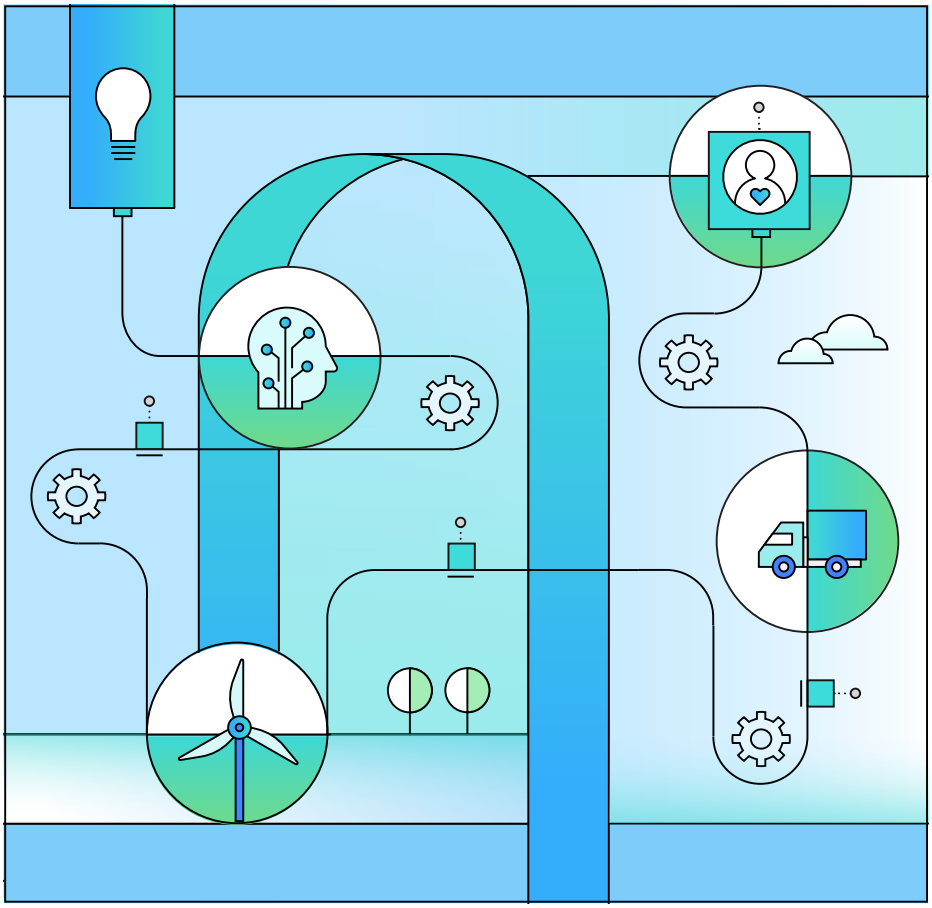

Sharpening a competitive edge with generative AI

Integrating product development, supply chains, and sustainability

IBM

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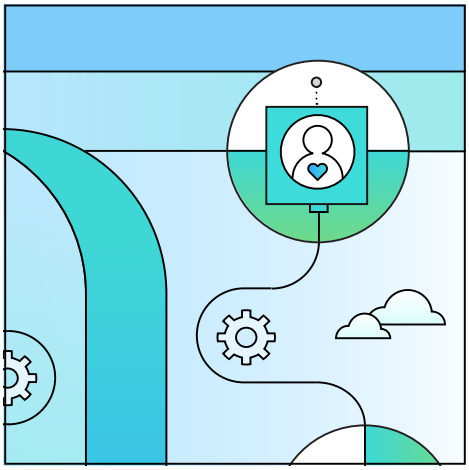


Key takeaways

Generative AI has significant potential to optimize new product development and improve supply chain operations for the consumer products industry.

Orchestrating improvements

Traditional AI and generative AI offer substantial opportunities to improve the success rate of new product launches for consumer products and orchestrate supply chain operations to improve efficiency and minimize waste.

Optimizing integration

Generative AI can optimize new product development, support interconnectivity with supply chain operations, and improve integration with suppliers and ecosystem partners to accelerate innovation and boost resiliency.

Supporting sustainability and regulatory compliance

Generative AI capabilities can support decision-making across the entire lifecycle of a consumer product, enable end-to-end sustainability, and support regulatory compliance across markets and regions.

Experiencing rapid adoption

Consumer product industry leaders are rapidly adopting generative AI. More than two-thirds agree or strongly agree that this technology is important to the future of their organization. And more than three-quarters of these leaders agree or strongly agree that generative AI should be adopted quickly to keep up with the competition.

AI ushers in a new era in product development

Launching a new product into the highly competitive consumer products marketplace has generally been a high-risk venture. Today, the hurdles are higher than ever.

Shifting consumer preferences, crowded markets, cost and supply chain pressures, regulatory compliance issues, and the churn of new products create an increasingly complex launch environment. As a result, a staggering 95% of the 30,000 new consumer products launched each year fail to meet their commercial objectives.[1]

Specifically, here are the top challenges facing the new product introduction (NPI) process in the 2020s:

Incomplete lifecycle view of a new product in the brand portfolio

When marketing, manufacturing, and supply chain teams operate in organizational silos, a lack of collaboration leads to delays, quality issues, and supply chain disruptions. Without a holistic product lifecycle view, it's difficult to know when to phase a product into the portfolio, when to plan for peak volume, and when to phase out, while limiting impacts on other products.

Inadequate market research and consumer insights

Failure to conduct thorough market research and gather accurate consumer insights creates products that do not meet customer needs or demand expectations. This leads to excess inventory, suboptimal sales performance, and supply chain inefficiencies.

Unrealistic timelines and tight deadlines

Aggressive timelines for new product development and launch put immense pressure on supply chains. This can impact financial performance downstream by expediting shipments and taking away production capacity from other profitable product lines.

Insights provided by generative AI can embed sustainability across the product lifecycle.

Decisions made upstream during the NPI process also create a cascade of downstream challenges, impacting supply chains and end-to-end product lifecycles. These include:

Constraints on suppliers and sources

Difficulties in identifying reliable suppliers, negotiating favorable terms, and ensuring stable supplies of new materials or ingredients significantly impact the ability to meet production and distribution requirements.

Limited supply chain visibility and coordination

Lack of end-to-end supply chain visibility and coordination contributes to communication disconnects, inventory imbalances, and inefficient distribution—which all compromise the success of new product launches.

Regulatory and compliance issues

When regulatory requirements and compliance standards are not addressed up-front during the product development phase, the risk increases for delays, product recalls, or supply chain disruptions—with deleterious impacts on cost and brand reputation.

Sustainability and supply chain transparency considerations

Neglecting to consider the sustainability impacts of new products and supply chain processes increases risks for regulatory non-compliance and missed opportunities to reduce costs and increase efficiency. Also, the level of supply chain transparency expected in the future will be significantly higher and needs to be considered in NPI.[2]

Inadequate risk management and contingency planning

Insufficient risk assessment and lack of contingency plans to mitigate potential supply chain disruptions—such as natural disasters, geopolitical events, or supplier issues—jeopardizes the success of new product launches.

To address the challenges and manage the risks involved with new product development, the consumer products industry needs a more forward-looking, data-driven, and end-to-end approach for decision-making. By assisting and augmenting product development, supply chain integration, and lifecycle management with generative AI, industry leaders can accelerate innovation, improve cost management, reduce waste, and boost overall efficiency.

Beyond optimizing NPI and supply chain integration, and managing regulatory compliance across markets and regions, generative AI brings another dimension to product lifecyle management—enhancing the user experience. Because generative AI supports human-centric design, it enables better product adoption and more informed decision-making.

Case study

Creating new perfume fragrances with AI

Symrise[3]

Based in Germany, Symrise develops, produces, and sells fragrances, flavoring and food ingredients, and active cosmetic ingredients for over 35,000 consumer products. Through its Aromas Molecules division, Symrise is also the world's leading producer of raw materials for fragrances.

With the consumer marketplace demanding the introduction of more new fragrances, Symrise saw an opportunity to unlock its treasure trove of over two million fragrance formulas. The key was artificial intelligence, applied to help Symrise manage ever-shorter product cycles, while making the overall product development process more efficient.

Initial fragrance design algorithms were created by developers and then improved on by AI tools. An AI assistant—named Philyra by Symrise—analyzed molecular structures, determined application areas, and factored in various markets and sales figures. Working with fragrance recipes and the characteristics of raw ingredients, AI ultimately helped perfumers create new fragrances by finding compositions that made a subtle difference.

The first market-ready Symrise product designed with AI was presented at the World Perfumery Congress in Nice, France. Two perfumes went on sale in 2019, marketed by the Brazilian manufacturer O Boticário, the world's third largest perfume maker. Today, AI is an integral part of the perfumers' toolbox, augmenting their refined sense of smell, and helping Symrise to automate and accelerate the creation of more products that customers want.

More than three-quarters of CPG leaders agree or strongly agree that generative AI should be adopted quickly to keep up with the competition.

The growing role of AI in the consumer products industry

Along with many other business sectors, the consumer product goods (CPG) industry has started leveraging generative AI to boost operations and assist decision-makers.

Generative AI's human-like output can make its results more intuitive and easier to trust, facilitating quicker adoption of generative AI-based solutions. Applications for this technology in CPG range from streamlining customer service with chatbots and digital assistants to more complex implementations. These include leveraging unstructured data for demand sensing and forecasting, as well as automating logistics management.

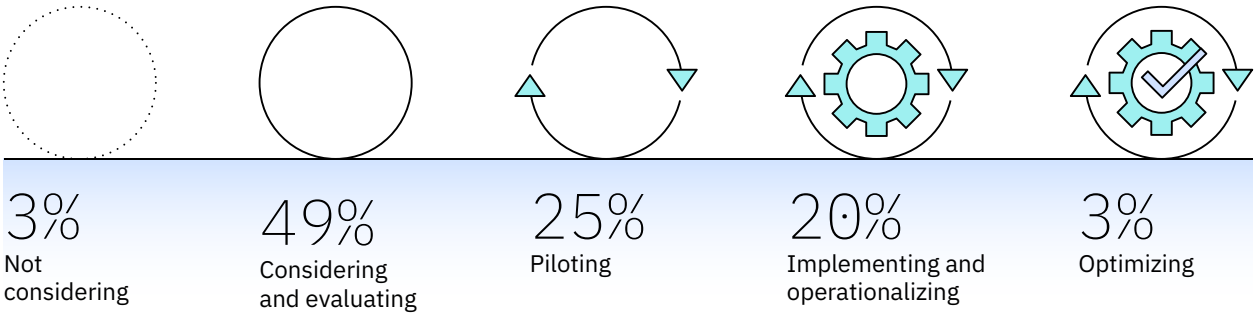
In the context of NPI, generative AI could help create new product designs and concepts by analyzing historical data related to popular product features or consumer preferences. Generative AI is expected to introduce further CPG efficiencies, with an internal IBM project assessment revealing opportunities to gain efficiencies by up to 30%.[4]

The latest IBM Institute for Business Value (IBM IBV) research shows that CPG industry leaders are adopting generative AI at a rapid pace. More than two-thirds agree or strongly agree that this technology is important to the future of their CPG organization. And more than three-quarters of these leaders agree or strongly agree that generative AI should be adopted quickly to keep up with the competition.[5]

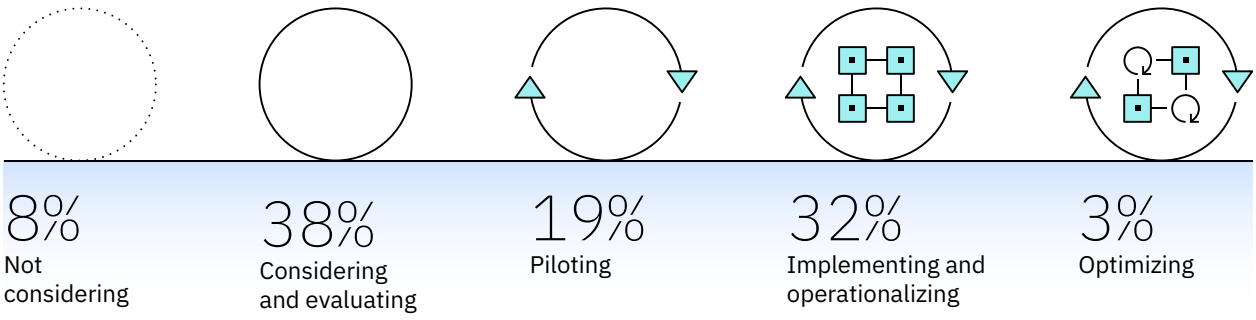
Nearly half of CPG organizations are piloting or implementing generative AI in the areas of supply chain, logistics, and fulfillment. 40% are piloting or implementing in product development but only 3% are currently optimizing this capability in product development and supply chain operations.[6]

FIGURE 1

Where organizations are in adopting generative AI for product development



Where organizations are in adopting generative AI for supply chain operations



Source: Unpublished IBM Institute for Business Value study. Survey of 225 global retail and consumer products goods executives.

By ingesting large amounts of information at unprecedented speeds, generative AI can summarize complex documents and create content to provide insights that would not otherwise be possible.

Where generative AI has potential to contribute more value

For years, CPG leaders have been looking for ways to improve the end-to-end management of a new product, from initial design and development to product phase-out. Because generative AI is informed and trained on such a broad corpus of product and market data from so many stakeholders, it can have a pivotal role in orchestrating the process for greater visibility and efficiency.

Working in partnership with trusted suppliers, NPI research and development teams can use proprietary data from suppliers to train generative AI models. Enhanced generative AI capabilities, informed by large amounts of structured and unstructured supplier data, provide insights to technologies and solutions that would not otherwise be visible. Generative AI provides conversational knowledge, summarization of complex documents, content creation, and code creation capabilities to support product development, especially during the earliest stages.

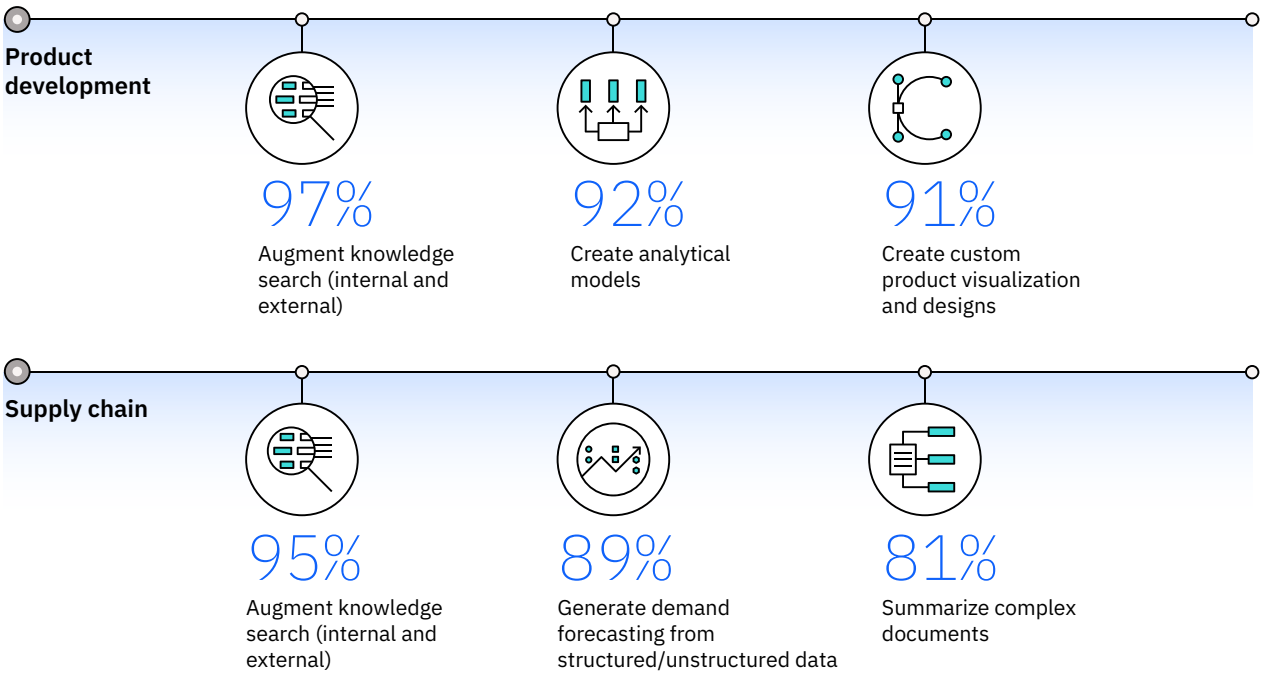
For example, if a packaging supplier provides detailed product and innovation information into a shared database, this can accelerate product development for a CPG company when generative AI is used to act on this data. The incentive for a supplier to share data can be significant—CPG experts expect they would more likely be awarded the packaging contract.

Another use case for generative AI is during new product exploration when research and development specialists scout for new technologies and materials. By ingesting and understanding large amounts of data from research publications, news reports, trade events, social media, and other sources, AI can summarize the art of the possible, and help planners quickly identify suppliers with the capabilities to deliver on emerging technologies. This approach could increase new product performance and market potential.

The goal state, enabled by generative AI, is to optimize cost and performance at inception instead of incrementally after launch. It can change the paradigm; for example, by rewarding procurement managers for building in cost savings at product launch instead of trying to cut materials costs for years after product launch.

FIGURE 2

Ranked value of generative AI use cases for product development and supply chain functions



Source: Unpublished IBM Institute for Business Value study. Survey of 225 global retail and consumer products goods executives.

Generative AI can anticipate the impact of compliance with new regulations and manage regulatory compliance more comprehensively.

Specifically, here are a dozen areas where generative AI has the potential to make a quick and long-term impact on how a new product is developed and launched, and how it performs as part of a larger product portfolio in the marketplace:

Make strategic product planning and portfolio management more strategic

Generative AI can help product planners accurately predict if a new product will cannibalize sales from an existing product. This technology can optimize choices and revenue from the overall portfolio and inform the launch of new products in specific channels that avoid impacting the sales performance of other products.

Enable the operation of digital twins

Generative AI enables the creation of operational digital twins representing the end-to-end supply chain. Before a new product is developed and launched, the digital twin can simulate and model how a new product will perform and impact the supply chain, enabling a positive feedback loop to inform decision-makers.

Limit the number of minor product changes impacting the supply chain

Generative AI helps new product planners stay current with consumer preferences, anticipate the impact of compliance with new regulations, and understand vendor terms and conditions with more clarity and assurance. This timely knowledge can help reduce product change orders delivered to manufacturing facilities. These changes can drive higher costs, such as obsolescence of materials due to minor artwork alterations. Changes also lead to bureaucratic delays and additional costs.

Generate customer personas for product testing

Generative AI can accelerate the early stages of product development and suggest product characteristics that meet the needs of specified customer personas.

Assist package design and materials planning

Generative AI can assist package designers, develop artwork and copy for product packaging, and explore options for personalization. Optimized design processes and more efficient material can yield faster turnaround on testing options for consumer preference and increase consumer uptake while reducing costs.

Forecast demand with more precision

Generative AI takes demand forecasting to a new level of usefulness and accuracy by leveraging large amounts of unstructured data to create accurate demand forecasts. In a recent IBM IBV benchmark survey, 48% of executives indicated that generative AI is expected to lower forecast error by 20% and reduce inventory carrying costs by 24%.[7]

Manage suppliers and regulatory compliance more comprehensively

By summarizing supplier performance across the supply chain ecosystem, along with finance and sustainability metrics, generative AI can improve the reporting of supplier performance and expand gross margin opportunities. Taking advantage of generative AI's ability to produce useful summaries derived from vast repositories of reports, logs, manuals, and other sources can also improve a CPG company's capabilities to comply with regulations across multiple markets and jurisdictions.

Extend product lifecycle management

Generative AI tools can train and tune models to handle product requirements, provide translation services, and optimize design workflows. Once products are manufactured, these tools can manage bills of materials and provide engineering assistance. The benefits: greater efficiency, accelerated innovation, more innovation, reduced time to market, and faster response to changing market and consumer trends.

Expedite product tracing and returns

Automation enabled by generative AI can accurately classify reasons for returns, prioritize return policies, and better predict rates of return, with corresponding cost savings, increased customer satisfaction, and streamlined logistics operations.

Make product transition planning more efficient

One of the most complicated decisions to make is when to pull a product from the shelves and replace it with a new product. Generative AI creates models to optimize transition plans, working backward from the retailer and distribution channels, down to manufacturing and packaging. Decision-makers benefit from multiple points of views and can make choices that work best for all links in the supply chain.

Improve management of trade promotions and promotional funds

Generative AI can take the guesswork out of managing trade promotions by creating strategic alternatives, analyzing decision parameters, spotting value creation opportunities, and identifying and prioritizing product and portfolio risk.

Improve management of sourcing and inbound logistics

By using generative AI, a CPG company can consolidate key sourcing and supply chain data in real time and summarize status and alerts. Faster and more accurate identification of supply issues contributes to greater manufacturing efficiency.

Case study

Capturing institutional knowledge and improving productivity with an AI assistant

British Sugar[8]

British Sugar has been the sole processor of British sugar beets for over 110 years. The company partners with approximately 2,300 growers to process over eight million tons of sugar beets into about 1.2 million tons of sugar every year, supplying around 50% of the UK market. However, with rising input costs, volatile weather patterns, disparate data sources, and employees relying heavily on the experience of colleagues, British Sugar needed a better way to share institutional knowledge at every level of the organization.

With many experienced experts at or near the retirement stage of their careers, preserving and sharing their knowledge is becoming ever more important with each passing year. To capture the knowledge and expertise of these individuals in a timely manner, British Sugar decided to investigate how operational data, coupled with AI, could augment knowledge search and quickly summarize thousands of data points. The aim is to deliver operational prioritization, combined with rapid interpretation of complex documentation.

Now, with a proof-of-concept generative AI assistant, optimized for mobile use, operational employees can get the detailed answers they need in 10 to 20 seconds, rather than in 10 to 20 minutes, as could previously have been the case. British Sugar continues to develop generative AI to inform a digital twin of the business network, optimize smart factory operations, and create a control tower view across multiple sites to monitor predictive maintenance, crop volumes, supply chain plans and operational performance.

"Harnessing generative AI, our solution processes millions of data points through language—the foundation of all decisions—significantly augmenting human ability and transforming manufacturing efficiency and innovation."

Daniel Simkiss, Head of Industry 4.0, British Sugar

Generative AI adoption in CPG: The decisive role of data and standards

As more consumer goods companies see the potential for generative AI to optimize new product launches and supply chain operations, they are running into many of the same barriers to adoption encountered by other industries. When analyzing the top six barriers identified by CPG leaders, data-related issues comprise half of these obstacles.

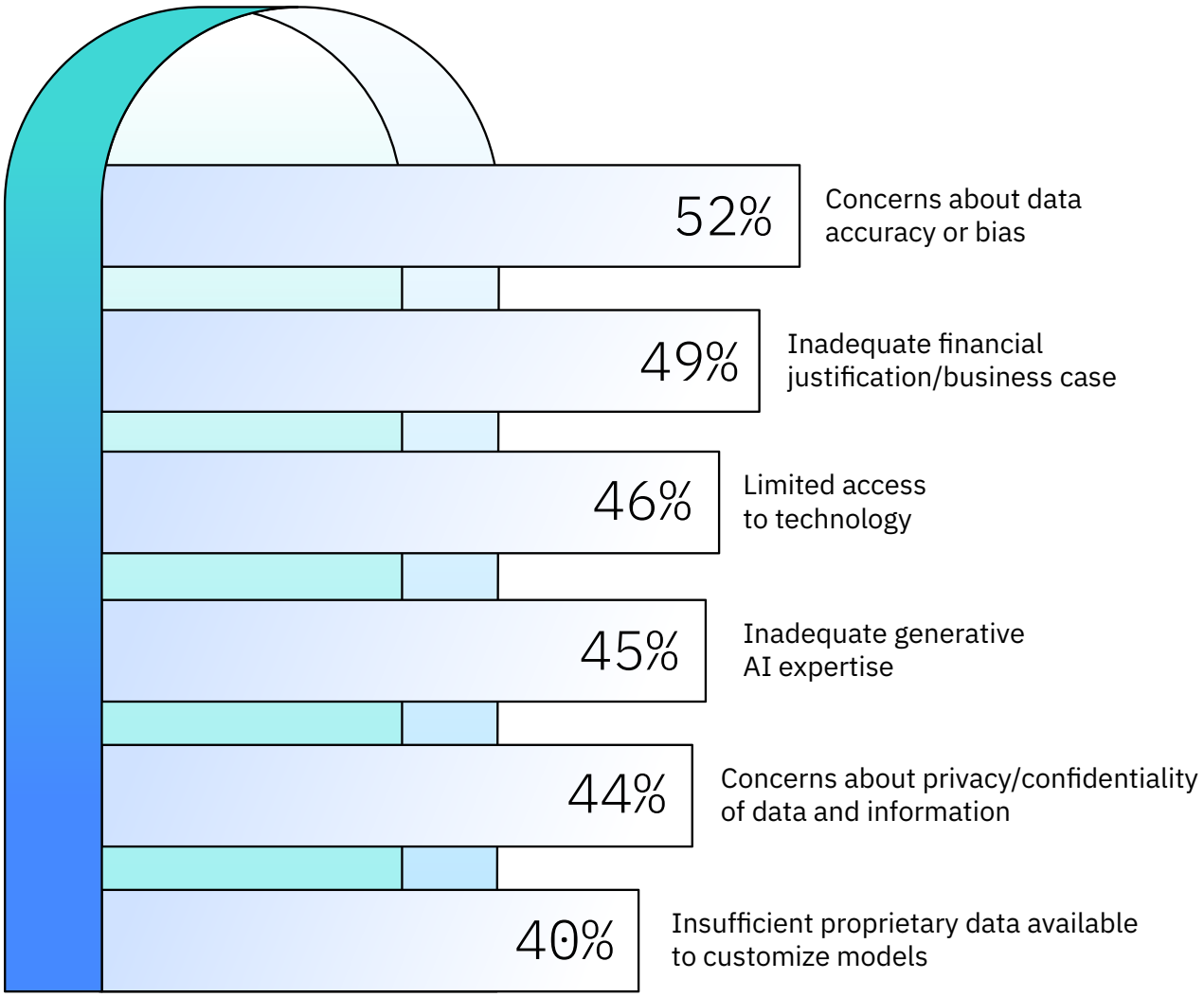
To make data-driven decisions, understanding the data is vital. The nature and quality of the data will also determine whether traditional automation, machine learning (ML) or generative AI is the most effective approach to solve a specific problem. In terms of strategic fit, generative AI is not a one-size-fits-all solution. Traditional automation and ML remain crucial technologies in many application scenarios.

The lack of clear standards is causing 51% of Consumer CEOs to delay investments because they lack clarity. In addition, 63% of these CEOs say they lack consistent standards—such as data, privacy, and sustainability—in one or more areas of strategic focus.[9]

Agreement on clear standards and the availability of timely and trustworthy data about customers, markets, and operations are the lifeblood of the CPG industry. Effective standard setting and management and governance of data will be essential to train and run the models generative AI requires for successful adoption.

FIGURE 3

The top six barriers to adopting generative AI



Source: Unpublished IBM Institute for Business Value study. Survey of 225 global retail and consumer products goods executives.

Case study

Using AI to streamline regulatory management across regions

A global consumer products company[10]

This multibillion-dollar consumer products company has a business presence across Europe, Asia-Pacific, the Middle East, Africa, and the Americas. Operating in the highly regulated agricultural products industry, the organization devotes significant resources to manage compliance with local regulations, stay current with continuously changing regulations, and integrate compliance into the product development process.

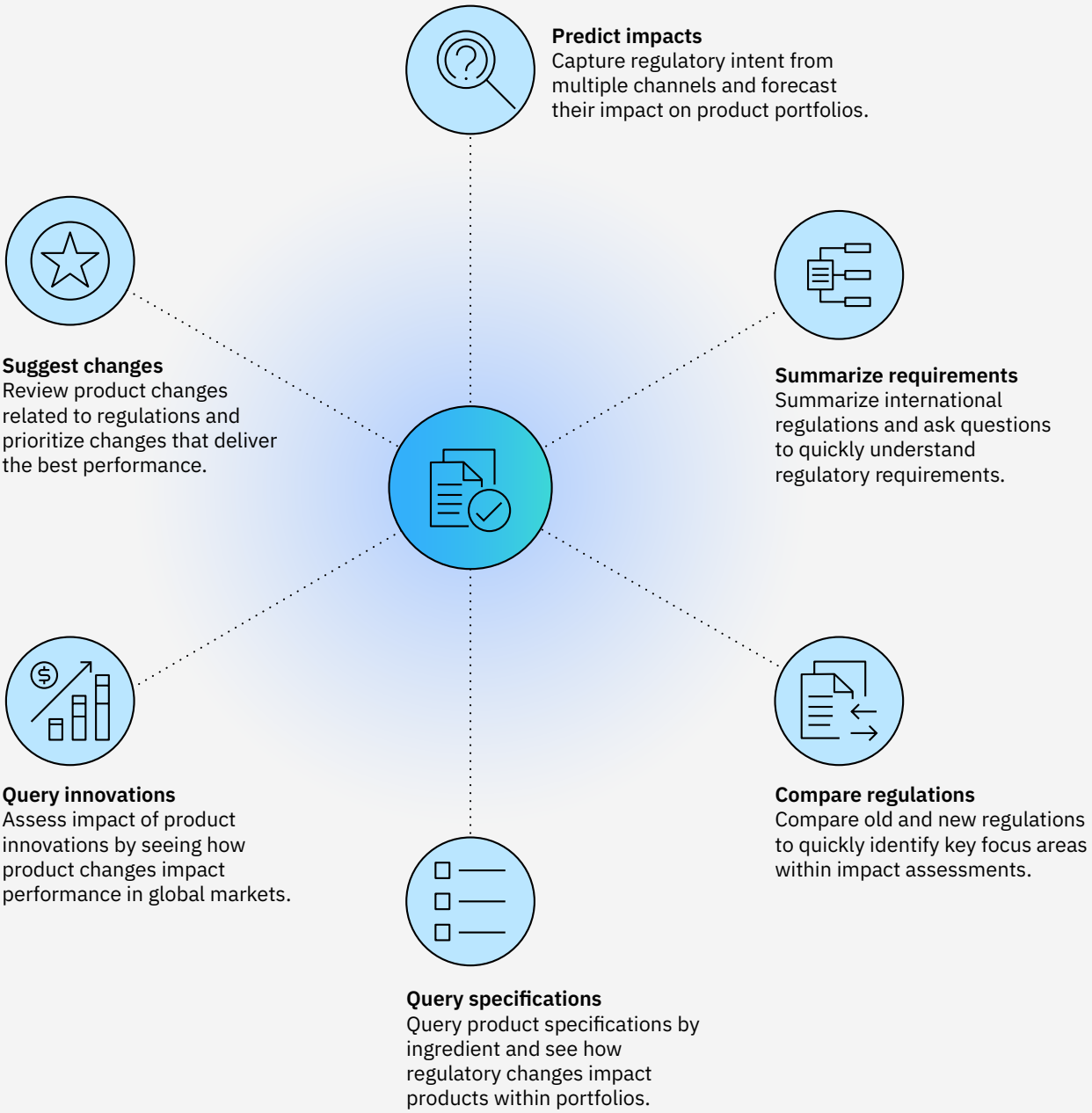
Looking for ways to help its product compliance and development teams reduce heavy manual workloads and free up more time to work strategically, the company developed a generative AI-powered regulations assistant. This solution for efficient and accurate regulatory management—with a conversational user interface—provides a single source of truth for over 1,000 regulations impacting worldwide operations.

The regulations assistant enables product compliance employees to predict the impact of regulatory intent, summarize regulatory requirements, and compare regulations globally—all within minutes, instead of hours or days. The AI tool also enables product developers to analyze the impact of regulations on product portfolios, review solution options, and query product specifications in a seamless conversational journey.

To date, the regulations assistant has met its proof-of-concept objective: to demonstrate that generative AI can orchestrate regulations data in a matter of minutes and drive closer collaboration across borders to leverage regulatory success across the business. The tool also has the potential to increase efficiency by 8% to 13%, increase productivity by 10% to 15%, and increase profits by over 165 million USD during the next five years.

FIGURE 4

How a generative AI assistant can augment and expedite regulatory compliance



Embed operations with AI and sustainability for greater benefits

A growing number of business leaders no longer see sustainability and operations as separate or competing initiatives. Instead, they strive to optimize investments and efforts to achieve business objectives in both areas. Three out of five consumer products leaders say they purposefully align sustainability goals with their business operational objectives.[11]

Most of the lifetime sustainability costs of a product, as well as its carbon footprint, are set during the design phase of product development. When sustainability considerations are factored in at the earliest stages of a product lifecycle, they are more likely to be embedded in operations and yield greater business benefits. That's why using generative AI tools during the critical NPI planning and product development phases can make such a significant rapid and long-term contribution to sustainability and operational goals. For example:

- 69% of consumer product executives say generative AI will be important for their sustainability agenda.[12]
- 73% of organizations plan to increase their investment in generative AI for sustainability.[13]

As with driving operational efficiency, it is essential for business to have the data platform and infrastructure in place and turn this valuable information into actionable insights for decision-makers. Organizations that embed sustainability are better at converting their data into sustainability benefits, and 84% of consumer product executives agree that high-quality data and transparency are necessary to achieve sustainability objectives.[14]

Business leaders recognize that generative AI creates new opportunities for tapping the potential of data for sustainability, and 83% of them agree that they are more likely to achieve great benefits to sustainable innovation and product/service development from their data capabilities.[15] In addition, 56% of consumer products executives say that generative AI models with visualization will uncover supply chain bottlenecks in real time.[16]

Case study

Making supply chain logistics more sustainable with integrated technologies

Smart Green Pallet[17]

Pallets are vital components in supply chains and make it possible to ship products in bulk more quickly. However, the ability to track pallets is limited. Carriers sometimes provide information during key stages of delivery, but this monitoring is not sufficiently detailed to allow goods to be traced and their status to be checked in real time.

Today, four out of 10 companies use IoT technology in their supply chains to trace goods and monitor storage conditions. This information is usually for internal use. But with blockchain technology—a reliable and secure distributed digital register—this information can provide end-to-end traceability. It can also eliminate or reduce the impacts of product quality losses or damage within distribution channels.

The Smart Green Pallet initiative, powered by blockchain, helps ensure comprehensive traceability, resulting in a reduction in disputes, better monitoring of the quality of goods, and substantial savings in transport costs and pallet management. Smart Green Pallets—with real-time sensors to report on the location and condition of the palletized goods via connections to blockchain and IoT networks—also have sustainability benefits. By combining recycled, recyclable, and reusable pallets with IoT and blockchain, the lifecycle of each pallet can be optimized in favor of the environment.

As companies adopt IoT and blockchain technology and apply AI solutions to gain insights from the collected data, Smart Green Pallets can make a growing contribution to supply chain sustainability.

Action guide

Build a trustworthy data foundation to realize the full potential of generative AI.

A strong data foundation is essential for building and tuning AI models on proprietary information—the data that differentiates your brand. Conduct a data assessment to understand when high-quality, structured data might benefit more from traditional automation or ML, while unstructured data could be better suited for generative AI.

Start small, think big, and determine if generative AI or ML is the best fit.

Assess your current NPI processes and identify initial use cases that offer the biggest opportunities for improvement. Use traditional automation for routine tasks, leverage ML for predictive tasks, and adopt generative AI for applications that benefit from natural language understanding or creative content generation to make complex data more accessible and actionable.

Build user trust through transparency.

Ensure that users understand generative AI systems and their decision-making processes. This will build trust and confidence in digital assistants and other augmentation tools. Achieving transparency can be difficult with complex AI models, which might operate as “black boxes” to users. Review and refine solutions based on user feedback and performance metrics to ensure they meet business needs.

Engage partners and stakeholders as early as possible.

When suppliers, manufacturers, procurement managers and others share information about processes and innovations, and use generative AI on this data, it accelerates product development and increases business opportunities for everyone. When issues and opportunities are identified up-front, the likelihood of a successful product launch increases, and the need for costly, downstream rectification diminishes.

Design for user experience and create moments that matter.

Design systems that are intuitive and enhance human interactions, such as interactive dashboards that simplify complex data insights for supply chain managers. Balancing simplicity and functionality can be challenging, and overly complex systems can hinder user adoption.

Manage new product launches as part of the entire product lifecycle—and make them sustainable from the start.

Activate sustainability data and insights for improved performance across the enterprise and ecosystems, understanding where specific generative AI use cases add value or introduce risks. Use generative AI to find patterns that inform better pricing, budgeting, and incentive mechanisms based on sustainability metrics and data.

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