

Research Insights

Resetting the rules for consumer companies

The race for post-COVID
competitive advantage



How IBM can help

For more than a century, IBM has been providing businesses with the expertise needed to help consumer products companies win in the marketplace. Our researchers and consultants create innovative solutions that help clients become more consumer centric to deliver compelling brand experiences, collaborate more effectively with channel partners, and align demand and supply.

For more information on our consumer product solutions, see ibm.com/consumerproducts. With a comprehensive portfolio of retail solutions for merchandising, supply chain management, omnichannel retailing, and advanced analytics, IBM helps deliver rapid time to value. With global capabilities that span 170 countries, we help retailers anticipate change and profit from new opportunities. For more information on our retail solutions, please visit: ibm.com/industries/retail.

Key takeaways

Embrace the “ands.” During COVID-19, brands and retailers have faced enormous demand volatility, igniting the need for their supply chains to be, not only more efficient, but also more agile, and consumer companies themselves to be more competitive in customer interactions, product innovation and development, and operations.

Find your “essential.” To help consumer companies navigate the increased demands of embracing the “ands,” they must find what makes them unique, identify their essential differentiators, focus on them, then rely on partners to help with the rest.

Scale the “pivot.” The ability to shift quickly—pivot—became a core requirement during COVID. Now consumer companies must operationalize this ability—in other words, “scale the pivot” by applying AI, intelligent workflow and automation, IoT, and cloud to expand their digital transformations.

A new reality takes hold

In the wake of COVID-19 and the sudden changes it’s wrought, brands and retailers must operationalize agility the same way they’ve operationalized efficiency over the past 20 years.

At the same time, the pandemic has accelerated innovations—many already in plan—as companies around the world respond to the disruptions. These innovations are creating opportunities to shift the paradigm of the industry.

The current climate is ushering in an era of “ands”: efficiency *and* agility; stellar digital customer experience *and* highly skilled frontline sales and service associates; sustainability *and* lower costs, among others.

To better understand the changes, challenges, and opportunities facing the industry, we conducted a survey of nearly 2,000 consumer products (CP), retail, agribusiness (Ag), and wholesale executives. They are leaders in supply chain, operations, customer engagement and sustainability across 24 countries. In this report, we’ll focus on how companies are navigating this disruption, their priorities over the next 6 to 12 months, and the requirements for longer-term success.

Maintaining continuity while building resilience

The biggest challenge during COVID-19, cited by more than half of executives surveyed, has been the inability to maintain business continuity, followed by financial loss, and cybersecurity threats. In response, organizations are exploring new work models, reducing costs, and transitioning to a more secure and resilient infrastructure.

As the pandemic continues to surge in different parts of the world, lockdown measures are still being imposed. Businesses are operationalizing scaling measures they put in place last year to support healthy employees, safe customer interactions, and sustained workplace operations. Over 70% of consumer products companies, and over 80% of retailers, have taken these actions.

Consumer company execs planning for new opportunity



55%

building agility to adapt faster to changes in demand



61%

accelerating automation for higher productivity



More than

80%

likely to use a combination of AI, intelligent workflows and IoT, or Cloud, intelligent workflows and IoT, to help them achieve future success.

They are also establishing new processes and procedures to minimize operational disruption and keep things running if disruption occurs. And consumer companies are focusing on building IT resilience across the enterprise in response to a much more distributed IT landscape.

From crisis to opportunity

In the beginning of the pandemic, government actions caused the industry to bifurcate into categories deemed “essential” (grocery, personal health, and household) and “nonessential” (fashion, entertainment, and travel). Companies needed to provide greater trust and transparency while rapidly accelerating their digital commerce agendas. These changes shaped consumer expectations and behaviors, many of which will endure after the pandemic is over.

As economies started to re-open, consumer companies had to rethink and clarify what it takes for them to be essential.¹ This involves identifying which aspects of the business both differentiate and deliver significant value, then focusing internal efforts there, while relying on partners for other capabilities.

When asked about the top 3 overall business goals for the next 6 to 12 months, growing revenue was cited as most important for both retail and consumer products executives. In consumer products, this was followed by increased efficiency and improved product; in retail, the next 2 goals were increased agility and improved customer experience. These goals have driven initiatives across supply chain, operations, stores, and customer experience, and are evidenced in the priorities they’ve set for the next 6 to 12 months (see Figure 1).

Embracing the “ands”

Among these goals, the most notable trend is that companies need to embrace multiple, sometimes competing priorities simultaneously, such as efficiency *and* agility, improved physical *and* digital customer experiences. Other examples include brands and retailers tightening demand *and* flexing supply, scaling online *and* enabling the frontline, planning for both unanticipated disruption *and* expected transition. Companies must acknowledge this new reality and learn to embrace these “ands” across business domains.

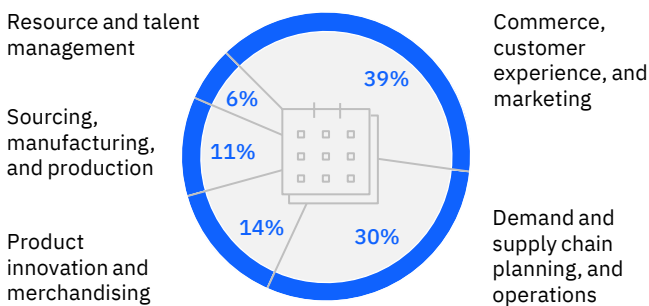
Consumer companies must embrace both efficiency and agility in equal parts—not one over the other.

Figure 1

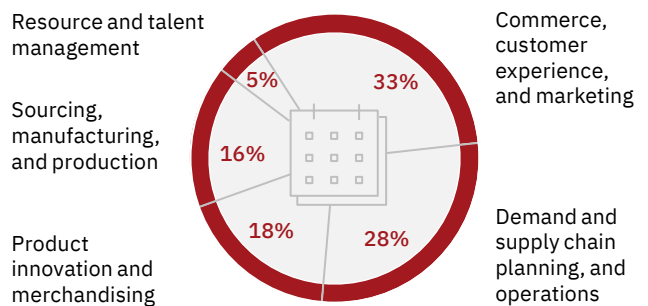
Achieving business goals

Top priorities for the next 6-12 months

Retail



Consumer products



Higher operations efficiency and agility

Operations efficiency is a long-standing pillar for the consumer industry, fueling growth through wider margins and generating capital for potential brand acquisitions. Supply chain organizations, in particular, contribute to this cause, with ongoing cost reduction and productivity initiatives that surface and resurface during corporate strategic planning exercises.

In contrast, agility—the ability to respond to marketplace change—has traditionally been a fleeting objective for the supply chain. Unlike efficiency, it’s often associated with unanticipated events that can drive industry segments to target a specific dimension of operations. Think, for example, of a food-borne illness that affects a retail grocer that, in response, increases the visibility of its supply. Until now, agility has been an occasional priority when useful.

In the wake of the pandemic, 93% of organizations experienced challenges with demand volatility, igniting the need for supply chains to be, not only more efficient with cost, but more agile in execution.² The consumer industry has endured over a year of disruption in anticipation of a return to a different but somewhat stabilized normal. And yet, consumer demand and expectations continue to fluctuate, while operational supply and capacity try to follow a moving target.

As consumer goods manufacturers and retailers contend with the next shift, they must embrace both efficiency and agility in equal parts—not one over the other.

Logistics operations is an example of this two-pronged approach. Traditionally, moving and storing product to meet demand has predominantly been a function of cost, be it inventory waste, truckload utilization, carrying cost, and other value levers.

But with a sustained increase in demand volatility, retail and wholesale logistics are augmenting cost efficiency with the flexibility to respond to variability. To mitigate disruption, nearly half the industry—51% consumer products, 48% retail—is setting up alternative modes of transportation and logistics. The criticality between the two priorities is quite even: 52% of retail executives are reducing operational cost and 58% are building agility to adapt faster to changes in demand.

Manufacturing operations have begun to follow suit. As with logistics, plants carry cost-saving objectives in terms of material, labor, and overhead. And while production flexibility has been a recognized priority with measures like throughput and yield, investments in the past have been incremental given the capital expense required for equipment overhauls and installations.

But for the post-pandemic era, the investments being made in efficiency and agility are more on par with each other. 61% of executives are accelerating automation for higher productivity and 49% are exploring new ways of increasing production capacity. Consumer goods manufacturers such as Campbell's and Nestle are well underway with new equipment and new lines to provide future capacity.³ To further manage this risk, nearly one third (29%) are collaborating with suppliers to further strengthen their ecosystems.

Better physical and digital customer experience

Even in countries where online shopping hadn't been easy because of underdeveloped infrastructure and the predominance of unbanked consumers, COVID-19's disruption forced rapid changes (see "Perspective: Sudden shifts make all experiences paramount"). Over the next 6-12 months, 39% of retail executives expect to focus on commerce and customer experience as their top priorities.

And even as restrictions ease, safety will remain a priority for shoppers and associates. Retail executives understand this: 81% are focusing on new processes and procedures to provide workplace and store safety.

Retailers will need to continue prioritizing safety measures, especially those that increase customer satisfaction. 70% of executives selected contactless payment technologies as the most critical technology for their organization. Walmart introduced self-checkouts with contactless payment options, pickup and delivery.⁴ In Germany, contactless payments boomed from 35% to more than 50% due to the pandemic. China saw the highest adoption rate.⁵

In addition to implementing standalone technologies like contactless payment, retailers are accelerating investments to build capabilities that harmonize the digital and physical channels and improve customer experience.

In the first quarter of 2020, a large electronic retailer saw a surge in demand online during lockdown. At the same time, it also saw that 40% of its ecommerce orders were still being picked up either in-store or at curbside.⁶ The retailer realized quickly that there was a considerable demand from customers who wanted to come to the store to get the item they purchased as quickly as possible. This retailer quickly enabled in-store pickup chain-wide to supply what their customers needed, wherever and in whatever time frame they wanted it. As stores reopened, customers gravitated to more complex sales in the stores.

Perspective: Sudden shifts make all experiences paramount

One of the remarkable effects of the pandemic has been a rapid acceleration in online shopping in parts of the world that had historically been slow to come on board.

In Mexico, for example, fewer than half of adults have bank accounts and less than 5% of retail sales had been online prior to the pandemic. The pandemic quickly changed that.⁷

With stores shuttered, millions went online to buy. In one quarter alone, Walmart de Mexico's online sales in Mexico grew 217%. A similar shift occurred in other countries initially slow to adopt online shopping, such as India, Brazil and Russia.⁸ Suddenly, having the best in-person shopping experience mattered little, whereas having a clunky digital shopping experience could be a company's death sentence.

Companies responded by hardening their platforms, improving payment security, increasing the speed of deliveries, and enhancing customer service—even tapping social media platforms to help. MercadoLibre, Latin America's largest e-commerce retailer, used its own planes to reduce shipping times as online sales surged across the region.⁹

Of course, this doesn't mean the physical shopping experience has become an endangered species. In fact, as the pandemic eases, companies will face the need to deliver differentiating customer experiences both in person and online, as buying habits adopted during the pandemic will, no doubt, have staying power, even as people begin to return to physical stores. And, they will most likely expect the two worlds to sync seamlessly.

A company can't prioritize everything, which is why finding its essential differentiators is so critical.

While customers want to be in control of their orders, they also want interactions, a prime reason to visit a physical location. Once in a store, they have high expectations for the interactions and consultation they seek. Hence, store associates must be fully able to help customers and contribute to a great experience.

Nearly half of executives—47%—indicated they are expanding tools for field and store associates to improve productivity and better serve customers. Retailers that fail to meet customer expectations risk the loss of confidence from their customer base, at a time when gaining trust and confidence has never been more important.

Find your essential

Embracing the “ands” could sound like a formula for diffuse action, aiming to achieve everything needed but not accomplishing anything meaningful in the process. How does a company strike the right balance to succeed in this environment?

A company can't prioritize everything, which is why finding its essential differentiators is so critical (see Figure 2). This requires the company to assess what makes it unique, then use this insight to differentiate itself. What's more, executives need to be candid about what their company does best, where it can scale quickly, then determine where to rely on partners to help out with the rest.

Figure 2

It's all important

Multiple areas of near-term focus in the current environment

Retail



Supply chain



Consumer products



Consumer experience



Operations



Innovation and technology



In retail, companies focus on the customer experience through service etiquette and dynamic feedback.

According to our latest CEO study, successful organizations are competitive in three areas: customer, product, and operations.¹⁰ In consumer products, outperformers prioritize operations, stressing disciplines such as efficiency, distribution, pricing, and transparency. This focus is even more pronounced with nearly half (44%) of consumer products companies prioritizing manufacturing and supply chain operations over the next 6 to 12 months. In addition, outperforming consumer products companies have a more forward-looking perspective, positioning themselves for the future by emphasizing factors such as emerging technology.

In retail, companies focus on the customer with heightened attention to relationships. Outperformers maintain customer experience as the top priority through service etiquette and dynamic feedback.

But while a retailer may largely view itself as being very customer-centric, many companies still operate in a traditional manner. Their organizational structures and profit and loss statements are still channel-based. They focus on the products they sell—instead of thinking about selling solutions. Their customer databases are based on transactions. And their marketing focuses on guiding consumers through a path to purchase, rather than cultivating long-term relationships.

Instead, companies need to expand their use of AI. They need to make decisions based on insights from data, then test and execute rapidly across operations to become more customer-centric. 52% of consumer products and retail companies are investing in analytics to improve speed and quality of decision making. Nearly half—51% of consumer products, 49% of retail—are rapidly testing, learning and scaling new ideas, and accelerating modernization initiatives to increase agility in meeting the needs of consumers.

The nature of work at consumer companies also needs to change, shifting from siloed operations toward integrated, empowered agile teams. This will require change in every area of the organization. It also requires adjustments to business models and key metrics, to a company's approach to people and culture, and to how data is organized and managed. By focusing everything on its essential core, a company can succeed in an environment of increasingly challenging demands.

Operationalize the ability to pivot—at scale

2021 will be a year of transition. In 2020, organizations were forced to develop and launch new capabilities, many seemingly overnight, as they pivoted to meet the new demands of COVID-19. But the post-pandemic world that is slowly emerging will require them to operationalize these new capabilities. In other words, companies need to “scale the pivot.”

To do this, they need to close gaps in their business operating model: organization structure, performance measures, business processes, and technology platforms. Many executives have already begun this important work.

A recent IBV study revealed 60% of executives are dramatically accelerating their company's digital transformation. And two-thirds said that the pandemic has allowed them to advance specific transformation initiatives that had previously encountered resistance.¹¹ An examination of the specific technologies these executives feel will most help them is informative (see Figure 3).

Essential technologies top the list, such as contactless payments and biometric-enabled security that can safeguard the workplace and stores. Mobile device management that enables contactless interactions ranked third on the list. While these could be considered “stand alone”—there is significant value in each being adopted by itself—there are many other technologies that, when used in combination, make up successful solution recipes.

Executives indicated that many of these critical technologies—AI, intelligent workflow and automation, IoT, Cloud, and advanced analytics, for example—were performance differentiators for their future success. According to our analysis, executives are more than 80% likely to choose to use a combination of these technologies together to help them achieve future success.

For example, 87% of executives selected AI, Intelligent workflow, and IoT together when asked what critical technologies they need to achieve future success. 85% selected intelligent workflow, Cloud, and IoT as an optimal technology combination.

These findings echo our 2020 CEO Study, which identified AI, Cloud and IoT as performance differentiators. These capabilities are often linked and self-reinforcing.

IoT enables data collection from devices and equipment in manufacturing, logistics, and store operations. AI learns and reasons from this data and recognizes semantic references to use as criteria for making autonomous decisions that self-correct over time. The decisions and results of AI analysis can then be organized and disseminated via cloud within the enterprise and across a business ecosystem.

Together, IoT, cloud computing, and AI represent where future-focused organizations will derive an advantage, redefining how work gets done into what we call intelligent workflows and automation.

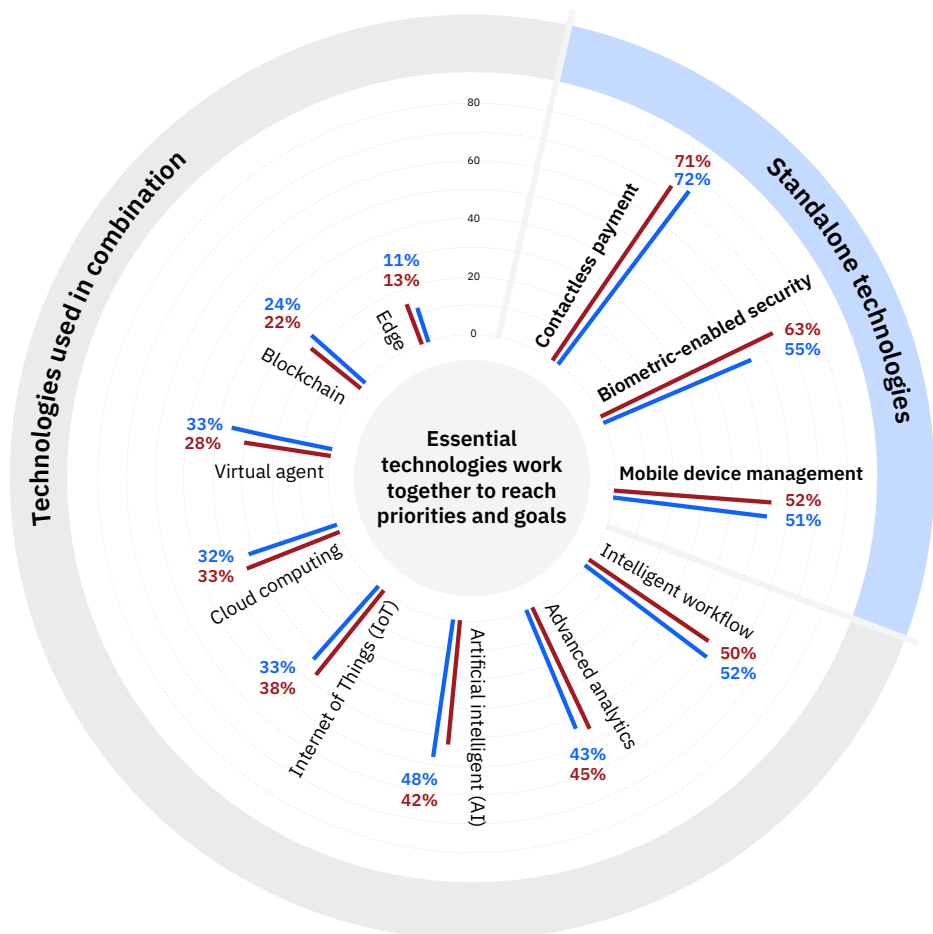
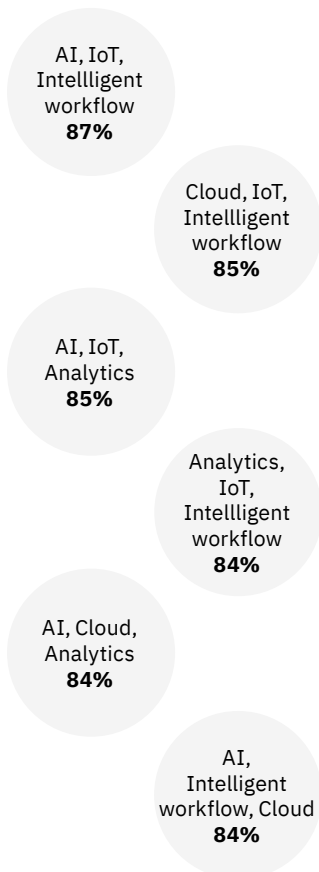
Figure 3

Orchestrating success

Three stand-alone technologies and a host of others that are used in combination

Retail | Consumer products

Highly used combinations



When used in concert, these technologies enable comprehensive supply chain visibility, as well as continuous collaboration and execution. This, in turn, supports a rapid response and resolution to issues in a dynamically changing market. These technologies can also help a company anticipate and quickly meet evolving consumer expectations as they unfold.

An international beauty and personal care brand, for example, is investing in Industry 4.0 to transform its business (see Definitions: Industry 4.0).¹³ It aims to become more agile and efficient while reducing the time to market for its products. Technologies such as IoT, augmented and virtual reality, and AI form the basis of its smarter factory.¹⁴ The company is also automating and optimizing the flows in its distribution centers—located in more than 50 countries—to simplify order preparation. As a result, the company is now able to deliver one order every two seconds, and thus to supply more than 500,000 delivery points all over the world.¹⁵

A leading retailer in Canada had been planning to transform from brick-and-mortar to omnichannel, but the onset of COVID-19 turned their plan from intent to urgent need. It re-platformed its eCommerce and decomposed its CRM system into micro-services, using the IBM Cloud for speed and agility. With a hybrid cloud architecture, the retailer was able to shift its brand strategy and transform its business in 6 months, as opposed to the 12-14 months originally planned.

Analysis from our recent study shows that outperformers use cloud capabilities for more advanced agile development and delivery 93 percent more frequently than others, and 75 percent use advanced cloud and data more often to respond to changing expectations.¹⁶ Today, this retailer is able to activate personalized promotions and appeal to individual customers in microseconds. It can also get real-time, accurate updates on inventory regardless of whether a purchase is in-store, online or a transfer between sites. And with AI as an enabler, it is now able to support complex analytical needs at a much faster pace and maintain business continuity in the most challenging circumstances.¹⁷

Definitions: Industry 4.0

Industry 4.0 typically refers to a set of innovations that build on previous “industrial revolutions.” It includes the use of digital technologies such as IoT, AI, and 5G to foster ubiquitous interconnection, machine-to-machine communication and decentralized decision-making. Industry 4.0 also stresses deeper AI, analytic, and augmented reality support for humans working in production environments to expand their abilities.

Action guide

Racing for post-COVID competitive advantage

The consumer industry faces unprecedented challenges, but also the convergence of technologies—AI, automation, IoT, blockchain, and others—that can help it meet them. These exponential technologies will be most effective only when applied at scale and integrated into a company's business operating model.

Among the most important actions consumer companies can take:

1. Enhance and extend digital capabilities—Even as the industry emerges from the pandemic, many customers will continue to engage digitally. Brands and retailers must have enterprise-scale digital marketing, sales, and service capabilities underpinned by a robust consumer data platform. And they need to extend these capabilities to frontline associates, to enable them to better serve customers.

2. Create smarter supply chains from sourcing through fulfillment—Changing consumer behaviors necessitate an intelligent supply chain with the capability to assess demand patterns at a local level and react to changes in near real time. Being able to easily see current inventory and raw material status across all business partners will make for better decisions and resiliency.

3. Modernize the nature of work—To increase agility and efficiency, build intelligent workflows that combine people and technology. This will help streamline operations and reduce operating costs, as will tapping managed services for non-core operations to fund transformational work. In light of new expectations of where work can be done, and advantages to distributed work models, transform existing talent processes to embrace virtual and hybrid work patterns, while making the workplace environment safer.

4. Innovate across the enterprise—Invest in enterprise AI, then use insights from it to identify opportunities to innovate in response to macro/micro changes in consumer trends, including more targeted assortments and new product opportunities. Institutionalize innovation and encourage a culture that supports it by developing a rapid, agile approach to test, learn, and scale new ideas. Also employ human-centered design to create enterprise experiences that exceed customer and associate needs.

5. Move to a secure hybrid cloud for speed and agility—Modernize legacy applications, moving them to an open hybrid cloud where legacy mainframe data can be integrated with the public and private cloud platforms to unlock further value. At the same time, shift the focus from legacy applications to new capabilities.

About the authors



Karl Haller

Karl.Haller@ibm.com
linkedin.com/in/karlhaller
@krhaller

Karl Haller, Global Leader, Consumer Center of Competence, IBM Global Business Services. Karl leads the IBM Global Consumer Industry Center of Competence, a team of industry experts who develop transformational solutions and programs for leading retailers and consumer products companies around the world. Karl has expertise in business strategy, customer experience and engagement, analytics and insights, merchandising, and omnichannel.



Jane Cheung

jane.cheung@us.ibm.com
linkedin.com/in/janescheung
@JaneSCheung

Jane Cheung, Global Research Leader for the Consumer Industry, IBM Institute for Business Value. Jane has over 20 years of working experience across retail and consumer product industries. Jane has worked at Macy's, Disney, Nike, and Hallmark Cards and as a trusted advisor for clients in a consulting capacity at IBM and Accenture. Jane earned an MBA from California State University, Long Beach.



Jim Lee

jim.s.lee@us.ibm.com
linkedin.com/in/jim-s-lee

Jim Lee, Partner, Distribution Sector, IBM Global Business Services. Jim leads Supply Chain Strategy services for the Consumer Industry at IBM. He works with consumer manufacturing and retail companies to formulate new ways to enhance service, widen margin, and optimize working capital. Jim helps the world's largest brands and retailers rethink their operating models through digital transformation and innovation enabled by AI, automation, IoT, and cloud.

Notes and sources

- 1 IBM CEO Study, IBM Institute for Business Value C-suite Series: The 2021 CEO Study February 2021. <https://www.ibm.com/thought-leadership/institute-business-value/c-suite-study/ceo#>
- 2 Wright, Jonathan, Takshay Aggarwal, Amar Sanghera, and Jessica Scott. "Smarter Supply Chains for an Unpredictable World." IBM Institute for Business Value, Aug. 2020, www.ibm.com/thought-leadership/institute-business-value/report/smarter-supply-chains
- 3 Annual Report, Campbell's Soup Company. <https://www.campbellsoupcompany.com/wp-content/uploads/2021/03/Campbell-Soup-Company-2020-Annual-Report.pdf>; "Nestle Launching \$50M Expansion Project at Wisconsin Plant." Powder & Bulk Solids. December 2, 2020. <https://www.powderbulksolids.com/food-beverage/nestle-launching-50m-expansion-project-wisconsin-plant>
- 4 Smith, Matt, "New Checkout Experience Seeks to Eliminate the Wait and Add Options at the Register." Walmart website. June 30, 2020. <https://corporate.walmart.com/newsroom/2020/06/30/new-checkout-experience-seeks-to-eliminate-the-wait-and-add-options-at-the-register>
- 5 "How contactless payments are driving digital payment services in times of COVID-19." Digipay.guru. 2021. <https://www.digipay.guru/blog/contactless-payments-solutions-during-covid-19>
- 6 Dowd, Jessie. "Best Buy CEO at CES 2021: 'Agnostically Meet the Customer Wherever They Are.'" Retail Touchpoints. January 15, 2021. <https://retailtouchpoints.com/features/retail-success-stories/best-buy-ceo-at-ces-2021-agnostically-meet-the-customer-wherever-they-are>
- 7 Mahoney, Noi. "Pandemic rapidly accelerating e-commerce in Mexico." Freight Waves. August 11, 2020. <https://www.freightwaves.com/news/pandemic-rapidly-accelerating-e-commerce-in-mexico>; Navarro, Andrea and Matthew Townsend. "Online Sales Ignite in Corners of World Late to the Revolution." Bloomberg. January 26, 2021. <https://www.bloomberg.com/news/articles/2021-01-26/online-shopping-websites-in-india-mexico-russia-boom-with-sales-in-covid-era>
- 8 Ibid.
- 9 Ibid.
- 10 IBM CEO Study, IBM Institute for Business Value C-suite Series: The 2021 CEO Study February 2021. <https://www.ibm.com/thought-leadership/institute-business-value/c-suite-study/ceo#>
- 11 Payraudeau, Jean-Stéphane, Anthony Marshall and Jacob Dencik. "Digital Acceleration." IBM Institute for Business Value. November 2020. <https://www.ibm.com/thought-leadership/institute-business-value/report/digital-acceleration>
- 12 IBM CEO Study, IBM Institute for Business Value C-suite Series: The 2021 CEO Study February 2021. <https://www.ibm.com/thought-leadership/institute-business-value/c-suite-study/ceo#>
- 13 "Industry 4.0 at L'Oréal: The beauty industry is gaining momentum." L'Oréal website. <https://www.loreal.com/en/news/group/industry-40-at-loreal-the-beauty-industry-is-gaining-momentum>
- 14 Kouwen, Peter. "L'Oréal and IBM: An Industry 4.0 makeover." IBM. January 24, 2019. <https://www.ibm.com/blogs/think/be-en/2019/01/24/loreal-and-ibm-an-industry-4-0-makeover/>
- 15 "How the beauty industry is being transformed by technological innovation." L'Oréal 2018 Annual Report. <https://www.loreal-finance.com/en/annual-report-2018/operations-4-2/how-beauty-industry-transformed-technological-innovation-4-2-3>
- 16 Payraudeau, Jean-Stéphane, Anthony Marshall and Jacob Dencik. "Digital Acceleration." IBM Institute for Business Value. November 2020. <https://www.ibm.com/thought-leadership/institute-business-value/report/digital-acceleration>
- 17 "How IBM Enabled Harry Rosen's Digital Transformation." IBM Services Channel. December 11, 2020. <https://www.youtube.com/watch?v=YBXbxgHvWCE&feature=youtu.be>

The right partner for a changing world

At IBM, we collaborate with our clients, bringing together business insight, advanced research, and technology to give them a distinct advantage in today's rapidly changing environment.

IBM Institute for Business Value

The IBM Institute for Business Value, part of IBM Services, develops fact-based, strategic insights for senior business executives on critical public and private sector issues.

For more information

To learn more about this study or the IBM Institute for Business Value, please contact us at iibv@us.ibm.com. Follow @IBMIBV on Twitter, and, for a full catalog of our research or to subscribe to our monthly newsletter, visit: ibm.com/ibv.

About Research Insights

Research Insights are fact-based strategic insights for business executives on critical public and private sector issues. They are based on findings from analysis of our own primary research studies. For more information, contact the IBM Institute for Business Value at iibv@us.ibm.com.

© Copyright IBM Corporation 2021

IBM Corporation
New Orchard Road
Armonk, NY 10504
Produced in the United States of America
May 2021

IBM, the IBM logo, ibm.com are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at “Copyright and trademark information” at: ibm.com/legal/copytrade.shtml.

This document is current as of the initial date of publication and may be changed by IBM at any time. Not all offerings are available in every country in which IBM operates.

THE INFORMATION IN THIS DOCUMENT IS PROVIDED “AS IS” WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, INCLUDING WITHOUT ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY OR CONDITION OF NON-INFRINGEMENT. IBM products are warranted according to the terms and conditions of the agreements under which they are provided.

This report is intended for general guidance only. It is not intended to be a substitute for detailed research or the exercise of professional judgment. IBM shall not be responsible for any loss whatsoever sustained by any organization or person who relies on this publication.

The data used in this report may be derived from third-party sources and IBM does not independently verify, validate or audit such data. The results from the use of such data are provided on an “as is” basis and IBM makes no representations or warranties, express or implied.

