



REWORKING THE REVOLUTION

**Are you ready to compete as intelligent
technology meets human ingenuity
to create the future workforce?**

#FutureWorkforce

#AppliedIntelligence

By Ellyn Shook and Mark Knickrehm



THE REVOLUTION

Intelligent machines are revolutionizing every aspect of our lives. Leading businesses are successfully using artificial intelligence (AI) to improve productivity. But to achieve superior rates of growth, and to create a new wave of employment, they must now apply AI in more innovative ways.

An alliance between humans and machines will usher in a new era of work and drive competitive advantage. The full promise of AI depends on humans and machines working together to develop differentiated customer experiences and to create entirely new products, services and markets. That is the real opportunity of AI.

Accenture estimates that this could boost business revenues by 38 percent in the next five years and generate higher levels of profitability and employment. To succeed, leaders must reimagine the nature of work today. Taking bold leaps means redefining the roles of people, shifting your workforce to new business models and scaling up “New Skilling” to harness intelligent technologies. It means doing things you never could before. Starting now.

Are you ready to take advantage of this opportunity in 2018? This paper aims to lay out the terrain and equip leaders to ask tough questions about your own organization’s readiness to succeed in the era of AI.

38% REVENUE BOOST

estimated over the next five years for those fully committing to AI and investing in human-machine collaboration.

A FUTURE OF PROMISE

Business is on the brink of a brave new world wrought by artificial intelligence (AI).

A revolution in which intelligent technology meets human ingenuity to create the future workforce, one that promises previously unobtainable sources of growth and innovation.

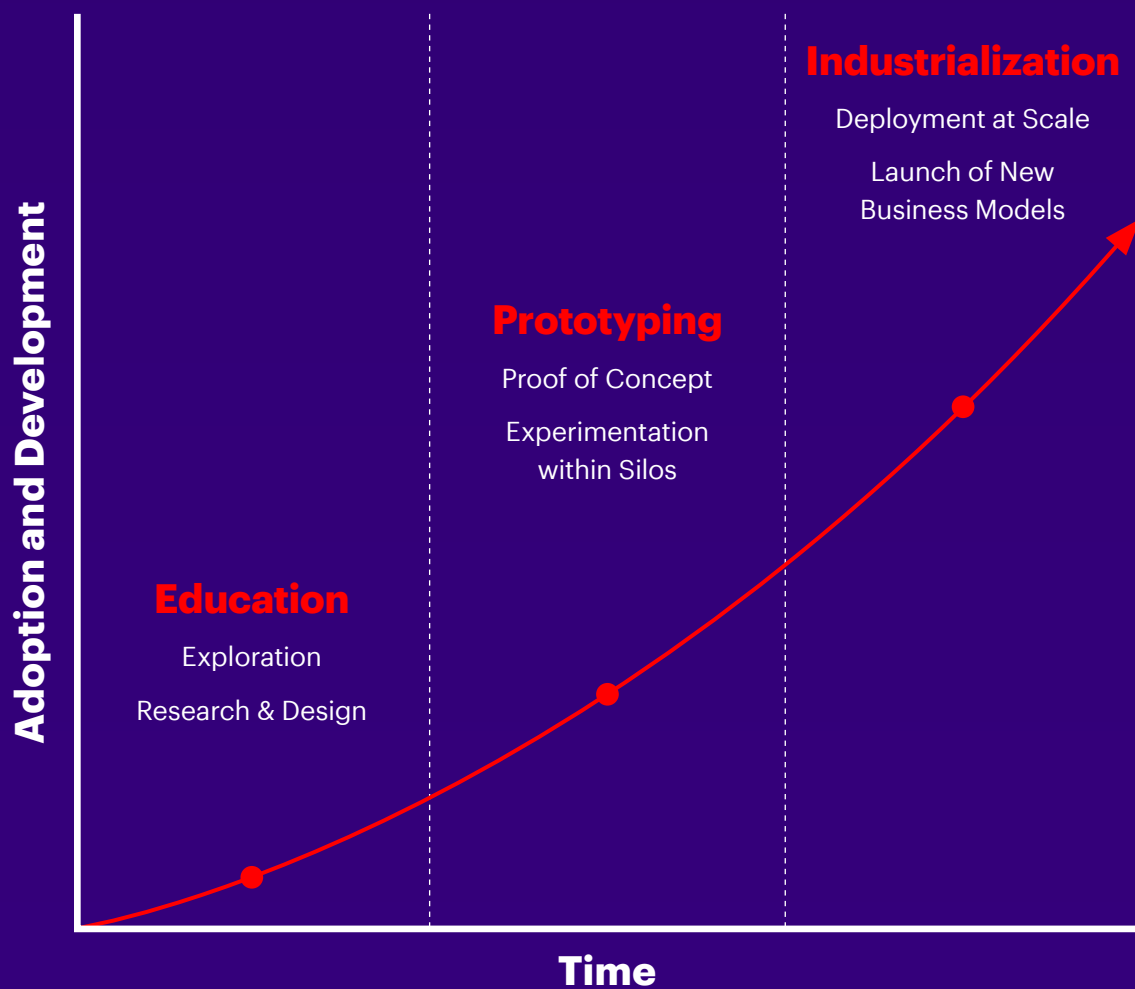
Until now, robots, big data analytics and other technologies have been used to work in parallel with people but in automated isolation. Their role: improve process efficiencies. Now, as companies invest in AI systems that can sense, communicate, interpret and learn, all that changes. AI can help businesses move beyond automation to elevate human capabilities that unlock new value.

Today, many businesses have yet to apply AI in this way to improve efficiencies or customer outcomes. They are at the first of three stages of adoption: education. In most cases, businesses have reached the second stage: prototyping and experimental initiatives. Only a few are embarking on the third stage: large-scale application. They are practicing what Accenture terms Applied Intelligence, the ability to implement technology and human ingenuity across all parts of their core business in order to solve complex challenges, break into new markets or generate entirely fresh revenue streams (see Figure 1). These include the online clothes retailer entering a crowded market to change the way consumers buy, the long-established sports shoemaker transforming the way manufacturers make and sell, or the pharma-tech company that fast-tracked initial phases of drug discovery to shortlist possible therapies for reducing rates of Ebola infection and multiple sclerosis.

The growth prospects of the AI revolution are not limited to such immediate outcomes. To take a lesson from history, the launch of the Ford Model T did not just replace horse-dependent labor with manufacturing employment. It ushered in an age of personal mobility that underpinned 20th century economic growth by opening the way to new industries and markets. Likewise, AI will have an exponential impact. But the speed of the digital revolution is unprecedented. According to Gartner, Deep Learning and Machine Learning, two key emerging AI technologies, will reach mainstream adoption within two to five years.¹ If businesses are to reap rewards from these developments, they need to take urgent action now.

Stages of adoption and development of new technologies.

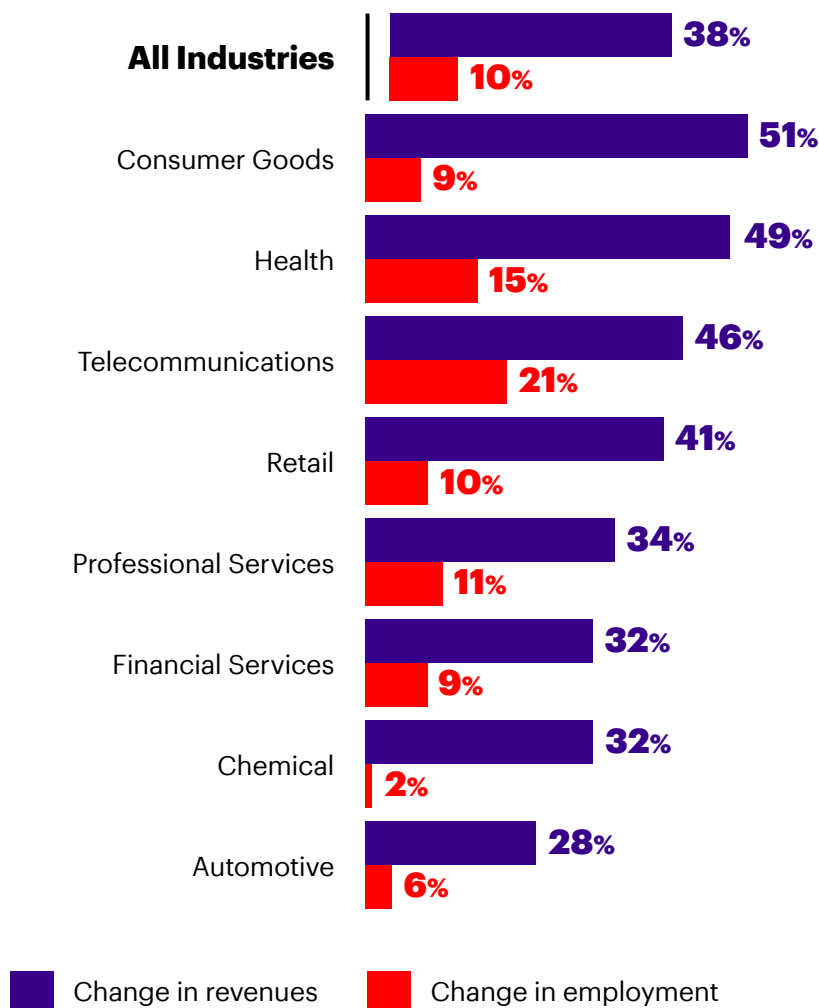
Figure 1



How higher AI investment can boost revenues and employment by industry, 2018 to 2022.

Accenture estimates that if companies invest in AI and in human-machine collaboration at the same rate as top-performing businesses, they could boost revenues by 38 percent between 2018 and 2022 (as much as 50 percent in the consumer goods and health sectors) and lift global profits by a total of US\$4.8 trillion by 2022. For the average S&P 500 company, this equates to US\$7.5 billion of revenues and a US\$880 million lift to profitability. They could also increase employment by 10 percent (see Figure 2).

Figure 2

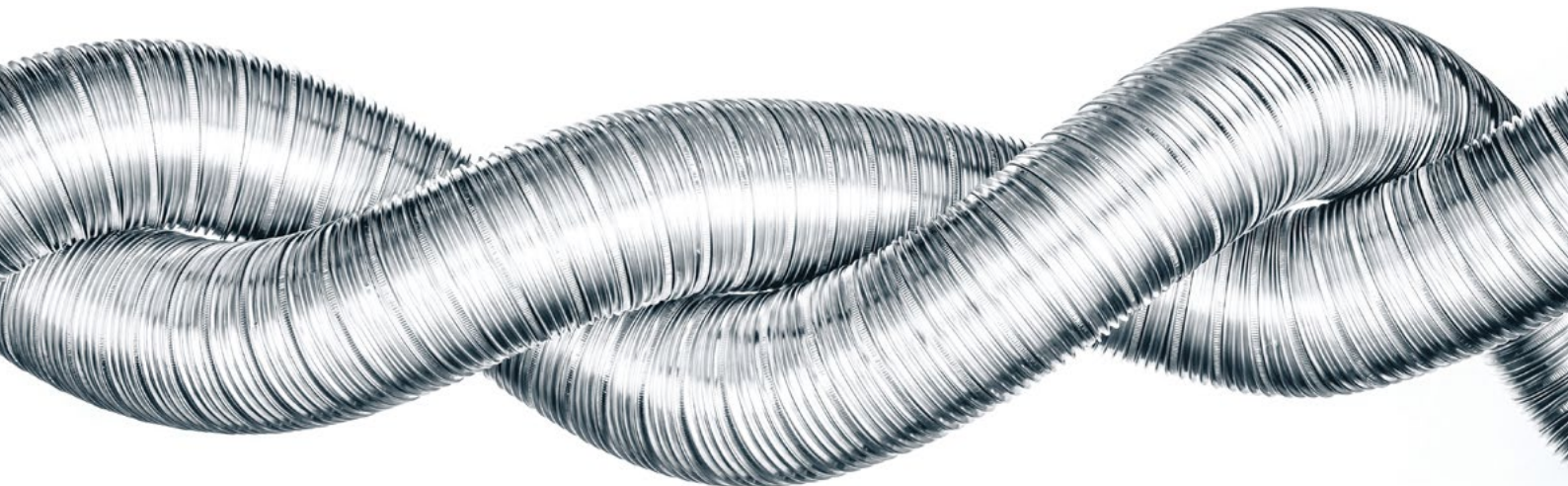


Source: Accenture Future Workforce Study 2017

AI offers insights that allow humans to make informed judgments.

The power of the new relationship between people and intelligent technology is becoming clear. For example, a Harvard-based team of pathologists recently created an AI-based technique to identify breast cancer cells with greater precision.

Pathologists beat the machines with 96 percent accuracy versus 92 percent. But the biggest surprise came when humans and AI combined forces. Together, they accurately identified 99.5 percent of cancerous biopsies.² With nearly 1.7 million new cases of breast cancer diagnosed globally each year,³ this translates to 68,000 to 130,000 more women receiving accurate diagnoses than if we relied on humans or machines alone.



This kind of success depends on people continuously interacting with AI, in this case, training and retraining it to identify the right kind of cancer cell so that its performance improves. As systems such as this become more intelligent, they will proactively offer insights that enable doctors to make far more informed judgments and to offer more specific treatments.

“We want to take the use of artificial intelligence and data analytics to the next level in the automotive industry. I firmly believe this will help us to be more innovative and agile in the rapid introduction of new technologies, particularly for enhanced health and wellness and intuitive human-machine interfaces.”

Patrick Koller, CEO, Faurecia

THE GLOBAL STUDY

Are business leaders and workers ready to take on human-machine collaboration of such sophistication and at a large scale?

To find out, Accenture Research spoke with more than 1,200 CEOs and top executives working with AI. We also surveyed more than 14,000 workers spanning four generations and representing all skill levels. The research covered 12 industries and 11 economies and included interviews with people working with AI in their daily work. Among the findings:

Three quarters (74 percent) of executives say they plan to use AI to automate tasks to a large or a very large extent in the next three years. But almost all (97 percent) note they intend to use AI to enhance worker capabilities.⁴ Reflecting the intention to go beyond the prototype stage to the industrialized stage of AI application, they envision creating new sources of value by enabling their people to collaborate with intelligent machines. And investment in AI is growing strongly. Worldwide spending on cognitive and AI systems was forecast to have increased 59.1 percent in 2017 compared to 2016, reaching US\$12 billion, according to IDC, and will rise to US\$57.6 billion in 2021.⁵

These numbers paint a positive picture, but business leaders are struggling to match this commitment with action to transform the workforce: Even though almost half of business leaders in our survey identify skills shortages as a key workforce challenge, only three percent say their organization plans to increase investment in training programs significantly in the next three years. This low level of commitment will radically curtail their ability to deploy AI at scale.

“Often people only think of AI boosting growth by substituting humans. But actually huge value is going to come from the new goods, services and innovations AI will enable.”

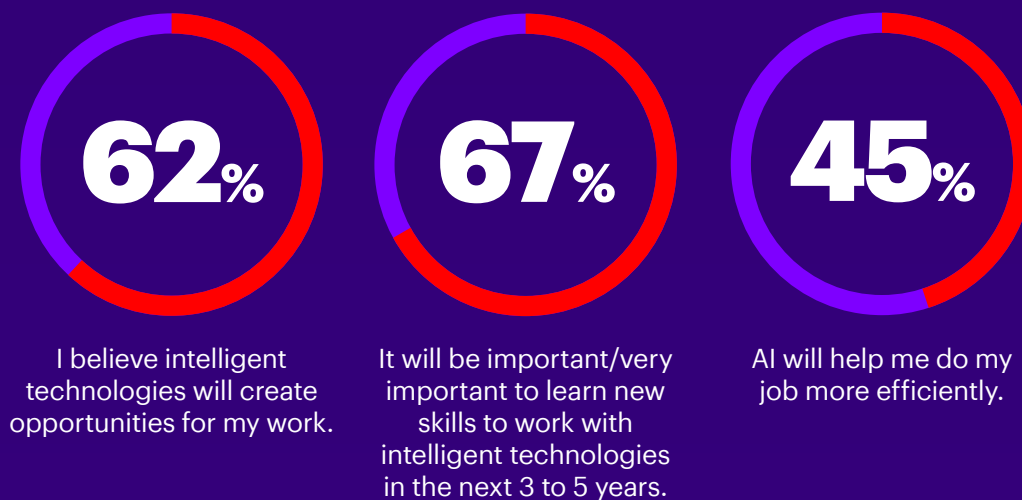
David Autor, Professor of Economics, MIT

ONE BARRIER

Employers underestimate the willingness of employees to acquire the relevant skills.

On average, they deem only about a quarter (26 percent) of their workforce as ready for AI adoption. Nearly one in four cite resistance by the workforce as a key obstacle. However, as our research revealed, 68 percent of highly skilled workers and nearly half (48 percent) of their lower skilled peers are positive about AI's impact on their work. Overall, 67 percent of workers consider it important to develop their own skills to work with intelligent machines. Millennials strongly support this view (75 percent) but even 56 percent of baby boomers do as well. Workers are impatient to embrace AI (see Figure 3).

Figure 3



ONLY 3%

of executives say they intend to significantly increase investment in training and reskilling programs in the next three years.

Source: Accenture Future Workforce Worker and C-Suite Surveys 2017

WHAT'S OFTEN OVERLOOKED

Workers are also consumers. They already dictate grocery lists to Alexa and ask Siri for restaurant suggestions.

They expect personalized services delivered by AI. So at work, why wouldn't they anticipate that intelligent machines will continuously inform them and proactively uncover new insights that help them make their customers' lives better? Business leaders must seize this opportunity: Their people not only want new skills. They are impatient to thrive in an intelligent enterprise that can disrupt markets and improve their working experience.

How can business leaders elevate their workforce to create new value through human-machine collaboration? Our research points to three key actions.



1

REIMAGINE WORK

from workforce planning
to work planning.

2

PIVOT THE WORKFORCE

to areas that create new
forms of value.

3

SCALE UP “NEW SKILLING”

to work with
intelligent machines.



1

REIMAGINE WORK

From workforce planning to work planning.

Forecasts of AI's impact on jobs vary. In January 2018, the World Economic Forum, in collaboration with Accenture, released analysis that reveals a smaller net loss of jobs than some studies have predicted. The study estimates that 16 percent of jobs are at risk of displacement in five production industries after accounting for potential job gains that would arise from the same trends. Even as automation continues, demand for labor will increase in parts of the value chain and in some locations.⁶

But a focus only on job gains and losses misses a crucial point:

The most significant impact of AI won't be on the number of jobs, but rather on job content. Nearly half of the executives we surveyed (46 percent) said that traditional job descriptions are obsolete as machines take on routine tasks and as people move to project-based work. Twenty-nine percent of leaders report that they've extensively redesigned jobs.

Consider Fast Retailing, the Japanese retail holding company, which implemented an AI-enabled device for its shop assistants. The technology provides real-time data on inventory, orders and returns, freeing assistants to have more informed conversations with clients.⁷ The company, which reported record sales and a profit increase of nearly 39 percent in its most recent financial year, plans to use AI to improve speed to market as part of its strategy to increase revenue by nearly 70 percent by 2021.⁸

46% of executives say
job descriptions
are obsolete.

How AI is elevating workers to add more value.

It should therefore come as no surprise that 61 percent of senior executives said that the proportion of roles requiring people to collaborate with AI will rise in the next three years. Figure 4 shows how work is transformed and how workers are elevated.

For example, Morgan Stanley is augmenting the work of its 16,000 financial advisors through the introduction of AI agents. By learning about their clients, the intelligent advisors continually interact with their human co-workers to proactively recommend a range of options that take into account their clients' changing financial situations. Financial advisors are consequently better placed to contact clients at the right time with more relevant advice.⁹

It's not just a case of AI enhancing human capabilities, but of humans improving the performance of intelligent technologies. It is perhaps for this reason that 63 percent of executives in our survey expect that AI will create net job gains in their organization in the next three years.

In previous research, Accenture explored the nature of some new roles and uncovered three new categories of AI-driven jobs: the "trainers," "explainers" and "sustainers."¹⁰ Trainers, for example, will help computers learn to recognize faces. Explainers will interpret the results of algorithms to improve transparency and accountability for their decisions, helping to strengthen the confidence of both customers and workers in AI-powered processes. Sustainers will ensure intelligent systems stay true to their original goals without crossing ethical lines or reinforcing bias. For example, this could include an ethics compliance manager to ensure that an AI-powered credit approval system does not discriminate against certain categories of customers (see more on Responsible AI on page 35).

The evolution of work and the elevation of workers.

Figure 4



Source: Accenture Future Workforce Ethnographic Study 2017

ACTIONS TO REIMAGINE WORK

While just over half of all employers acknowledge that getting human-machine collaboration right is critical to achieving their goals, few have adopted a systematic approach to unlock the value that lies at the intersection of people and intelligent machines.¹¹ The principle is to move the spotlight from jobs to the nature of the work itself before preparing workers with the necessary skills. When reconfiguring work, organizations need to take three steps (see Figure 5):

Figure 5



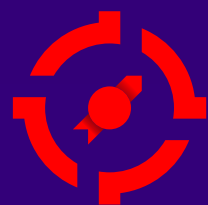
Assess Tasks and Skills

Reconfigure work:
Identify tasks and allocate them between machines and humans.



Create New Roles

Break with tradition:
Go beyond functional jobs to specialized, insight-driven, multiskilled roles.



Map Skills to New Roles

Assess internal skills: Prioritize “New Skilling” strategies for the existing workforce.

i) Assess tasks and skills, not jobs

First, companies need to identify the new kinds of tasks that must be performed. Assessing the range of technologies and teams at their disposal, they can then allocate those tasks to people or machines.

Dynamic Group, a US manufacturer, faced skills shortages in its injection molding production business. Using light robots that can work collaboratively side by side with workers, the company reallocated tasks accordingly. The investment quadrupled the efficiency of the process, reduced wastage from errors and saved existing workers repetitive and strenuous work.¹²

The process of allocating tasks between machines and robots is ongoing; it requires constant observation. Some companies are finding that they need to correct their initial allocation of work to machines. After all, many AI systems are not fully autonomous and require considerable input and adjustment from humans. In China, one vehicle technician we interviewed at an automaker found that a system analyzing massive amounts of customer data to help design cars with the right features was suggesting configurations that would be almost impossible to build. The company had to readjust roles so that people could train the AI to make more relevant recommendations.¹³

Designers' roles will change in sectors that can take advantage of generative AI software, such as that developed by Autodesk. This software mimics nature's evolutionary approach to design in order to develop creations that were not possible before. As the AI makes complex calculations to come up with designs, human co-workers set and reset aesthetic, engineering and material parameters that nudge the software through millions of concepts. This entirely collaborative process has been used by Airbus to design aircraft components that have to meet tough standards for strength and lightness. For example, the company produced a cabin partition 45 percent lighter than previous designs, which saved an estimated 3,180kg of fuel per partition per year,¹⁴ more than twice the average annual fuel consumption of a car in the US.¹⁵

ii) Create new roles

Companies need to create new roles within a broader contextual shift as AI enables people to take on higher value work.

As Figure 6 shows, operational jobs will become more insight-driven and strategic, while mono-skilled roles will become multiskilled. For example, a trader at a Japanese investment firm explained how demand for people will change.

“We’ll get workers to become familiar with AI or get workers who can make it smarter. They’ll need experience as a trader and be strong in computers. They’ll need to understand that deep learning works but that the data can’t be perfect without a knowledge of trading.”¹⁶

This evolution in work corresponds with the “trainer” and “sustainer” roles described earlier.

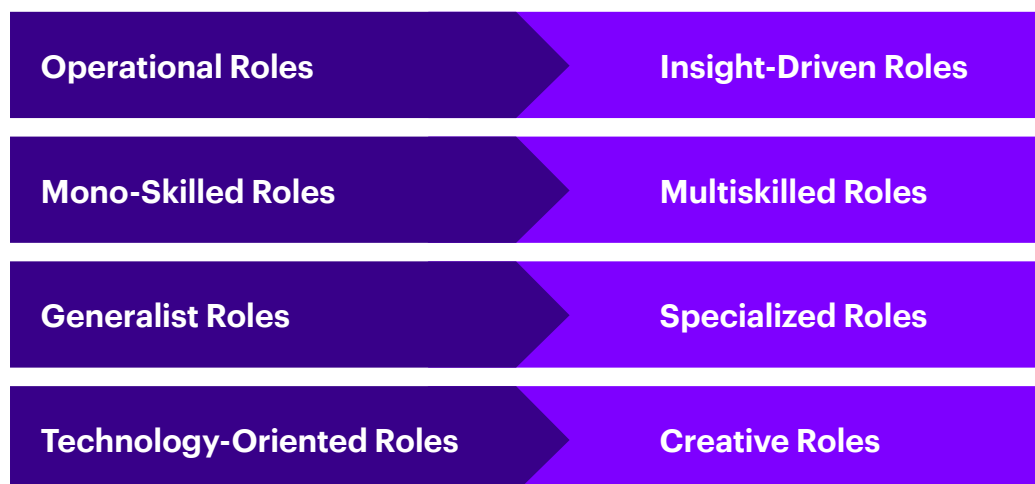
Jobs will also become more specialized as greater volumes of precise data allow more insights to be explored. For example, consumer brands will become increasingly dependent on AI chatbots to represent them in the mass market. Personality trainers will be required to develop the appropriate tone, humor and level of empathy needed for different situations. A health care AI agent must appreciate the sensitivity of patients in a different way than a supermarket AI agent would need to appreciate the mood and mindset of a groceries customer. Microsoft uses a team including a poet, a novelist and a playwright to develop Cortana’s personality, without which this manifestation of the brand would be no different from any other.¹⁷



Reconfigured jobs are more strategic.

One of the greatest benefits of job reconfiguration: Employees take on higher value work, giving them a chance to be more strategic and to do more satisfying work.

Figure 6



Source: Accenture Future Workforce Ethnographic Study 2017

Marriott checks out AI.

Marriott International puts AI at the heart of its pursuit of differentiation. Its TestBED is an accelerator for technology-driven customer experiences, giving startups a chance to trial products at the company's European hotels.¹⁸

One example: Mario, a robot at the reception desk of the Marriott Ghent, Belgium, speaks 19 languages and helps staff register guests.¹⁹

"Our AI council brings together subject matter experts from all disciplines within the company to consider new applications," said David Rodriguez, Chief Human Resources Officer, Marriott International. "Ultimately, AI helps employees strengthen their relationship with guests by knowing them better. When we experiment with new technology, we implement it with a personal touch and ensure that we train our people in a localized way."

Marriott's annual associate engagement survey reported its highest ever engagement scores in 2017.

iii) Map skills to new roles

Once a company has a full list of required tasks, skills and newly defined roles, it can map that list against the skills present in the workforce.

Where there are gaps in skills, companies must decide whether they can quickly train current employees or look for new sources of talent. In our research, we have found that some companies are addressing skills gaps with contract workers in the short term. Others have managed to align the skills of their existing workforce to the new requirements. One Indian telecoms company carefully analyzed changes in workflow to redefine roles when intelligent technologies were added.

Subsequently, the company's Chief Digital Officer told us, *"We then redesigned certain jobs, for example in customer support and logistics support, and provided training to our employees to operate these technologies in an efficient manner."*²⁰

New intelligent platforms often result in changing roles. Consider Predix, a platform that can sense and predict faults in assets, such as aircraft engines. The company's technology assesses the performance of fleets of data in order to understand performance and the conditions that impact it. This allows maintenance workers to focus on fixing faults in place of making routine checks and gives engineers the data with which to pre-empt issues, resulting in more creative solutions down the line. The company has estimated it could save clients US\$7 million in jet plane fuel annually through resulting engine efficiency.²¹

2

PIVOT THE WORKFORCE TO AREAS THAT CREATE NEW FORMS OF VALUE

AI is not simply the next in a line of new digital technologies. In the last century, perhaps only the motor car, the airplane and the internet have matched its potential to transform the way we work and live.

Today, AI and human-machine collaboration is beginning to have a significant impact on how enterprises conduct business.

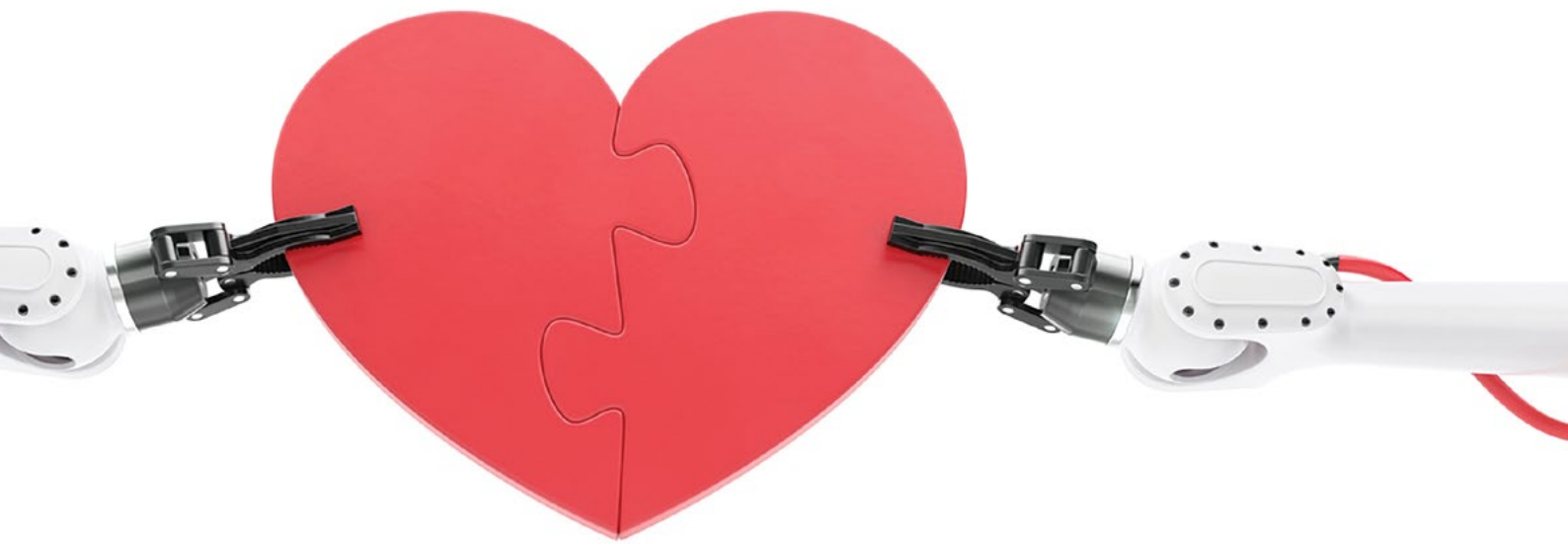
But it has yet to transform what business enterprises choose to pursue. Just as Henry Ford could not have foreseen how the motor car would propel tourism, retail consumption, labor mobility or urbanization, we cannot know what opportunities await those who lead the AI revolution.

It is becoming clear, however, that as people and intelligent machines begin to collaborate in entirely new ways, business leaders will have to pivot their workforce not just once, but twice. The second and truly transformational shift may be less than a decade away in some sectors. In the meantime, business leaders must make a more immediate pivot to take full advantage of the opportunities human-machine collaboration presents today, which can create the springboard to entirely new future growth opportunities and market disruptions.

Executives seem to recognize the power of AI and humans to collaborate to create new customer experiences and business models. Seventy-two percent agree that adopting intelligent technologies will be critical to their organization's ability to differentiate in the market. Forty-two percent believe intelligent technologies will be behind every new innovation they implement in the next three years. This suggests that companies are positioning themselves to move from the prototype stage of development to larger scale applications, as suggested by Figure 1 (see page 5).

"Michelin solutions has used digital technologies, including IoT, to create innovative customer experiences that extend the value of our expertise. Part of the success is due to the way people collaborate with technology and data to offer new services. As businesses adopt artificial intelligence, human-machine collaboration to enhance human intelligence and capabilities will be a critical part of new business models."

Florent Menegaux, Senior Executive Vice President
and Chief Operating Officer, Michelin Group



Marriott International is a pioneer in integrating its people with AI to create new value within its existing business. It is taking on the competition of both incumbents and digital players, such as Airbnb, with a growth model based on creating new technology-enabled experiences. Aside from its famous Relay and Botlr robots, which deliver towels and other items to guests' rooms, Marriott's new ChatBotlr uses Natural Language Processing to respond to guests' requests, relying on Machine Learning to get smarter each time it is used. At the heart of the company's successful drive for growth are innovations that reward loyalty and boost new revenue streams. It has launched recommendation engines to extend what it can sell to guests and new AI-powered chatbot apps that allow rewards customers to book direct on Facebook Messenger and Slack, saving on commission payments to travel agents.²² The company reported a 20 percent year-on-year rise in adjusted net income in its latest financial results.²³ See *"Marriott checks out AI"*.

“Artificial Intelligence enables new services and revenue streams and is significantly changing how we deliver our telecom services now and in the future to our operator and vertical customers. AI has triggered a major shift in the skills of our engineers so they can deliver services faster and with higher quality.”

Igor Leprince, President of Global Services, Nokia

Similarly, Carnival Corporation uses AI to create a competitive edge through enhanced customer experiences. AI helps crew members personalize engagement with its cruise ship guests. Using an Accenture-built solution, passengers wear Wi-Fi-enabled medallions holding information garnered by Machine Learning that collects and interprets their interests. The medallions alert nearby crew members who can anticipate passengers’ needs and offer the bespoke kind of attention typically reserved for high-end guests.²⁴

Driving growth opportunities with AI.

CenturyLink, a US-based telecommunications company, uses an AI agent called Angie that works with its sales managers. It saves them the virtually impossible task of cherry-picking the best of 30,000 sales leads per month. Angie sends emails to these leads, converses with them, interpreting responses in order to drop cases or to judge when to hand likely prospects to salespeople. The solution generates 40 hot leads a month and so far earns US\$20 in new contracts for every dollar spent on the system.²⁵

ACTIONS TO PIVOT THE WORKFORCE

Executives should take immediate steps to pivot their workforce, but in doing so they must be sure that they are resisting the pressure to capture only short-term market advantage. They need to create the mindset, acumen and agility that will be required to seize longer term, transformational opportunities. This means ensuring that the workforce can adapt to new customer markets, that organizational processes can flex accordingly and that leadership is ready to champion a new culture. These four steps will help companies make that first, crucial pivot.

i) Align the workforce to new business models

Shift the purpose of your workforce to synchronize with your unique value proposition to customers.

Consider Stitch Fix, which stands out in clothes retail for its innovative use of human-machine collaboration. In place of salespeople, it has personal stylists who work with algorithms that interpret customers' preferences and learn more with every Pinterest post or returned item. Stylists use the information to improve the bespoke selections they make for customers.²⁶

Adidas, the German sports apparel company, offers another example in the form of SPEEDFACTORY, its small but future-looking initiative to localize manufacturing in particular markets to meet demand for personalized products. Through SPEEDFACTORY, moving from design to production of a customized shoe can now happen in days. The initiative not only reduces time to market, but shifts the entire value proposition to satisfying demanding consumers with differentiated products. Importantly, it also requires a pivot to a highly specialized workforce of tailors, process engineers and others working closely with intelligent technology. The linchpin is the collaboration of people and robots in a series of overlapping production steps. Human hands are required, for example, to finally shape shoes that have been co-designed by computers and people.²⁷ Customization requires a level of adaptability that only people can provide, working hand in hand with intelligent machines.

42%

of executives say AI will be behind every new innovation in their organization in the next three years.

ii) Recognize the business case

Don't simply bank efficiencies to benefit the bottom line. Turn the savings into investments for the future workforce that will propel new business models.

Accenture puts 60 percent of the money it saves from investments from AI into its training programs. Over the past two years, it has retrained tens of thousands of people whose roles have been automated. These employees are now taking on higher value work, in some cases using AI and other technologies to provide more informed services to clients.

Take order processing and accounts payable collections. One Accenture client, a leader in the high-tech industry, has produced a human-AI hybrid workforce where algorithms predict which orders have issues, such as a risk of cancellation or payment disputes. Employees can therefore spend more time paying attention to high-risk situations and be more proactive in mitigating negative outcomes.

This approach has required training people to help them develop a range of expertise and capabilities — from industry sector knowledge to analytics and data interpretation, to the soft skills required to work with customers in new ways. But this investment in Applied Intelligence is paying off with a potential of delivering cash flow improvements of over US\$50 million along with increased working capital and a bottom line profit of more than US\$10 million in the first year of implementation.

“At ENGIE, we consider AI to be one of the key accelerators of harmonious progress, to create new and better ways of working for our people and to design brand new experiences for our clients.”

Yves Le Gélard, Executive Vice President, Chief Digital Officer
and in charge of Group Information Systems, ENGIE

2 PIVOT THE WORKFORCE

iii) Organize for agility

As people do less repetitive work and instead participate in a series of project teams, they must be given more autonomy and decision-making power.

An open culture is needed to encourage experimentation. That openness must extend to involving people in decisions that will change their working environment and the work they do. As the Chief Digital Officer of an Indian telecoms company told us:

“Being an employee-oriented organization, we don’t only undertake initiatives based on market research. We also crowdsource ideas internally where our people get a chance to bring innovation to the organization by using their creativity.”²⁸

Organizations must also redesign the processes and organizational structures that enable the fluid assembly and disassembly of project teams, freeing people from traditional functional constraints.

“The opportunity for newly skilled individuals to collaborate with increasingly intelligent machines and software will accelerate the shift from an assembly line approach to a more fluid ‘assemblage’ of teams and technology, capable of higher levels of creativity and innovation,” write Accenture’s Paul Daugherty and Jim Wilson in *Human + Machine: Reimagining Work in the Age of AI*.²⁹

iv) Foster a new leadership DNA

An agile workforce that leverages the best of intelligent technology and the best of human ingenuity ushers in a new set of expectations for today's leaders.

As hierarchies collapse and cross-function teams assemble and disassemble, leaders become co-creators and collaborators with their people. And, while AI enables individuals to take on higher value responsibilities, it also pushes decision-making closer to where the actual work occurs. Consider the shop floor worker whose tablet delivers real-time data, insights and training to make a decision on the spot. Ultimately leadership isn't a level — we need to build leaders at all levels.

Good leaders also recognize that the more digital we become, the more human connection matters. Angela Ahrendts, Senior Vice President of Retail at Apple, wisely suggests, *"The more technologically advanced our society becomes, the more we need to go back to the basic fundamentals of human communication."*³⁰ In an increasingly digital workplace, empathy, creativity, listening and inclusion — all uniquely human attributes — are needed now more than ever. Leaders' actions are a visible exemplar of these human attributes and a role model of the culture.

Circling back to the idea of the big pivot organizations eventually need to make to reap the full potential of intelligent technology, leadership is all about courage and innovation. Diving head first into uncharted territory. Good leadership seizes the opportunity to create that new reality — pivoting from existing core businesses to the new.

SCALE UP “NEW SKILLING” TO WORK WITH INTELLIGENT MACHINES

To fill the new and reconfigured jobs of the intelligent enterprise, companies will need new approaches to training. “New Skilling” programs must be rapid, flexible, tailored and large-scale to maximize the value humans and machines can create together.

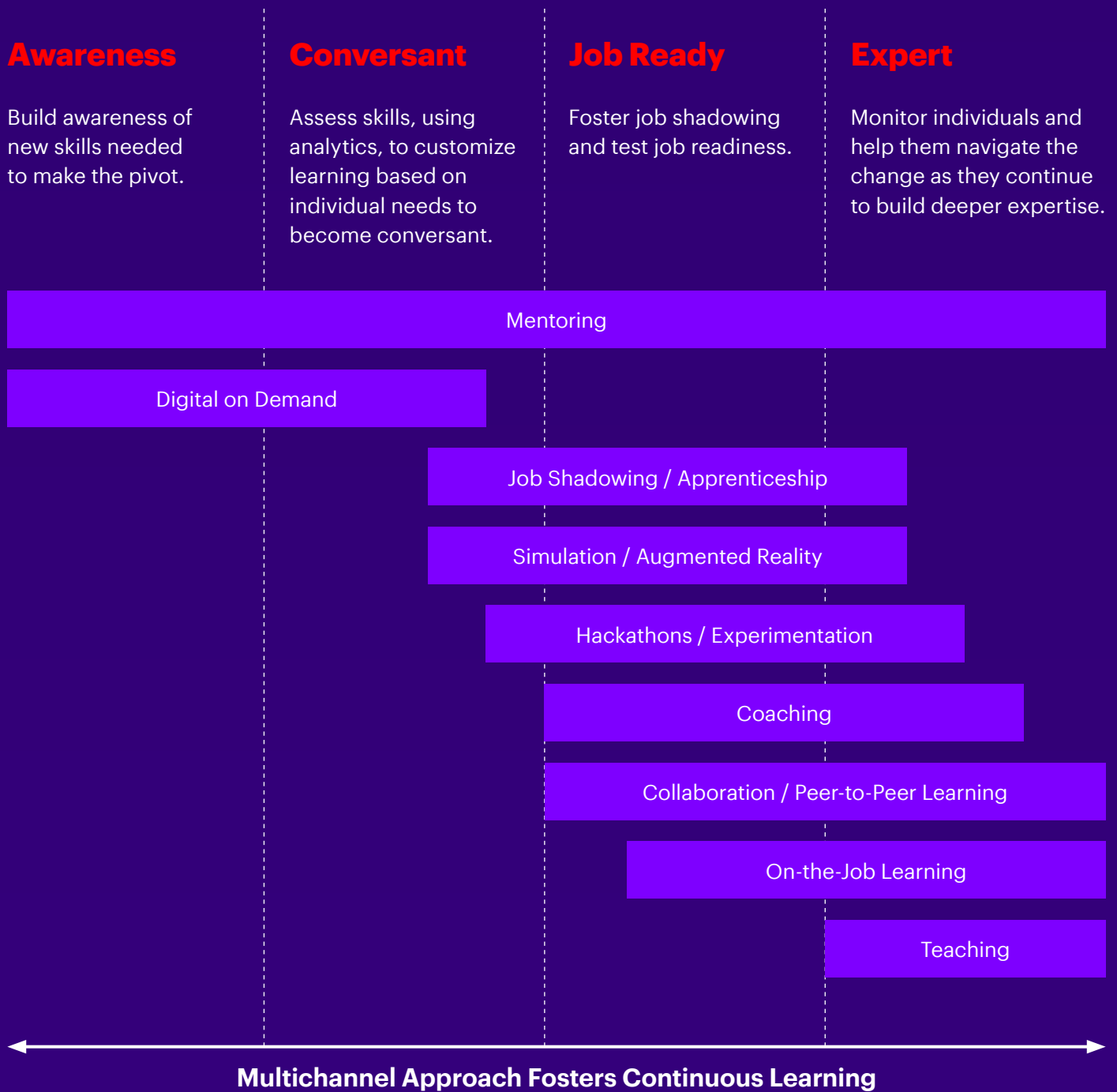
In its efforts to rapidly pivot over 160,000 of its employees to be conversant in new IT skills and more than 100,000 to be job ready in less than two years, Accenture developed a “New Skilling” framework to guide its ambition based on a progression of skills from awareness to expert, while relying on a suite of innovative learning methods grounded in neuroscience research (see Figure 7).

Even though almost half of business leaders in our survey identify skills shortages as a key challenge, only three percent say their organization plans to increase investment in training programs significantly in the next three years. Companies can achieve more with less, but only if they are willing to innovate their training methods. Accenture has actually lowered its cost of training hours by more than 25 percent since it began aggressively expanding its digital learning channels while increasing the number of training hours its people spent by 40 percent.

3 SCALE UP “NEW SKILLING”

Figure 7

Learning Framework: “New Skilling” at Accenture.



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ACTIONS TO SCALE UP “NEW SKILLING”

Three steps to expand the reach of skills programs.



i) Prioritize skills for development

Selecting skills training will depend on the type of AI being used and the size, sector and existing skills levels of an organization.

Creative skills will be important. However, in our survey, executives rank the following as the top five most important skills in the next three years: resource management, followed by leadership, communication, complex problem-solving and judgment/decision-making.³¹

Among the most valuable human skills required to collaborate with AI will be the judgment skills needed to intervene and make or correct decisions when machines struggle to make them. Also critical will be the ability to interrogate systems to gain maximum insight. This requires knowing how they categorize information and understanding the parameters of their algorithms. Teaching intelligent machines will be fundamental, both through explicit processes based on feeding them with quality inputs and through the implicit processes of learning on the job alongside people.

Sustained success will depend on practicing Responsible AI, ensuring that data and systems are managed to be fair, transparent and accountable. This will require training programs that extend from regulatory imperatives to the ethical behaviors of people and machines, and the business practices that follow.

3 SCALE UP “NEW SKILLING”

ii) Account for willingness and skill

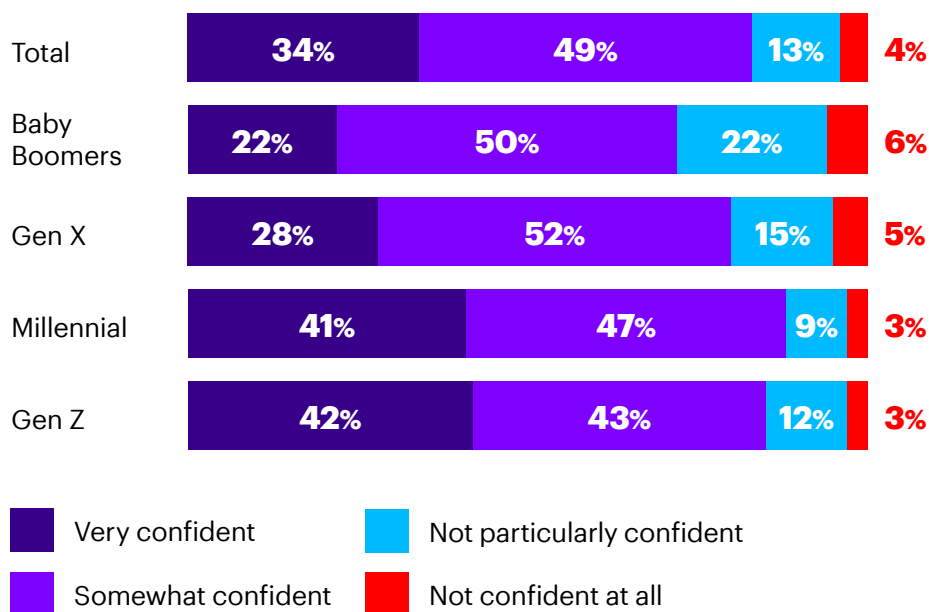
Target training to account for different levels of willingness and skill.

It is important to tailor programs to suit a range of employee “starting points.” The training you offer must address both the differences in motivation levels and differences in skill levels.

Our research shows that confidence levels vary by age (see Figure 8), but that workers are willing to learn. We asked people to self-rate their skill and willingness levels (see Figure 9). A full 54 percent saw themselves as “high skill/high willingness” when it comes to learning new capabilities.

Figure 8

How confident are you in your skills and abilities to work with intelligent technologies?



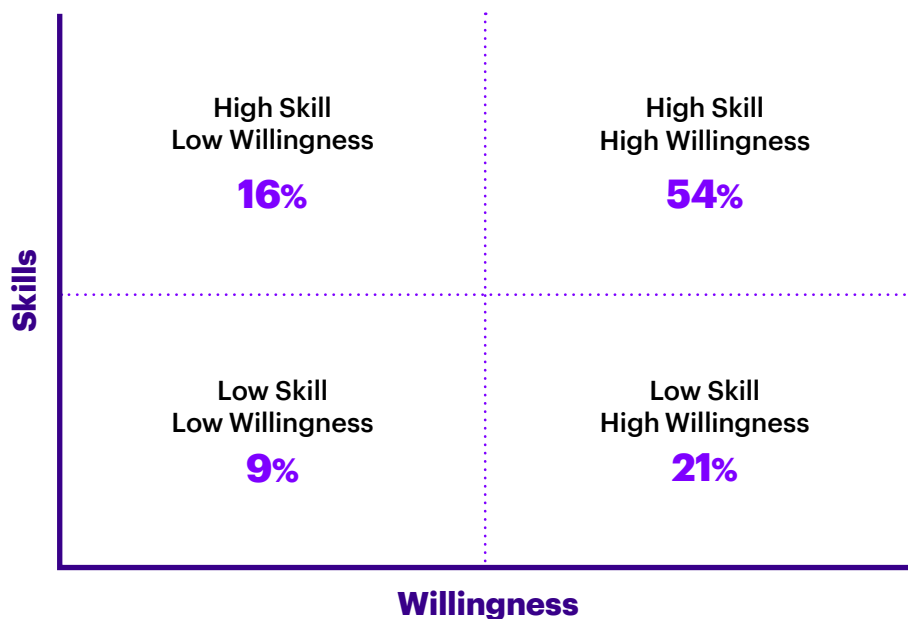
Source: Accenture Future Workforce Worker Survey 2017

3 SCALE UP “NEW SKILLING”

Targeting “New Skilling.”

Most employees fall into the high skill/high willingness category and have a positive attitude toward AI. Half are confident in their AI skills. Companies need to determine the levels of their own workforce and tailor “New Skilling” efforts accordingly.

Figure 9



Source: Accenture Future Workforce Worker Survey 2017

While this number may be on the optimistic side, the approach illustrates the need to gauge the varying motivations of diverse workforces and to target programs at different generations and skill levels. Overall, the research revealed that 62 percent of workers think AI will have a positive impact on their work. When asked what factors would motivate them to develop new skills, almost half (49 percent) of baby boomers want time during the workday for training, but only 36 percent of Gen Z respondents feel that need. And while at least 46 percent of Gen X, Gen Z and millennials are looking to learn new skills to advance their careers, only 35 percent of baby boomers feel the same way.

iii) Go digital to create innovative learning experiences

Digital learning methods, such as virtual reality and augmented reality technologies, can provide realistic simulations to help workers master new manual tasks so they can work with smart machinery.

The same technologies can help reinforce correct procedures on the shop floor — monitoring how employees execute tasks and coaching them to do it the best way. Thyssenkrupp is overcoming skill mismatches through AI. The industrial services giant equips its elevator technicians to consult subject matter experts through Microsoft HoloLens, an augmented reality headset.³²



Walmart’s approach to “New Skilling.”

At Walmart, US employees are being trained at the retailer’s training academies using Oculus Rift virtual reality headsets, allowing trainees to experience and practice responding to real-world scenarios. Think a spill in aisle three with the instructor and trainee peer group able to provide performance feedback as they watch remotely through the employees’ eyes. Following early success, Walmart has now rolled out the program to all 200 academies following the success of the pilot.³³

Digital technology also helps to democratize learning. Accenture’s 3,000 Pinterest-like digital learning boards are curated by approximately 900 experts and give 435,000 employees access to more than 300 content categories, with topics ranging from technical skills, such as blockchain, to softer skills such as coaching. Employees have completed more than 42 million learning activities via the digital boards since their inception, with over 29 million completed in the past year alone.

“Our customers are changing and so are their expectations. They expect simpler, faster, frictionless experiences both in our stores and online. To meet those needs, we are constantly evolving our use of technology to empower our associates and provide them with new skills at speed and scale to better serve our customers. Our academies combine classroom learning with hands-on experience delivered through technology, such as virtual reality, to create immersive and adaptive learning experiences. We have seen that department managers who complete academies have higher retention rates as do associates who report to them. These training investments are providing our associates with the skills they need to succeed today and in the future, driving positive business outcomes and keeping us competitive in our rapidly evolving retail environment.”

Jacqui Canney, Executive Vice President, Global People Division, Walmart

HUMANS HELPING AI HELP HUMANS

Artificial intelligence is redefining the nature of value creation at unparalleled speed and scale. It is reshaping core business processes and has the potential to transform customer experiences and establish entirely new business models.

Companies in the future will achieve sustained growth by using AI to create better outcomes for customers and for wider communities. And yet, most businesses today are still focused on using intelligent technologies to improve efficiencies.

What's needed is an urgent shift in approach. Companies must help people learn to work closely with intelligent machines as collaborative partners. In other words: Humans need to help AI help humans. Combined with radical changes to organizational structures and processes, this allows them to make Applied Intelligence a reality.

The good news.

Workers are impatient to collaborate with AI and to learn the necessary skills for doing so. And they have a vision for how AI can improve the lives of customers.

The bad news.

Many business leaders don't recognize workers' enthusiasm and aren't funneling the necessary resources into "New Skilling."

"2017 was the year AI leapt to the forefront of CEO consciousness. 2018 may be the year that the hype starts to become reality."³⁴

Alan Murray,
President, Fortune

It's time for business leaders to reimagine the work their people do in partnership with AI and to ask themselves tough, uncomfortable questions about their organization's readiness to compete.

1 From “Workforce” Planning to “Work” Planning

Do we have a clear understanding today of how work in our organization will be reconfigured by intelligent machines, starting in 2018? Which of our core activities will be automated, which will see human-machine collaboration elevate our workers, and which will remain the preserve of workers only? What will this mean for our operating model? Are we prepared for the enormous changes ahead as the nature of work is reimagined, starting now?

2 “New Skilling” the Future Workforce

Do we have a clear view today of the knowledge, skills and mindsets required to work with intelligent machines in a way that creates real value? Where are our people against that benchmark? Is “New Skilling” already being integrated into our leadership development, learning and recruitment programs?

3 Positioning for the Full Value of AI

Do we have a clear understanding as a leadership team of how AI will be disruptive not just with efficiency and productivity gains in our existing business model, but in creating entirely new markets, products, services and customer experiences? What new jobs will this create in our organization? Are we organized, and do we have the talent to take advantage of both the top line and bottom line opportunity as human-machine collaboration reshapes the nature of competition in multiple industries?

These are some of the defining questions that will separate winners and losers in an era of intelligent machines. Not in three years or five years. Now. If you want to get ahead of the game in 2018, let's talk.

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About the Research

The Accenture Research program was built on five proprietary research initiatives.

A worker survey of 14,078 workers across skill levels and generations. Executed by Market Knowledge Online.

A business leader survey of 1,201 C-level executives.

Both surveys covered 11 countries (Australia, Brazil, China, France, Germany, India, Italy, Japan, Spain, the UK and the USA) and the following industry sectors: Automotive, Consumer Goods & Services, Health & Life Sciences, Infrastructure & Transportation, Energy, Media & Entertainment, Software & Platforms, Banking (Retail & Investment), Insurance, Retail, Telecommunications and Utilities. Survey development and fieldwork undertaken with the assistance of Oxford Economics.

In-depth interviews with 48 C-level executives from a range of industries in Australia, Brazil, China, France, Germany, India, Italy, Japan, Spain and the USA. Interviews executed with the assistance of Oxford Economics.

Ethnographic interviews involving 30 in-depth qualitative in-work interviews with individuals who have been significantly impacted by the integration of new AI technologies into their workplace. Interviews covered Brazil, China, Germany, India, Japan, the UK and the USA, and eight industry sectors. Interviews executed by PSB.

Econometric modeling to determine the potential financial performance improvement resulting from investments in artificial intelligence. We adapted Acemoğlu & Autor (2014) to build a multivariate panel data econometric model that is able to account for the productivity impact of different sets of new technologies for both “leading” and “follower” companies. Leading companies are the top 20 percent according to both AI investment and financial performance. The company-level econometric model is the first to study the effect of investment in specific new technology clusters on companies’ Profits (EBITDA), Productivity (EBITDA/Employees), Revenues and Employment with such level of granularity. The model runs on a unique and newly constructed data set that includes financial and technology investment data for 16,000+ companies across 14 industries and 10 new technologies for 2015 and 2016. Financial and technology investment data was sourced from IDC, Ovum and Capital IQ. The data set was enriched with companies’ new technology investment forecasts through 2022.

Sources

- ¹ Gartner. Hype Cycle for Emerging Technologies, 2017. Available at: <https://www.gartner.com/smarterwithgartner/top-trends-in-the-gartner-hype-cycle-for-emerging-technologies-2017> [Accessed January 6, 2018].
- ² Fjord Trends 2018. Available at: <https://trends.fjordnet.com/?>
- ³ World Cancer Research Fund International. Available at: <http://www.wcrf.org/int/cancer-facts-figures/data-specific-cancers/breast-cancer-statistics> [Accessed January 6, 2018].
- ⁴ Accenture Future Workforce C-Suite Survey 2017.
- ⁵ © Copyright IDC. Worldwide Semiannual Cognitive/Artificial Intelligence Systems Spending Guide. Available at: <https://www.idc.com/getdoc.jsp?containerId=prUS43095417>
- ⁶ The New Production Workforce: Responding to Shifting Labour Demands, 2018. World Economic Forum. Available at: <https://www.weforum.org/whitepapers/the-new-production-workforce-responding-to-shifting-labour-demands> [Accessed February 21, 2018]
- ⁷ Real-Time Retail: Why Uniqlo Employees Use Handhelds. *RTInsights* [online]. Available at: <https://www.rtinights.com/real-time-retail-why-uniqlo-employees-use-handhelds> [Accessed December 13, 2017].
- ⁸ Takada, K. and Huang, G. (2017). Uniqlo thinks faster fashion can help it beat Zara, *Bloomberg* [online]. Available at: <https://www.bloomberg.com/news/articles/2017-03-16/uniqlo-turns-speed-demon-to-take-on-zara-for-global-sales-crown> [Accessed 22 December 2017]; and Fast Retailing Results Summary 2017, *Fast Retailing*. Available at: <http://www.fastretailing.com/eng/ir/financial/summary.html> [Accessed December 22, 2017].
- ⁹ Son, H. (2017). Morgan Stanley's 16,000 human brokers get algorithmic makeover. *Bloomberg* [online]. Available at: <https://www.bloomberg.com/news/articles/2017-05-31/morgan-stanley-s-16-000-human-brokers-get-algorithmic-makeover> [Accessed December 21, 2017].
- ¹⁰ Wilson, H. J., Daugherty, P. R., and Morini-Bianzino, N. (2017). The Jobs that Artificial Intelligence will create. *MIT Sloan Management Review* [online]. Available at: <https://sloanreview.mit.edu/article/will-ai-create-as-many-jobs-as-it-eliminates> [Accessed January 4, 2018].
- ¹¹ Accenture Future Workforce C-Suite Survey 2017.
- ¹² Tingley, K. (2017). Learning to love our robot co workers. *New York Times* [online]. Available at: <https://www.nytimes.com/2017/02/23/magazine/learning-to-love-our-robot-co-workers.html> [Accessed January 3, 2018].
- ¹³ Accenture Future Workforce Ethnographic Study 2017.
- ¹⁴ Autodesk. Reimagining the future of air travel. Available at: <https://www.autodesk.com/customer-stories/airbus> [Accessed December 22, 2017].
- ¹⁵ Alternative Fuels Data Center (2015). Based on data from Federal Highway Administration and American Public Transportation Association. Available at: <https://www.afdc.energy.gov/data/10308> [Accessed January 7, 2018].
- ¹⁶ Accenture Future Workforce Ethnographic Study 2017.
- ¹⁷ Wilson, H. J., Daugherty, P. R., and Morini-Bianzino, N. (2017). When AI becomes the new face of your brand. *Harvard Business Review* [online]. Available at: <https://hbr.org/2017/06/when-ai-becomes-the-new-face-of-your-brand> [Accessed December 22, 2017].
- ¹⁸ Marriott TestBED, Transforming the Future of Travel and Hospitality. *Marriott International* [online]. Available at: <http://www.marriotttestbed.com> [Accessed December 19, 2017].
- ¹⁹ Waters, A. (2016). Robot takes reception desk at Ghent Marriott. *4Hoteliers.com* [online]. Available at: <https://www.4hoteliers.com/itb/newsarticle/487> [Accessed December 18, 2017].
- ²⁰ Accenture Future Workforce C-Suite Survey 2017.
- ²¹ Winig, L. (2016). GE's big bet on big data and analytics. *MIT Sloan Management Review* [online]. Available at: <https://sloanreview.mit.edu/case-study/ge-big-bet-on-data-and-analytics> [Accessed December 22, 2017].
- ²² Marriott International's AI-powered Chatbots on Facebook Messenger and Slack, and Aloft's ChatBotlr, Simplify Travel for Guests Throughout Their Journey. *Marriott International* [online]. Available at: <http://news.marriott.com/2017/09/marriott-internationals-ai-powered-chatbots-facebook-messenger-slack-alofts-chatbotlr-simplify-travel-guests-throughout-journey> [Accessed December 13, 2017].
- ²³ Marriott International 3rd Quarter Financial Results, 2017. Available at: <http://news.marriott.com/2017/11/marriott-international-reports-third-quarter-2017-results-highlights> [Accessed December 22, 2017].
- ²⁴ Accenture to Help Carnival Corporation Transform the Guest Experience Through Intelligent Personalization. *Accenture* [online]. Available at: <https://newsroom.accenture.com/news/accenture-to-help-carnival-corporation-transform-the-guest-experience-through-intelligent-personalization.htm>
- ²⁵ Wilson, C. (2017). CenturyLink using AI to boost sales efficiency. *Light Reading* [online]. Available at: <http://www.lightreading.com/automation/centurylink-using-ai-to-boost-sales-efficiency/d/d-id/735575> [Accessed December 22, 2017].
- ²⁶ Gaudin, S. (2016). At Stitch Fix, data scientists and A.I. become personal stylists. *Computerworld* [online]. Available at: <https://www.computerworld.com/article/3067264/artificial-intelligence/at-stitch-fix-data-scientists-and-ai-become-personal-stylists.html> [Accessed December 13, 2017]; and Wilson, H., Daugherty, P., and Shukla, P. (2016). How One Clothing Company Blends AI and Human Expertise. *Harvard Business Review* [online]. Available at: <https://hbr.org/2016/11/how-one-clothing-company-blends-ai-and-human-expertise> [Accessed December 13, 2017].
- ²⁷ Wiener, A. (2017). Inside Adidas' Robot-Powered, On-Demand Sneaker Factory. *WIRED* [online]. Available at: <https://www.wired.com/story/inside-speedfactory-adidas-robot-powered-sneaker-factory> [Accessed December 13, 2017].
- ²⁸ Accenture Future Workforce C-Suite Survey 2017.
- ²⁹ Human + Machine: Reimagining work in the age of AI, scheduled for publication by *Harvard Business Review Press* in March, 2018.
- ³⁰ Reingold, J. (2015). What the heck is Angela Ahrendts doing at Apple. *Fortune* [online]. Available at: <http://fortune.com/2015/09/10/angela-ahrendts-apple> [Accessed January 6, 2018].
- ³¹ Accenture Future Workforce C-Suite Survey 2017.
- ³² Ridder, M. (2016). Thyssenkrupp unveils latest technology to transform the global elevator service industry: Microsoft HoloLens, for enhancing interventions. *Thyssenkrupp* [online]. Available at: <https://www.thyssenkrupp.com/en/newsroom/press-releases/press-release-114208.html> [Accessed December 13, 2017].
- ³³ Feloni, R. (2017). Walmart is using virtual reality to train its employees. *Business Insider UK* [online]. Available at: <http://uk.businessinsider.com/walmart-using-virtual-reality-employee-training-2017-6?r=US&IR=T> [Accessed December 13, 2017]; and Money, J. (2017). Walmart says virtual reality training is a hit with its staff. *NewsOK* [online]. Available at: <http://newsok.com/walmart-says-virtual-reality-training-is-a-hit-with-its-staff/article/5573001> [Accessed December 13, 2017].
- ³⁴ Murray, A. (January 2, 2018). *Fortune CEO Daily*. Available at: <http://fortune.com/2018/01/02/recession-ai-metoo-ceo-daily-for-january-2-2017> [Accessed January 9, 2018].

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