

Advanced Manufacturing Realized

How can
manufacturers
place innovation
at the heart of
transformation?

The better the question. The better the answer.
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Building a better
working world



To build the right foundation for long-term growth, manufacturers must put innovation and digital strategies at the heart of transformation.

Executive summary

- ▶ Massive geopolitical, technological and cultural changes have prompted unprecedented shifts in industrial manufacturing.
- ▶ As pressures mount to build smart products, digitize operations and exceed customer expectations, incremental approaches to change are falling short.
- ▶ Manufacturers need to design a transformation that is innovative, agile, cross-functional, and scalable to realize tangible business value.

Over the last several years, challenges related to geopolitics, technology, the pandemic and climate change have shaken the foundation of industrial manufacturing -- creating tectonic shifts in how manufacturers think, operate and deliver their products and services.

The pressure to make products smart and connected, digitize the factory and operations, create more automated and reliable supply chains, and deliver on rising customer expectations presents significant opportunities to move toward radical growth. Yet many manufacturers' current approaches - driven by siloed teams, functions rather than strategies, and static views of competitive and operational landscapes - present significant risks on the road to reinvention.

Legacy manufacturers trying to speed ahead into the future of smart products, digital platforms and new service-oriented business models urgently need a better way forward. A hybrid, innovation-led approach that incubates future businesses while simultaneously optimizing today's products and operations can provide practical, value-driven solutions in both the short and long term.

Disruptive forces shift operational priorities

The range of disruptive forces manufacturers are experiencing has implications across the entire enterprise. These forces include:

- ▶ sector convergence
- ▶ power shifts within value chains
- ▶ evolving customer expectations
- ▶ volatile macroeconomic environments
- ▶ tougher workforce dynamics
- ▶ sustainability pressures
- ▶ transformative technologies

In response, manufacturers are prioritizing digital transformation and innovation-related investments. According to the **EY January 2023 CEO Outlook Pulse survey**, virtually all (97%) of industrial manufacturing CEOs indicate that continuing digital and technology transformation to deliver growth and operational advantages is either a very or fairly important near-term priority, despite near-term economic uncertainty.

Through these investments, manufacturers seek to revolutionize processes by implementing innovations such as digital twins, artificial intelligence and machine

learning. At the same time, they are advancing product and service offerings across the value chain that are smart and connected.

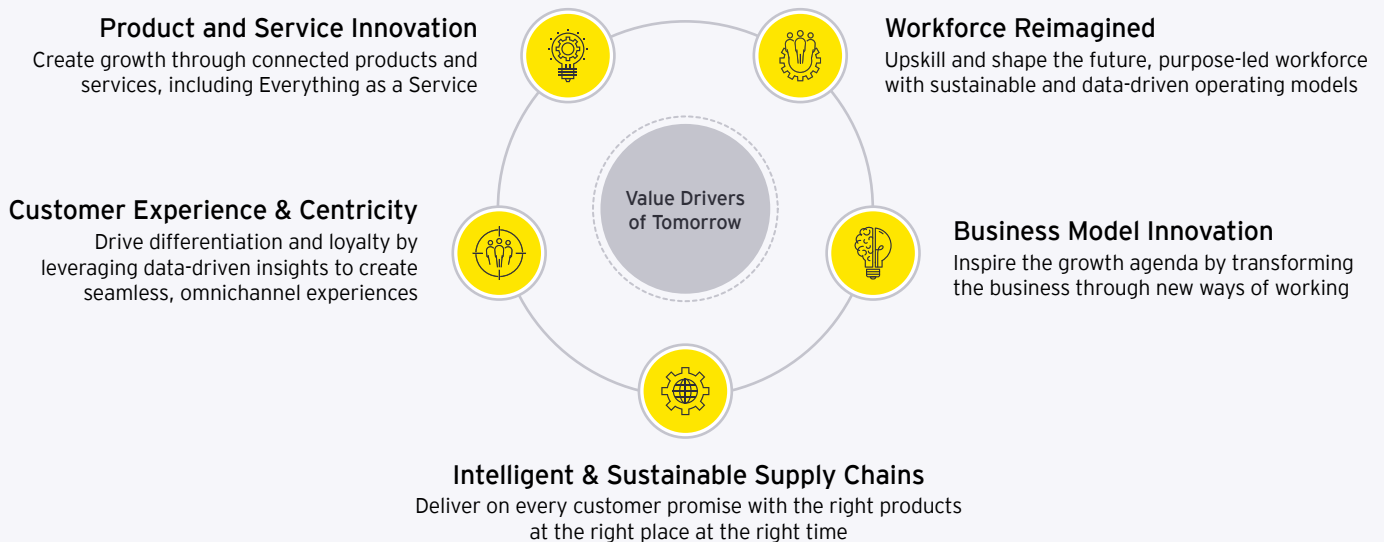
However, to fully realize the significant opportunities arising from disruption and the value of these investments, manufacturers must tie them to a unifying vision of where their markets are headed.

A different, innovation-focused approach to manufacturing transformation

Forging a new path to the future will require manufacturers to put their growth agenda at the center of transformation. This plan needs to be backed by a detailed strategic roadmap that accounts for both the innovations needed to succeed, as well as the transformation required to launch and scale these breakthroughs in the market. It must also be developed with an enterprise-wide outcome in mind, breaking down functional and geographic silos.

While not every initiative needs extensive cross-organization coordination and buy-in, many of the most prominent areas for manufacturers' business reinvention are inherently interdisciplinary. Effective transformations demand engagement with a range of intersecting value drivers, including product and service innovation; customer experience; intelligent and sustainable supply chains; workforce and talent; and business model innovation.

The value drivers of tomorrow



Once a decision is made to pursue small- or large-scale reinvention, manufacturers can maximize the speed, agility and long-term value generation by adopting the following best practices.

Chapter 01

Start with the end in mind, but also know where to begin.

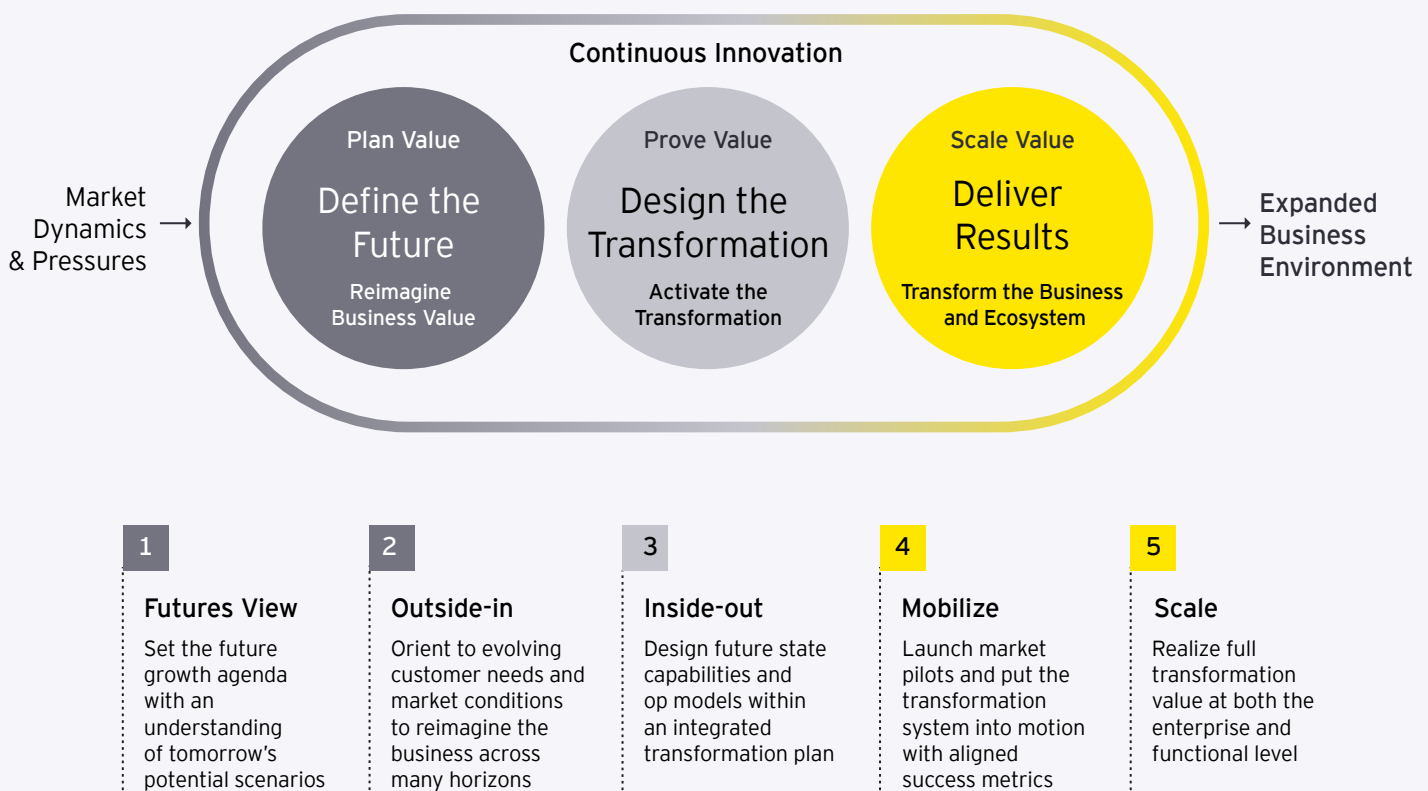
Manufacturers will want to use a future-back approach to explore potential opportunities.

With business challenges clearly defined, manufacturers should explore solutions using a future-back approach that starts with the end in mind. The critical first step involves rapidly defining and assessing tomorrow's potential futures from the outside-in, and predicting how these future scenarios may shape customer needs, market conditions and value pools across time horizons. In parallel, organizations must also perform a thorough

review of their current state capabilities, particularly those that may play an increasingly important role in future competitiveness.

Taken together, assessments of a company's current state and potential futures serve as the foundation of a new strategy that will act as the transformation's "north star" - guiding it relative to the level of ambition, while optimizing development speed and investment spending. This strategy should also provide a framework for cross-enterprise transparency and engagement.

Our approach to transformation



Case study

Optimizing the present to build the future

A leading player in the HVAC industry recognized that its future growth depended on being a leader in smart, connected products. As a legacy original equipment manufacturer (OEM) that had historically sold its products exclusively B2B, its roadmap required rapid development of digital and direct-to-consumer (D2C) competencies. EY's **Advanced Manufacturing Realized** playbook helped the company begin its journey by optimizing investments that would have both near-term positive returns while simultaneously laying the foundation for the company's customer-centric aspirations.

Working with EY, the company developed an omnichannel digital platform that enabled a refreshed e-commerce experience for its B2B customers, which increased sales by 25% in its

first three months while reducing lead times. More important, the new platform represented a first step in building a D2C platform with a dramatically improved user experience.

A second project involved real-world, at-scale testing of edge devices and data analysis. Looking beyond lab-based experimentation, the company tapped its service technicians as a testbed. With Bluetooth-enabled diagnostic tools serving as prototypes for future edge devices, the company worked with EY teams to develop an analytics platform that both improved services for today's users and served as an unparalleled source of field data for training algorithms and identifying other service opportunities.



Chapter 02

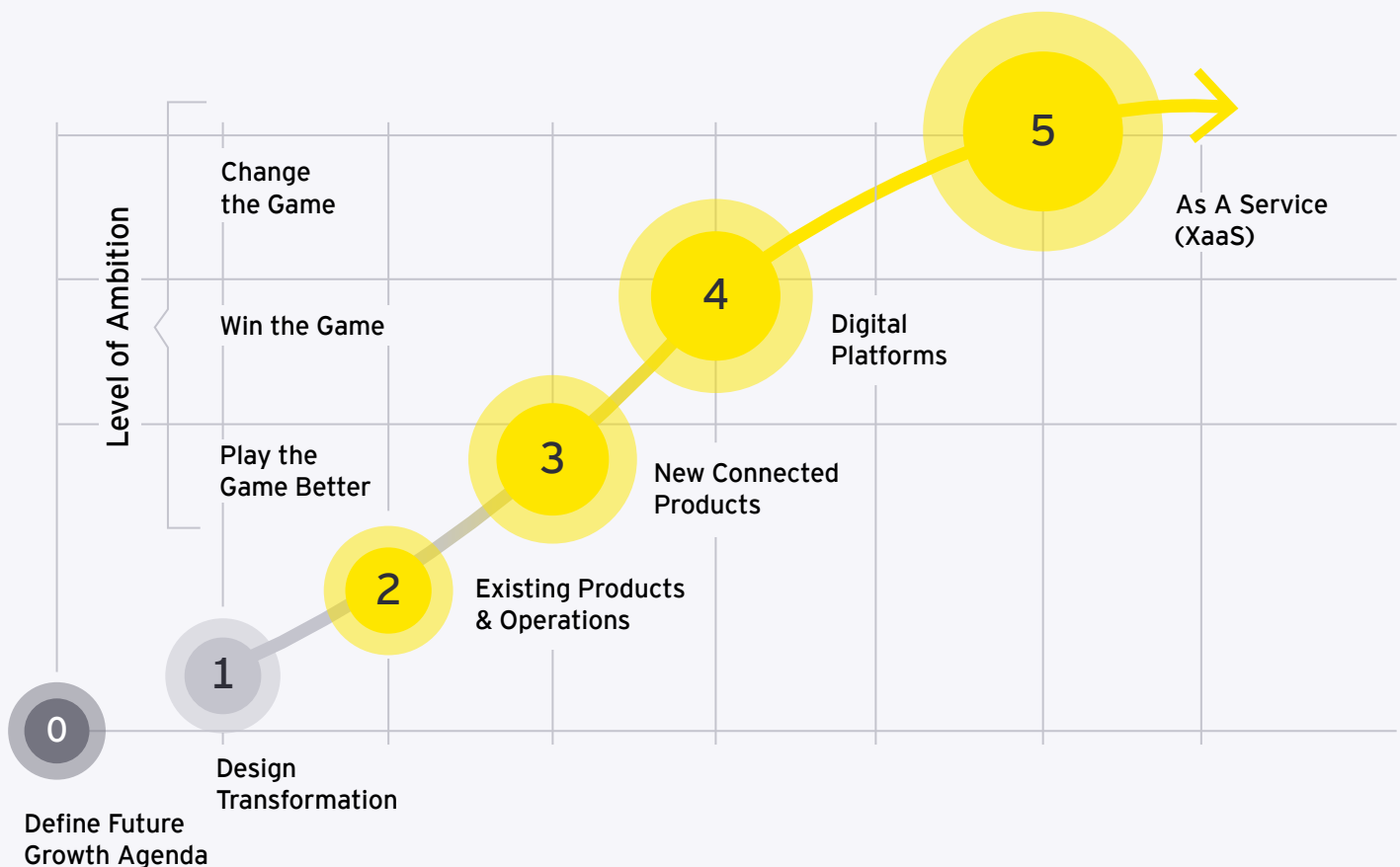
Design the transformation with a hands-on approach to innovation

Conduct rapid prototyping to substantiate future views and refine perspectives on must-have innovations.

Rapid prototyping is an essential step for manufacturers to substantiate their future views and refine perspectives on must-have innovations. Multiple, accelerated iterations of both physical products and digital offerings are important for assessing features and costs in the context of various customer expectations, demand levels and competition scenarios.

Making the future tangible will pay dividends in the design phase of the transformation. Understanding necessary enterprise-wide adaptations - from specific technology or talent enhancements to new business models - will inform an achievable, cross-functional plan. The ability to "show your work" will also help build support across various internal constituencies as they are enlisted in the effort.

Starting with the end in mind



Case study

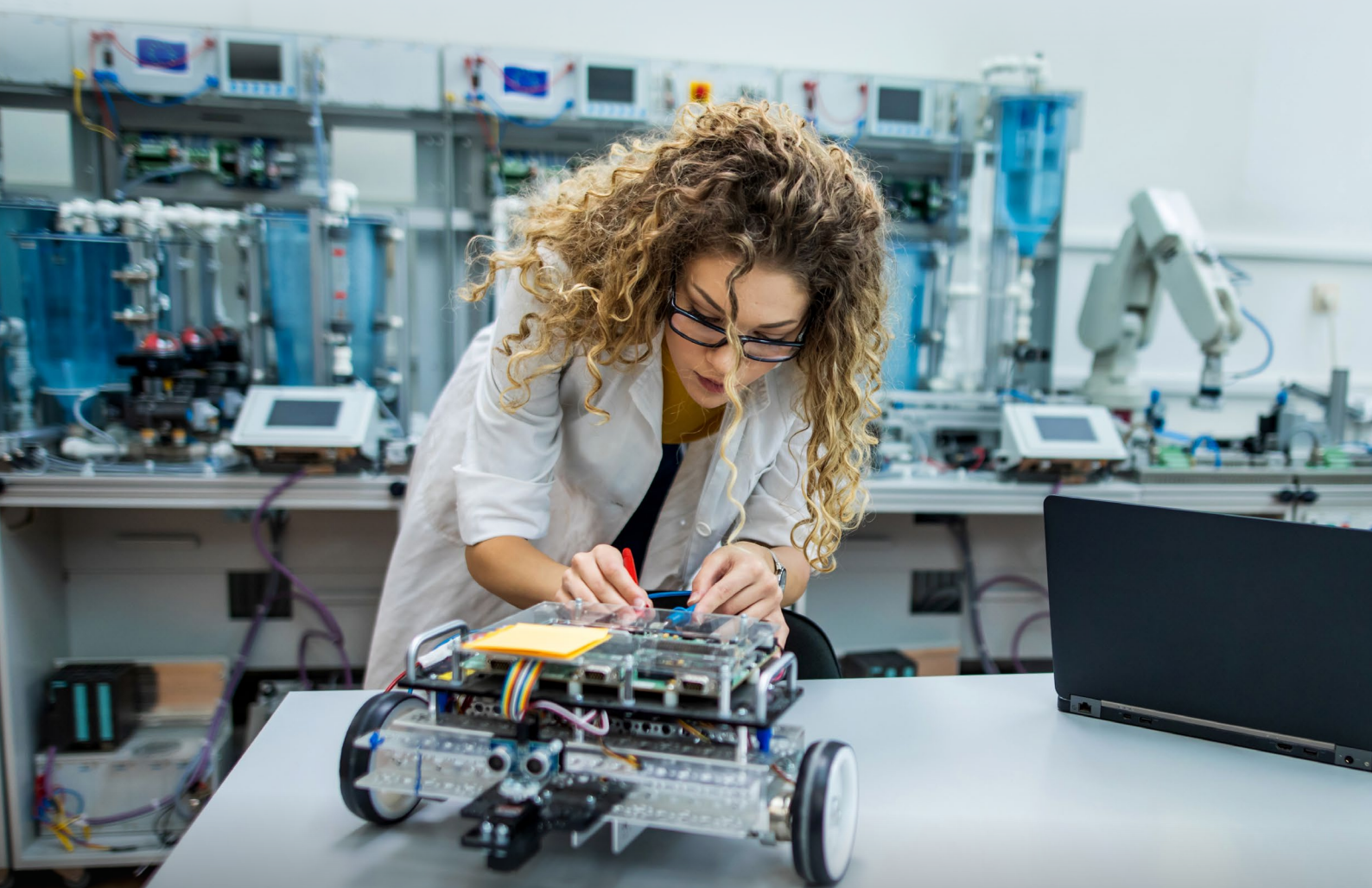
Extensive prototyping shapes transformation

In a rapidly changing market, an industrial products manufacturer was presented with a significant opportunity to set a new growth agenda by commercializing new business models via smart connected products. Starting with exploring emerging value pools and defining a new growth strategy and strategic vision, EY teams helped the company transition from a manufacturing company selling physical products to a platform company selling energy management alongside a suite of other digital solutions.

Supported by the EY-Nottingham Spirk Innovation Hub, the company took an experience-led approach to defining the future experiences across all key stakeholders, addressing their current pain-points,

and delivering “signature moments” to differentiate from competitors in the market. This helped enable the multi-disciplinary POD teams to begin prototyping the new smart connected product as well as the new suite of digital solutions in order to test and get feedback, early and often, from their future customers and partners. After multiple rounds of rapid iteration, the market validated designs went into development for field tests and market pilots, having significantly accelerated and de-risked the path to commercialization.

The promise demonstrated by these prototypes inspired management to accelerate its overall transformation plan, moving past status quo incrementalism to redefining an industry as we know it.



Chapter 03

Accelerate results by incubating new business model concepts

Prioritize small-scale experimentation using a start-up style approach.

When future growth depends on technologies, customer expectations or new value pools that are not addressed by a manufacturer's current core competencies, innovation at the business model level may be a solution. For example, what are the implications of collecting, analyzing and monetizing data from a new connected product? Successfully assessing and addressing these impacts could enable manufacturers to leapfrog the competition.

Given the enterprise-wide implications of such changes, legacy manufacturers should prioritize small-scale experimentation with a lean, internal start-up style approach. In conjunction with ongoing physical product innovation, manufacturers will want to invest in teams to explore the internal and external infrastructure and capabilities needed to support an operating model for an offering's full lifecycle. This approach can be particularly beneficial for evaluating the technology infrastructure required for a potential new business model. By using focused, lean teams, manufacturers can leverage agile sprints to further define capabilities and architectural requirements as the transformation progresses.

Case study

Disruption seeds a new business model

A global agricultural chemicals company faced disruption due to rapidly changing customer expectations and pricing pressures. These factors were exacerbated by the agriculture industry's adoption of new technologies such as digital, precision equipment, and data analytics. To capitalize on the opportunity these changes created, EY supported the client in incubating and launching a new business model that enabled sales of product yield rather than volume.

This business model required a major evolution beyond existing processes, capabilities and the company's role in the value chain. With EY and the **EY-Nottingham Spirk Innovation Hub** as accelerators, the company rapidly defined the requirements of the new business and then explored a range of organizational structures, digital technologies and analytics, and risk management approaches. EY also helped to implement new enabling technologies, including standalone CRM, ERP and ecommerce solutions, allowing the client to move quickly and minimize impacts on existing business operations.

Chapter 04

Identify ecosystem partners to address critical capability gaps

Given the complexity of factors, a structured process to assess potential collaborators is vital.

As manufacturers innovate, they will have to decide whether their long-term strategies are better served by seeking ecosystem partners versus internally developing or acquiring new capabilities. Assessing targeted value pools and key differentiators of success can help inform these decisions.

Manufacturers whose future offerings are likely to depend on the secure sharing and analysis of data at scale will want to consider partnering with technology providers as a more efficient path to market. However, the factors to consider when choosing a mission-critical partner can be extensive,

particularly given the high cost of potential failure. Legacy manufacturers can benefit from a structured process to weigh the benefits of various collaborators.

Manufacturers exploring business model innovation may also find a need for ecosystem partners outside of the technology sector. For example, future mobility business models may involve close collaboration among vehicle OEM, energy, infrastructure and insurance firms. When framing new relationships with potential commercial partners, manufacturing leaders should take an active role in defining their organization's positioning and contributions so that the partnership's value is distributed equitably.



Chapter 05

Key questions for manufacturers considering reinvention

Answers may help to address critical gaps.

The urgency around transformation has escalated as manufacturers grapple with multi-faceted disruptions. Reactive, short-term focused responses limit the vision for enterprise-wide transformation. When thinking about the right approach, manufacturers should consider the following questions:

- 1 Product and service innovation: How do we evolve our product portfolio to create dynamic products and services that address customer demands for smarter and more connected features, customization, and safety/security?
- 2 Customer experience: How does a shift from B2B to B2C or D2C impact how we operate today?
- 3 Operations:
 - a. How can we leverage emerging technologies to future-proof our supply chain?
 - b. How do we design our future manufacturing capabilities as a competitive differentiator?
- 4 Workforce and talent: How can we advance innovation as a core capability through hiring, developing, training, and incentivizing our employees?
- 5 Business model innovation: How do we innovate to drive the core business to peak profitability while simultaneously incubating new growth engines?

Answers to these questions may help leaders address strategic or operational gaps. With a clear vision of their organization's future ambitions in mind, and a strong strategy for innovation-focused transformation, leaders can position their organizations to accelerate growth and leapfrog their competition.



Summary

A range of disruptive forces have shifted operational priorities. Legacy manufacturers urgently need a better way forward. An innovation-led approach that incubates future opportunities while optimizing current products and operations can provide value-driven solutions for the short term and long term.



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EY | Building a better working world

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Enabled by data and technology, diverse EY teams in over 150 countries provide trust through assurance and help clients grow, transform and operate.

Working across assurance, consulting, law, strategy, tax and transactions, EY teams ask better questions to find new answers for the complex issues facing our world today.

About EY's Global Advanced Manufacturing & Mobility Sector

Urbanization, changing consumer expectations and emerging digital technologies are reshaping what's possible, from the production and distribution of goods to the transportation of people. To succeed in this new world of mobility and smart manufacturing, incumbents must transform themselves at unprecedented speed – to think like an innovative start-up, tap into new talent and engage the customer. With experience across the value chain and key technology alliances, our teams show clients how to create efficiencies now while adopting digitization and optionality for long-term growth. Automotive, transportation, aerospace, defense, chemicals and industrial products companies can draw on the strength of our network of cross-industry players and put our diverse range of approaches to use today to equip their businesses for tomorrow.

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