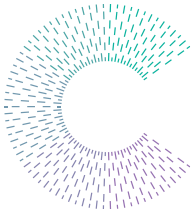
Collective intelligence
Deriving insights across the C-suite

Global C-suite Study
19th edition

Industrial Products

IBM Institute for
Business Value



The IBM Institute for Business Value, in cooperation with Oxford Economics, interviewed 1,023 CxOs from the Industrial Products industry. These conversations included both quantitative and qualitative responses. The analytical basis for this Industrial Products industry report uses 994 valid responses from the total data sample collected.

More than 12,800 CxOs, representing six C-suite roles, 20 industries and 112 countries, contributed to our latest research. We used the IBM Watson Natural Language Classifier to analyze their contextual responses and ascertain overarching themes. We also used various statistical methods, including cluster analysis and discriminant analysis, to scrutinize the millions of data points we collected.

Enterprise need for intelligence

Commoditization. Digitization. Increased customer demands. Interconnected economies. Shortage of skills. Collectively, these challenges are creating unprecedented levels of change in the Industrial Products industry. According to the nearly 1,000 Industrial Products CxOs we surveyed, market forces, technological factors and people skills continue to top their enterprises' agendas in terms of what they expect to face in the next two to three years (cited by 74 percent, 66 percent and 65 percent respectively). Market forces involve increased competition, changing market dynamics, changing customer preferences and new distribution channels. Technological factors include the disruptive technologies such as cloud computing, artificial intelligence (AI) and the Internet of Things (IoT). People skills could suggest the talent gap in digital capabilities and data science, as those skill sets continue to grow in importance and need.

It's not outsiders that Industrial Products CxOs are most concerned about: More than three quarters of these CxOs report that the real disruption is coming from innovative industry incumbents – in particular, those enterprises that are reinventing themselves to thrive in a disruptive digital era. Over half of Industrial Products CxOs report that their current business model is being threatened by competitors using technology to create more compelling value propositions.

What's changed most fundamentally is how Industrial Products companies respond to these challenges. The rules for success have shifted – moving from overcoming disruptors to continuously reinventing the organization and choosing the right partners. Industrial Products CEOs rank industry convergence (73 percent) as the top trend driving the development of new strategies. These strategies currently focus on innovation by developing new products and services to achieve organic growth and expansion through mergers or acquisitions or by leveraging the partner network. Asked what would accelerate their performance in the near future, these CEOs rank a more dynamic business strategy as their top accelerator.

How does a company create a dynamic business strategy? It is through intelligence. The rise of analytics technologies makes data easier to access and use than ever before. Insight-driven AI and cognitive computing systems use combinations of algorithmic, natural language processing and machine learning capabilities to enable people and machines to interact more naturally. A key aspect of analytics technologies – and deep learning in particular – is that they rely on data, and the more data, the better. Greater volumes and sources of data can result in more accurate and meaningful insights.[1]

By taking advantage of intelligence, Industrial Products companies can evaluate the business market, identify new customer needs and assess decisions. These insights can provide both competitive and strategic advantages.

Tap into data

Industrial Products companies can leverage existing data from functions across the organization to add value:

Finance	Transactional data, competitor information, risk profile data
Human resources	Employee sentiment
Information technology	IT asset management, network monitoring data
Marketing	Customer segmentation, advertising optimization, purchases and total spending
Operations	Route optimization, maintenance patterns, downtime avoidance, weather data

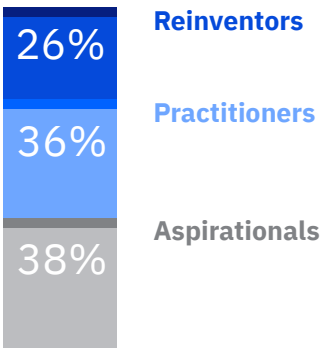
Meet the leaders: Reinventors

To understand how top-performing organizations, in particular, navigate disruption differently, we applied cluster analysis definitions and identified three distinct organizational “archetypes”: Reinventors, Practitioners and Aspirationals.

Figure 1

Industrial Products split

Industry archetypes have distinct characteristics that lead to differing vantage points



By definition, Reinventors focus on developing breakthrough products, services and business models; excel at extracting value from their ecosystems; and actively experiment. Their IT strategy and business strategy are in synch – all of which helps them stand out both financially and as innovators.

Reinventors automate their processes or create autonomous (self-run) processes with AI. In particular, they have realized the benefits of AI more so than their peers in the areas of manufacturing, research and development, and product/service delivery (see Figure 3). And their CEOs say they have well-defined strategies focused on innovation (88 percent) and expansion (71 percent) in place to manage disruption.

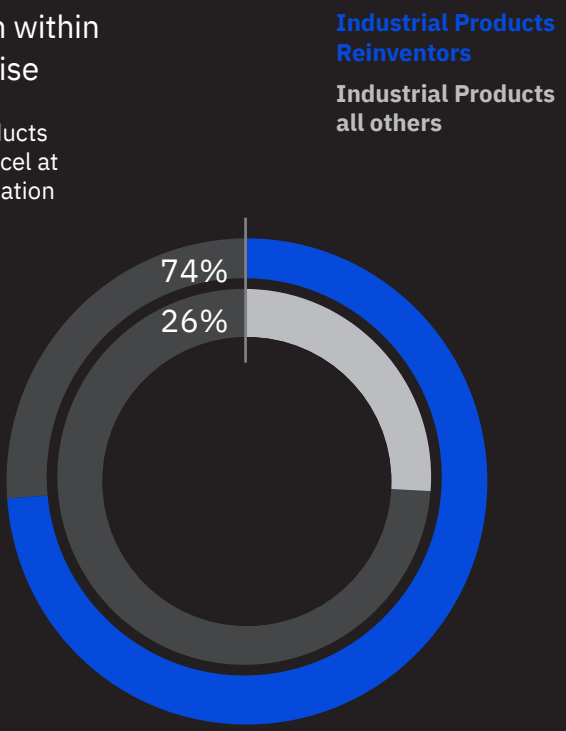
"Applying AI to our manufacturing process data can help us reduce the defect rate, decrease cycle time and maintain the proper stock levels in our value chain."

Chief Financial Officer, Industrial Products, Japan

Figure 2

Automation within the enterprise

Industrial Products Reinventors excel at process automation



Q: Which of the following best describes the level of process automation within your enterprise today? (Percentages represent the number of respondents who selected either automation of processes using unstructured data or autonomous/cognitive decision-making capabilities based on data discovery.)

Practitioners are ambitious but haven't yet acquired the capabilities required to achieve their objectives. They're neither as focused nor as agile as Reinventors.

Aspirationals have fallen further behind. They still need to devise a clear strategy, put the right processes and resources in place, and develop the agility to seize new opportunities. Unlike Reinventors, they are less motivated by technology, slower to partner extensively and less likely to have an organizational culture conducive to rapid change.

"We aim to combine AI and IoT to improve production efficiency and traceability, create insight from integrated data sources, and enhance understanding of actual customer behavior and usage."

Chief Executive Officer, Industrial Products, China

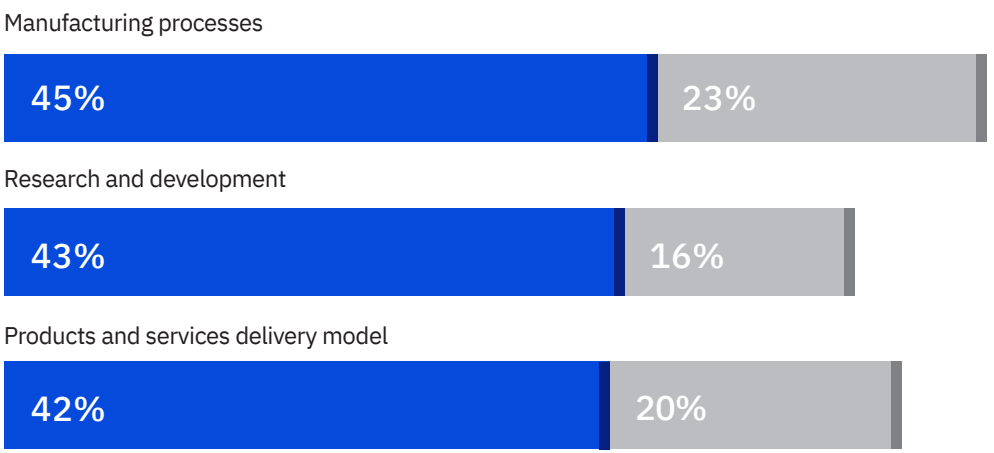
Figure 3

AI impact on business processes

More Industrial Products Reinventors infuse AI into their business processes

Industrial Products Reinventors

Industrial Products all others



Q: Please indicate the impact of AI/cognitive technologies on the following organizational business processes to date. (Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale.)

Reinventor CxOs are creating intelligence

What makes Reinventor C-suite executives stand out from their peers? CxO members in Reinventor organizations are doing their individual parts using intelligence gained through data and analytics. CFOs are focusing on helping their enterprises grow. CHROs are reinventing the employee experience. CMOs are revamping how their enterprises engage with customers. And COOs are executing the customer experience strategy and driving operational efficiency.

CFO actions

CFOs produce and leverage analytical insights that help them assess the value of strategic opportunities, including any potential risks. In turn, CFOs can provide and help interpret the analysis of the performance of newly commercialized opportunities from a risk-and-return perspective. Analytics yield the insights necessary to evaluate the risk/return profile of capital allocated to growth opportunities, whether organic or acquisitive, and set the bar for expected returns.

> “We plan to improve our customer experience through data-driven services that boost technical results.”

Chief Information Officer, Industrial Products, Belgium

Establishing commonality, integrating data and retaining the necessary skills are the ingredients to create trusted insights. It's no surprise that Reinventor CFOs have mastered the adoption of standard financial charts of accounts, common finance data definitions and enterprise-wide information standards. In fact, 83 percent of Reinventor CFOs have effectively implemented enterprise-wide information standards, versus half of their peers. Reinventor CFOs are more effective than their peers at integrating data across the enterprise to enable the delivery of analytics that enhance all aspects of performance. Moreover, almost three-fourths of Reinventor CFOs have developed the analytical talent in their finance organizations to partner with the business, compared to well under half of their peers.

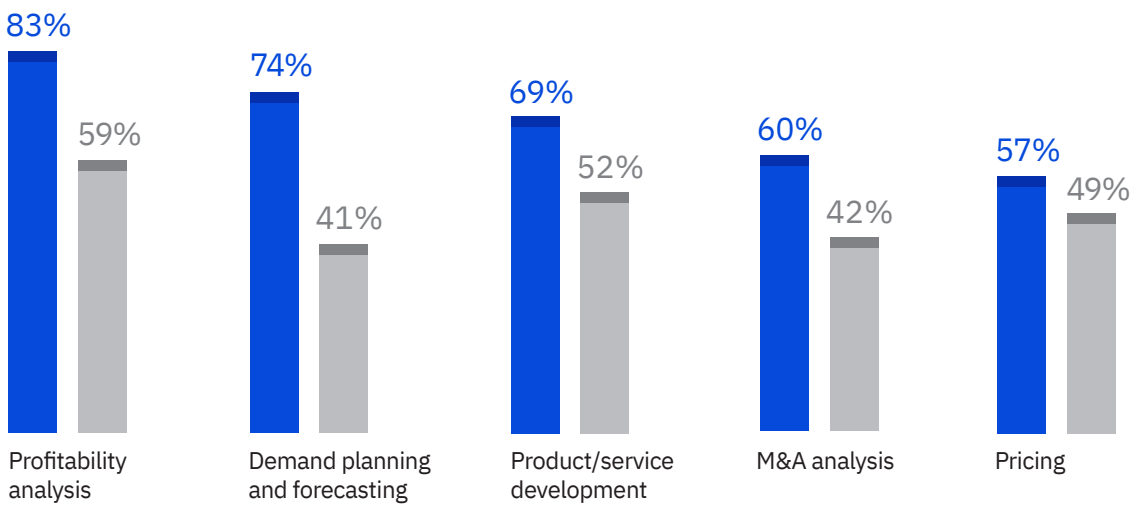
CFOs need to produce deep insights that help identify profitable growth areas and forecast opportunities. Across the board, Reinventor CFOs excel in these areas, from profitability reporting to forecasting demand and product pricing.

Figure 4

Finance analytics supporting growth

Industrial Products
Reinventor CFOs excel at developing insights

Industrial Products
CFO Reinventors
CFO all others



Q: How effective is your organization in the following areas? (Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale.)

CHRO actions

Realizing that people results are linked to business results, nearly two-thirds of Reinventor CHROs report that they rely on data and analytics to a large extent to glean insights that help them understand and address issues related to employee experience programs. Reinventor CHROs also use data and analytics to guide many other activities. Developing robust models to forecast dynamics such as employee turnover and future levels of supply and demand for specific skills helps an organization anticipate and mitigate forthcoming challenges.

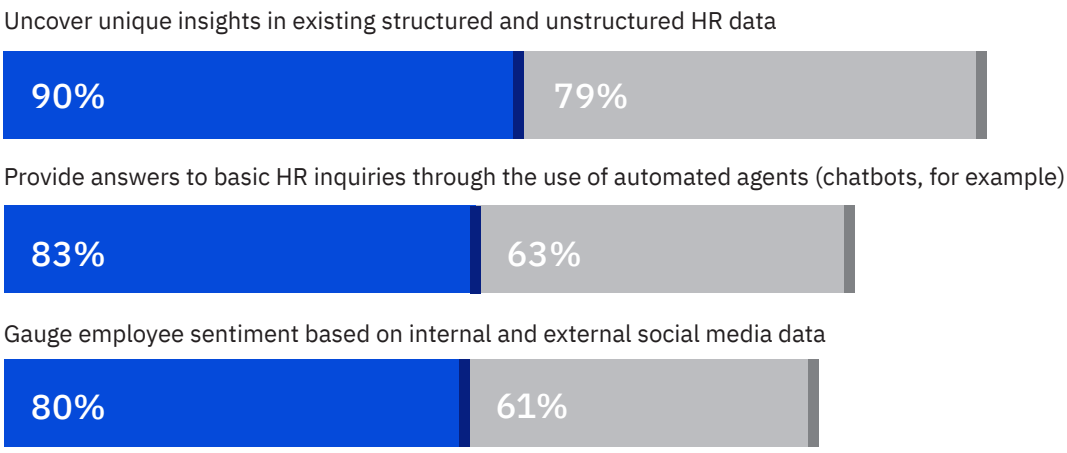
Reinventor CHROs are piloting or already using a variety of data sources – structured/unstructured and internal/external. They see significant value in gauging employee sentiment, using this data to gather employee feedback on business issues, generate innovative ideas and create a continuous dialogue with employees. Reinventor CHROs are also tapping cognitive computing systems, such as natural language processing, to create more intuitive interfaces, such as chatbots, for their employees. These digital assistants can improve employee self service.

Figure 5

Insights in HR

Industrial Products
Reinventor CHROs are piloting or already leveraging data and analytics across the HR function

Industrial Products
CHRO Reinventors
CHRO all others



Q: To what extent is your HR organization able to perform the following activities? (Percentages represent the number of respondents who selected 3, 4 or 5 on a 5-point scale.)

CMO actions

CMOs have a broader responsibility to analyze and predict market and customer trends, based not only on their assessment of the marketplace, but also on community feedback from their digital platforms. These data-driven insights can define and establish enterprise-wide strategies that reimagine customer experiences and explore innovative new business models.

Since customer experiences define and differentiate their organizations, CMO Reinventors stand out in customer intelligence. They effectively use data to identify undefined and unmet customer needs. They leverage customer data from outside the organization by working with partners to target specific segments – much more so than their peers. By collecting and circulating data freely with partners, the organizations can collaborate to create mutual value, drive breakthrough innovation and promote continuous learning. CMO Reinventors then turn those perspectives into action – more than two thirds act on the insights to meet customer expectations. They are also collaborating with partners to develop new products and services. Finally, CMO Reinventors are exploiting opportunities to provide differentiated, high-value aftermarket services.

Figure 6

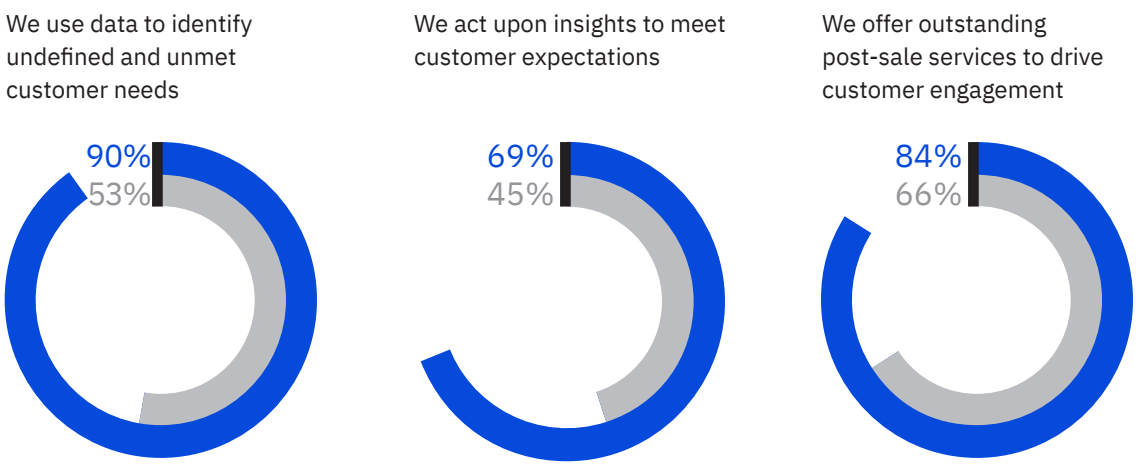
Data-driven customer decisions

Industrial Products Reinventor CMOs embrace data to transform the customer experience

Industrial Products

CMO Reinventors

CMO all others



Q: How effective is your enterprise at creating compelling customer experiences through the following actions? (Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale.)

COO actions

For operations executives, the mandate is to improve the customer experience and adjust operations as a result. COO support extends well beyond product and service design – and even standard process optimization – to emphasize speed and responsiveness. For leading organizations, different sources of data and innovative technologies play an outsized role in their operations makeovers.

Seven in ten Reinventor COOs are already accessing real-time information to optimize their processes and networks for quick actions and outcomes. As systems thinkers, Reinventor COOs are skilled at making sense of their operational environments by orchestrating innovative IoT connections. As sensors stream data from manufacturing equipment, shipping containers, networked buildings and more, real breakthroughs and entirely new ways of working (for man and machine) become possible.

Reinventor COOs recognize the importance of advanced analytics, AI and cognitive computing for insights, decisions and actions for their processes. In fact, nearly three quarters report they are using these technologies for digital manufacturing. These technologies allow them to further improve productivity in their planning and production processes. Nearly two thirds of Reinventor COOs report using predictive or cognitive analytics for connected transportation visibility. Analytics and AI help these organizations identify risks and react to developing global supply events.

Figure 7

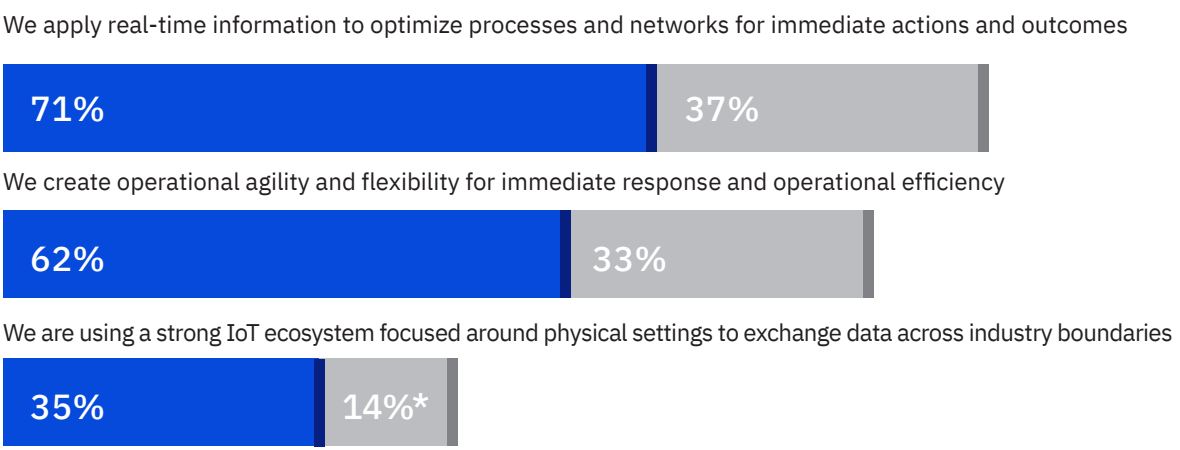
Data-driven outcomes

Industrial Products COOs leverage internal and external data to improve processes

Industrial Products

COO Reinventors

COO all others



** Results using low counts are statistically unreliable but can be considered directional.*
Q: To what extent do you agree with the following statements concerning your business strategy? (Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale.)

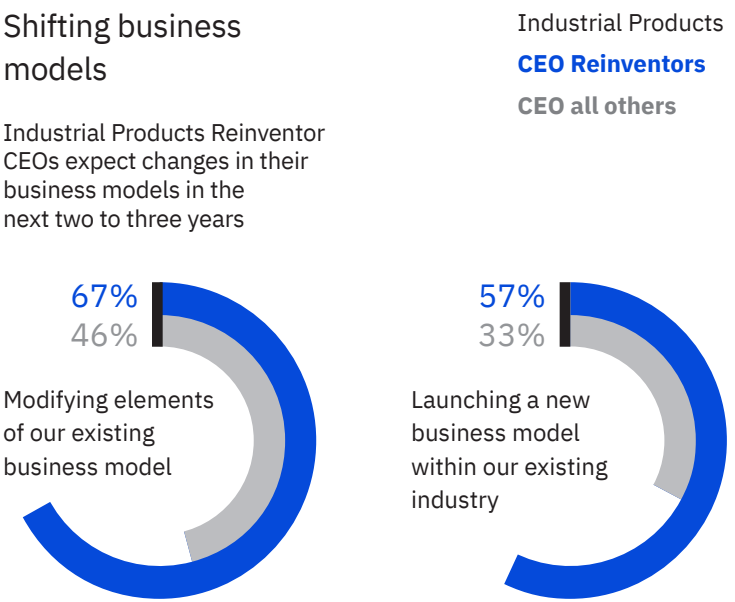
Which way to the future?

As value chains reconfigure in new ways and economies interconnect, Reinventors recognize that their organizations need to be poised to respond. A majority of Industrial Products Reinventor CEOs tell us they plan to modify an existing business model or embrace new business models.

Figure 8

Shifting business models

Industrial Products Reinventor CEOs expect changes in their business models in the next two to three years



Q: How does your enterprise plan to change its business model within the next 2–3 years?

To support this, they recognize the importance of internal and external data, particularly as they seek to leverage platforms and network economies. And they recognize that a combination of technologies – advanced analytics, AI and IoT – is crucial to deliver the insights and intelligence to create new experiences, pursue new areas of innovation and identify new growth opportunities.

Almost 70 percent of Industrial Products Reinventors expect to analyze a mix of structured, unstructured, behavioral and visual data over the next two to three years – compared to 47 percent of their peers. And almost 60 percent of Reinventors will increase their velocity of decision making by shifting toward real-time analysis in the future.

Reinventors plan on pursuing AI and cognitive computing. AI systems understand unstructured information in a way that's similar to humans. However, AI systems consume staggering amounts of data moving at far greater velocity to continually learn. AI systems can be trained to take data-driven decision making to a whole new level. Sixty-five percent of Reinventors will increase investment in industry-specific AI and cognitive computing technologies, compared to 49 percent of their peers. They expect AI to benefit their business models in a variety of ways.

Industrial Products Reinventors also see the benefits of integrating AI with IoT. Nearly half understand that combining

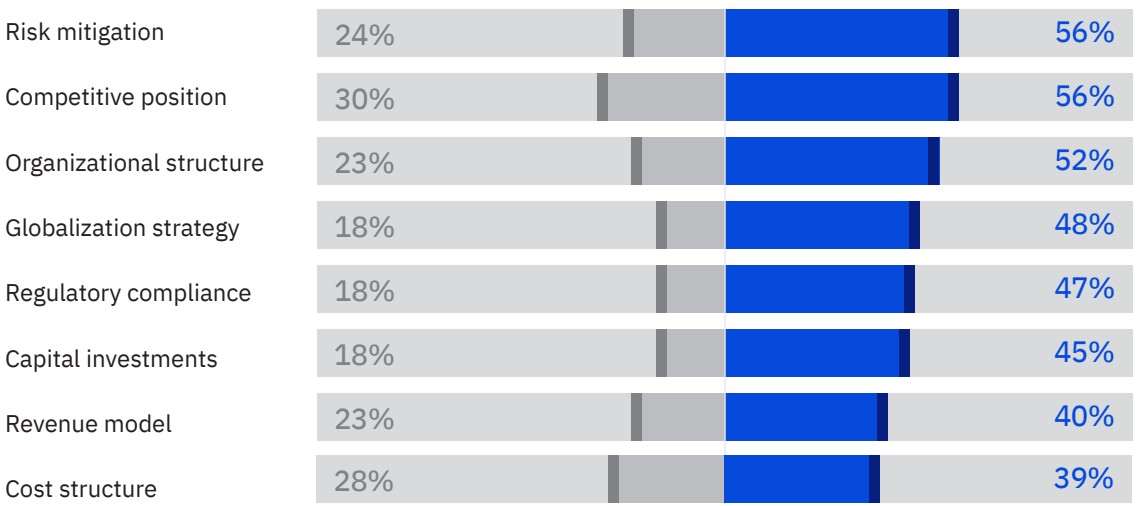
Figure 9

AI's future impact

More Industrial Products Reinventors expect AI to influence various elements of their business models

Industrial Products Reinventors

Industrial Products all others



Q: What impact will the use of AI/cognitive computing have on elements of your enterprise's business model in 2-3 years? (Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale.)

these technologies provides potential benefits that can be leveraged for business model reinvention. Ultimately, it can help them discover new opportunities for IoT-driven products and services, as well as help improve decision making inside the organization and with customers.

Reinventor CxOs also plan to take specific actions. Reinventor CHROs express a strong desire to close the skills gap through personalized learning. AI and cognitive systems can facilitate personalized learning. Because these systems are able to understand unstructured information at speed and scale, they can rapidly and comprehensively source and organize the most up-to-date learning content for employees.

The CIO role will be critical for Reinventors going forward. CIOs will be responsible for managing data and connections across the various functions of the enterprise. To support their peers, Reinventor CIOs will build their data intelligence capabilities and help the enterprise as a whole. Reinventor CIOs will drive a single data-driven view of the customer, with 95 percent expecting to in the next two to three years. A significant majority of Reinventor CIOs plan to use culture and tools in the future to promote collective intelligence.

Reinventor CMOs recognize that deriving insights from analytics is necessary for their continued professional success. Eighty percent agree this will become increasingly important for making marketing decisions in the next two to three years. Reinventor CMOs also plan to invest in analytics to rapidly deliver insights to assist customer-facing service professionals and use predictive analytics to engage customers directly in personalized experiences.

Reinventor COOs look to invest in analytics, AI and cognitive computing technologies in the future. This will allow them to redesign important aspects of their operations. In particular, the supply chain is a critical area to support the customer interaction from order to delivery. Seventy-eight percent of Reinventors plan to increase investments in industry-specific analytics to optimize the supply chain. Predictive analytics will allow them to forecast and operate more flexibly in real time. They see the benefit in demand management and forecasting and instrumented machinery and equipment.

For Reinventors, success has been rooted in their ability to leverage intelligence not only to predict the future, but also to be nimble enough to handle whatever comes their way. How will you handle a disruption in the supply chain? New market opportunities? Changes in the talent pool? Is your organization prepared for engaging with customers in new ways?

> “Our goal is to create customer relationships based on providing services that are focused on customers’ success and bringing key products from around the world to them safely.”

Chief Executive Officer, Industrial Products, Australia

Recommendations: Becoming a Reinventor

Below are actions you can implement to help your organization better leverage intelligence for competitive and strategic advantage.

Protect your data

Prioritizing data standards and foundation is a necessity. The consistency and standardization created help support the use of self-service analytics and secure connections in the ecosystem.

As part of protecting your organization's data, guide the data architecture and quality standards – master data and metadata management, common data definitions, data lineage and transparency. In addition, create an integrated, agile data foundation (for example, microservices, cloud-based data storage, data curation services). Also, leverage IoT-enabled sensors and location data and add real-time/streaming data. IoT provides opportunities to optimize production operations and plant efficiency, improve worker safety and environmental compliance, and drive the shift to data-enabled services and customer centricity.

Establish a data-driven culture

Adopting a mindset that embraces the science of data is critical at the enterprise level. This includes a willingness to infuse insights into every action, interaction and decision, which requires changes related to employee skills and data management.

With smart manufacturing, employee roles become more analytical and technical, making it necessary to add new skills sets. Evaluate what additional roles are required, such as data analysts, data architects, data scientists and data visualization specialists. In terms of data management, set enterprise-level, business-driven data and information governance. Establish a federated ecosystem of data sources and analytics partners to address supply, manufacturing and distribution. Real-time connectivity across an extended value chain can facilitate a coordinated response to disruptions.

Enable meaningful insights to drive innovation

Innovation comes from infusing customer experience and associated operations with analytics and AI. Collaborate across the C-suite to apply analytics and AI to optimize internal and customer-centric processes and systems, including risk management, technology investments, new markets and customers, operational capabilities and talent.

Determining what individual customers want at a given place or time typically requires insights based on structured and unstructured data from a variety of sources. Capitalize on analytics and AI to help glean these insights and deliver personalized digital experiences to customers. In addition, orchestrate data monetization and new platforms to create new revenue streams, such as data-enabled services and pay-as-you-go and as-a-service models.

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Notes and sources

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