in streamlining activities and boosting efficiency. In a **survey** of more than 400 global manufacturing companies, 94% indicated that Industry 4.0 helped them to keep their operations running during the crisis, and 56% said the digital transformation they undertook was essential to their pandemic responses.

Now, manufacturers are ready for more advances as they begin to address the pent-up demand and begin building new partnerships to pursue new go-to-market models and sustainable vehicles.

## Big moves required

With so many challenges and options, many manufacturers are finding themselves in the proverbial “sink or swim” situation where critical choices must be made and bold actions taken. Investment in digital technology is the first step of the path forward, as most tactics for modernizing include automation, connectivity, and visibility on comprehensive scales. Major process changes are required to remain competitive in this new era. Simple pivots or subtle shifts in current strategies will not be enough to compensate for the billions in losses experienced during the pandemic and chip shortage.

Surrounded by such obstacles, how can manufacturing leaders know where to launch initiatives and how to best invest in strategies that will serve them long-term? Knee-jerk reactions and quick fixes can do more harm than good, wasting resources and frustrating stakeholders, including front-line workers who are worried about job security. Fortunately, AI-driven technology can help manufacturers make sense of the options and choose the paths best for them.

## Making smart choices

**Deloitte** reminds manufacturers that optimism about recovery may be short-lived if certain basic threats aren’t addressed first. “As industrial production and capacity utilization surpassed pre-pandemic levels [in late 2021]... strong increases in new orders for all major subsectors signal growth... However, optimism around revenue growth is held in check by caution from ongoing risks. Workforce shortages and supply chain instability are reducing operational efficiency and margins. Business agility can be critical for organizations seeking to operate through the turbulence from an unusually quick economic rebound—and to compete in the next growth period.” The report goes on to suggest manufacturing leaders should “look not only to defend against disruption but strengthen their offense.”

Consequently, business intelligence and data-driven insights are critical right now. Manufacturers must carefully choose the correct path—not the one with the least resistance, but the one with the most opportunities.

## Build the data-savvy workforce

When preparing for future market demands, building a skilled workforce that understands the value of data management is a necessary first step. This creates allies to help convey the vision, build consensus among teams, and execute plans. Unfortunately, a severe shortage of skilled workers has plagued manufacturers for a decade with no easy solutions in sight.

In a recent **Forrester study**, 40% of manufacturing leaders said that recruiting people with the necessary technical skills is a top challenge. Finding workers with data management skills is especially challenging. “As manufacturers drive toward becoming data-driven decision makers, they struggle to get their existing staff to believe data over instinct (35%). Even more concerning: 39% of decision makers’ organizations struggle to find and hire staff with the right skills to gather actionable insights from data,” Forester says.

Despite the uphill journey, making the effort to recruit top talent will pay off. Investing in the IT workforce can become a true differentiator, laying the foundation for future innovation and problem solving.

“This will need to consist of world-class recruiting and retention-related initiatives that promote inclusivity and a lifelong learning culture,” says Jerry Kurtz, executive VP of Insights & Data at **Capgemini Americas**. “The market has never been more competitive for people with AI skills, and this trend is likely to continue for years to come. As such, strategic partnerships will also be key across organizations and industries,” he adds.

## Jump on the AI bandwagon

Once the team is assembled, strategies can be formulated. Breaking large AI-driven projects into phases may help make execution more manageable. Organizations will learn from experience. Many organizations are still in early stages of exploration, as **VentureBeat** reports. “AI is a hot topic for businesses. AI capabilities are expanding the possibilities for how businesses approach real-time engagement with their customers, manage their operations and ensure business continuity through the pandemic. As the technology advances, companies are finding new ways to innovate and expand.”

Adopting AI strategies is a top priority for many organizations. IEEE, the largest technical professional organization, recently released the results of a **study** in which 76% of enterprises say they plan to prioritize AI and machine learning initiatives over other IT goals. CIOs and other technology leaders are the most enthusiastic supporters, with 95% of CIOs saying that AI will drive the majority of innovation in the next one to five years.

“Expect AI engagements to become larger, more strategically significant, and more mission-critical—with a focus on long-term scalability,” Kurtz says. Robotics, Natural Language Processing (NLP), virtual assistants, recommendation engines, and enhanced cyber security will be among the top use cases.

## The advanced use of business intelligence will help manufacturers:

- Understand the evolving market
- Pinpoint customer preferences and predict buying behavior
- Uncover weaknesses within internal processes
- Automate routine decision-making
- Extend the lifecycle of existing plant assets
- Accurately predict necessary inventory levels
- Gather data from multiple points in the extended value chain
- Create one consolidated data fabric that can stretch and contour as needed

## Early in the maturity scale

Although data analytics and the use of AI have been identified as essentials, most companies still have a long journey ahead before mastering the maturity scale, says **Enterprisers Project**. AI is a broad field with many possible elements. Knowing where and how to start requires some research.

Basic starting points include how to capture and store data. Most AI models require massive amounts of data, often from hundreds of sources, over an extended period, and in both structured and unstructured forms. Meanwhile, most manufacturers are still working on building a modern data pipeline. Context is always critical, as is a format which allows for integration and analysis in a meaningful way.

Safe storage is another requirement: the large amount of data needs to be stored in a reliable place. A data lake in the cloud is the typical data storage solution, providing flexible capacity, security, and real-time access.

## Sample use cases

The use cases and benefits of AI clearly justify the investment of resources. Some applications include:

- **Process mining**—This is a tactic which helps organizations define, document, and refine steps in workflows, including ones which can be completed by software or robots.
- **Intelligent visibility**—Intelligent supply chain applications are now critical, as evidenced from the severe shortages experienced during the pandemic. Visibility into inventory, demand, and shipping routes will help managers plan appropriately.
- **Customer-facing roles**—The pandemic saw major AI adoption in customer-facing roles such as virtual agents, chatbots, and recommendation engines. The success and positive responses from customers are leading to further innovation in this area.
- **Natural Language Generation (NLG)**—This capability has advanced and been incorporated into several solutions, allowing for voice recognition and voice commands to activate action. This is particularly important for manufacturers where employee safety and hands-on tasks may necessitate workers making voice commands, rather than typing on a keyboard.
- **Machine learning**—This capability allows the AI applications to continuously improve, using more data sources and relevant data points. Machine learning helps applications make more accurate decisions based on previous data and outcomes.
- **Predictive insights**—AI and ML help determine next likely outcomes in certain situations—an insight that can be used in recommendation engines and forecasting future trends. It can also be used with a digital twin to anticipate likely outcomes, analyze risk, and explore “what if” scenarios.
- **Manage complexity**—AI adoption can help manage modern systems that are highly complex, requiring advanced algorithms to identify actionable incidents, such as an internal asset needing recalibration. The subtle data clues may be too obscure for a human to detect, but easily identified by a program created to find abnormalities or deviations from accepted standards.
- **Model-based AI applications**—Some platforms support model-based AI development, also offering training and deployment. This leads to a more accessible AI product for the organization’s strategists. Companies no longer need to hire data scientists for building basic use cases and can instead turn to model-based management and simplified lifecycle management of AI assets to support continued growth.
- **Data unification**—Enterprises need simple yet powerful tools to manage petabyte-level data repositories as a means of understanding the shape of data stored.
- **Data fabric**—A unification of data competencies and domains including Data Lakes for economical, big data sourced from many applications and services, real-time data pipelines that help drive operational decision points, and “Lakehouses” where curated, ready-to-report data becomes accessible using hot storage and data interfaces.
- **Data catalog**—Establish semantic governance with data dictionary services, registration wizards, metadata index, and documentation repository. This will help organizations build and refine metadata models used across the ecosystem as well as cross-reference relationships defined within the catalog.
- **Low-code and no-code**—Manufacturers are increasingly turning to out-of-the-box foundation models, substantially reducing time-to-value for AI solutions. Fortunately, some operating systems also provide tools so the average user can generate their own use cases, reports, and forecasts using low-code and no-code applications. Citizen coders will be able to describe the goal through words, and conversational AI will create appropriate code.

COVID-19 and related disruptions have had a major impact on the high-tech manufacturing industry, generating unprecedented obstacles and challenges. The consumer demand for greater sustainability is also accelerating the evolution. Now, more than ever before, manufacturers and suppliers must make smart decisions about how to invest in the future and where to focus their energies to expedite recovery and seize their share of the emerging high-tech market. Without the use of AI, companies run the risk of making snap judgments or shifts in priorities that bring short-lived opportunities.

Instead, if manufacturers and suppliers create a foundation of digitalization that includes advanced AI tools, they can make critical decisions based on data and sound business insights, not hunches. Using AI to help analyze and identify opportunities can even become a differentiator, setting the company apart from others. In this era of fierce competition, having a technology advantage is smart business. In today's brutally harsh landscape, the smartest organizations will be the ones to prevail, adapt, and flourish.

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