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The promise of artificial intelligence

Redefining management
in the workforce of the future

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A large, stylized orange chevron graphic pointing to the right, serving as a background for the tagline.

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Executive summary

By the end of this decade, artificial intelligence (AI) will enter businesses en masse.¹ But unlike prior waves of new technology—which have largely disrupted blue collar and service jobs—recent advancements in AI will affect *all* levels of management, from the C-suite to the front line. Picture an organization where AI automates scheduling, resource allocation and reporting—taking administrative and time-consuming tasks off managers' shoulders. Imagine what AI-assisted analytics, simulation and hypothesis testing can do for decision making, strategy and innovation throughout the enterprise.

AI not only presents unprecedented opportunities for value creation, but also daunting challenges for executives and managers. It will force them to reconsider their own roles and redefine the fundamental operating principles currently guiding their organizations. Division of labor will change, and collaboration among humans and machines will increase. Companies will have to adapt their training, performance and talent acquisition strategies to account for a newfound emphasis on work that hinges on human judgment and skills, including experimentation and collaboration. Our survey on the impact of AI on management, coupled with executive interviews, reveals the following:

AI will put an end to administrative management work. Managers spend most of their time on tasks at which they know AI will excel in the future. Specifically, surveyed managers expect that AI's greatest impact will be on administrative coordination and control tasks, such as scheduling, resource allocation and reporting.

There is both readiness and resistance in the ranks. Unlike their counterparts in the C-suite, lower-level managers are much more skeptical about AI's promise and express greater concern over issues related to privacy. Younger managers are more receptive than older ones. And managers in emerging economies seem ready to leapfrog the competition by embracing AI.

The next-generation manager will thrive on judgment work. AI-driven upheaval will place a higher premium on what we call "judgment work"—the application of human experience and expertise to critical business decisions and practices when the information available is insufficient to suggest a successful course of action. This kind of work will require new skills and mindsets.

Follow a people-first strategy. Replacing people with machines is not a goal in itself. While artificial intelligence enables cost-cutting automation of routine work, it also empowers value-adding augmentation of human capabilities. Our findings suggest that augmentation—putting people first and using AI to amplify what they can achieve—holds the biggest potential for value creation in management settings.

Executives must start experimenting with AI. Now is the time for executives to get themselves and their organizations started on experimenting with AI and learning from these experiences. If the labor market's shortage of analytical talent is any guide, executives can ill afford to "wait and see" if they and their managers are equipped to work with AI and capable of acquiring the essential skills and work approaches.

An end to administration

As our survey indicates, managers across all levels spend more than half of their time on coordination and control tasks, the very responsibilities that are expected to be most impacted by AI (see Figure 1). Administrative and routine tasks, such as scheduling, allocation of resources, and reporting, will fall within the remit of intelligent machines—responsibilities that have long been reserved for humans. For instance, a typical store manager or a lead nurse at a nursing home must constantly juggle shift schedules, accounting for staff members' absences owing to illness, vacation time or sudden departures. Many of these tasks will be automated by AI. Survey respondents recognize oncoming changes to their administrative work, with 86 percent saying that they would like AI support with monitoring and reporting. What is more, 45 percent of the managers we surveyed would automate such tasks, if possible. Imagine AI writing your monthly reports. It is not a distant dream. Leading news providers and Wall Street banks are now using AI report generators to write news and analytical reports by drawing on quantitative data. The Associated Press, for example, expanded its quarterly earnings reporting from approximately 300 companies to nearly 3,000 with the help of AI-powered software robots—freeing up journalists to conduct more investigative and interpretive reporting.²

A new division of labor

While the prospect of intelligent machines generating investor statements or management reports may seem fairly harmless, their impact will not be limited to administrative tasks. Artificial intelligence is currently creeping into territory once considered exclusive to humans: assessing and acting on human emotions and personality traits.

For example, Jobaline, a job-placement site, uses intelligent voice analysis algorithms to evaluate job applicants. The algorithm assesses paralinguistic elements of speech, such as tone and inflection, predicts which emotions a specific voice will elicit, and identifies the type of work at which an applicant will likely excel.³

If AI could absorb and accelerate routine work as well as provide powerful analytical support, what would the next-generation manager's responsibilities look like, and which skills would he or she need to master? Some of our interviewees questioned whether the manager role as we know it will survive. As Lloyds Banking Group's Chief Information Officer of Digital and Transformation, Jon Webster, put it:

"A manager's job is to coordinate action across various parts of the organization and understand the context in which the work is done so he can help shape the context. But if that context changes so quickly and can be uncovered dynamically through advances in technology, then we may not need managers."

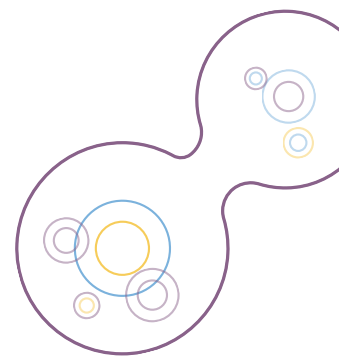
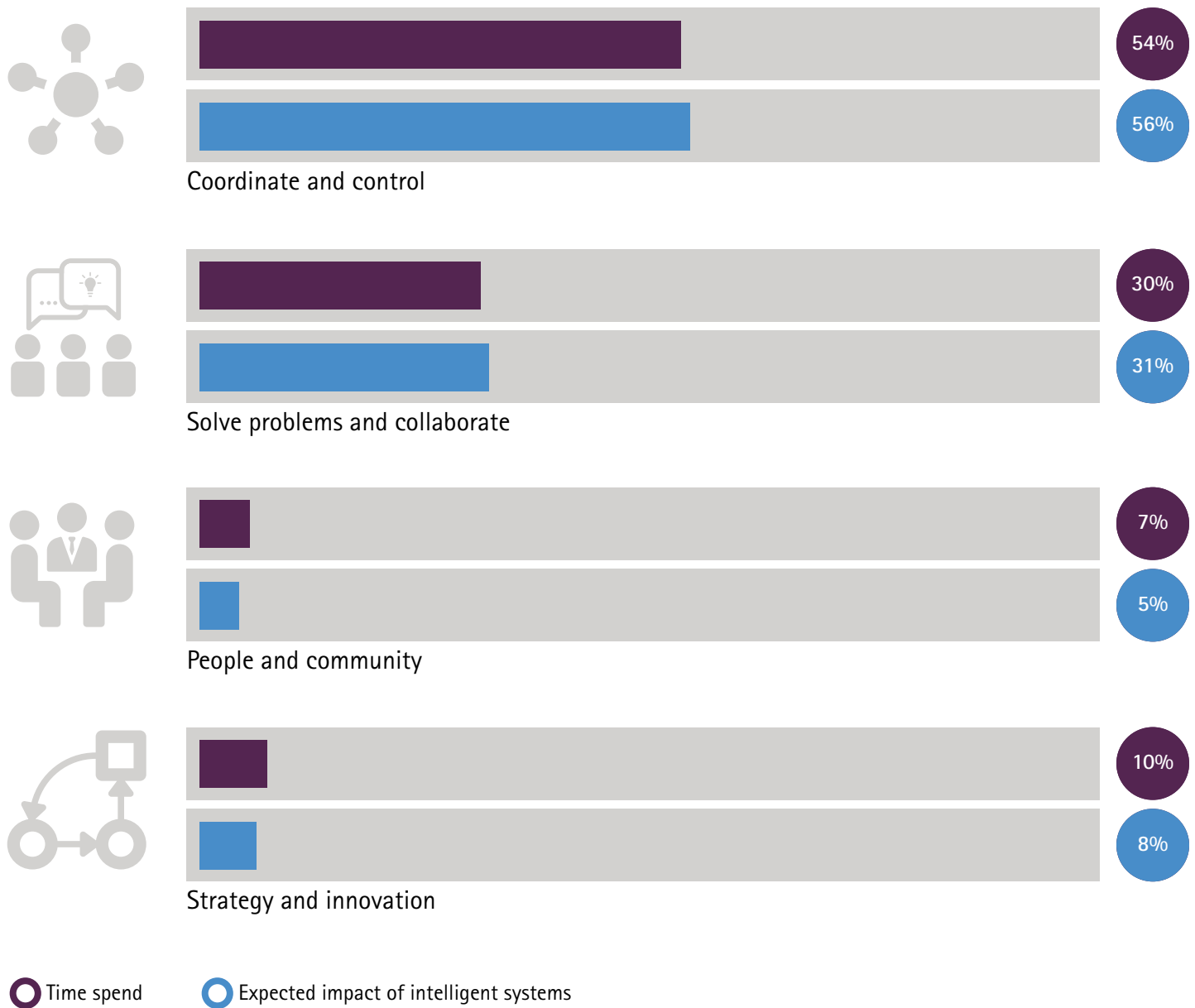


Figure 1. Changing tasks

Managers spend the bulk of their time on coordination and control tasks—those most expected to fall to intelligent systems in the future.

% of time spent on categories of work versus views on the impact of intelligent systems



Source: Accenture Institute for High Performance and Accenture Strategy, "The Impact of Cognitive Computing in Management" study, 2015.

About the research

In August and September 2015, the Accenture Institute for High Performance (AIHP), in partnership with Accenture Strategy, surveyed 1,770 front-line, mid-level and executive-level managers from 14 countries ("The Impact of Cognitive Computing in Management" study, 2015). Our survey respondents represented 17 distinct industries and provided thoughts on artificial intelligence's potential impact on their jobs, perceptions of their current tasks and skills and the future of their positions.

From April 2014 through October 2015, AIHP conducted 37 interviews with executives that incorporated insights from seven industries and nine countries on the topic of leading the digital enterprise. Interviewees shared their thoughts on their company's digital transformation efforts, industry developments, the evolution of their roles in relation to digital disruption and ways to keep up with increasingly tech-savvy employees and customers.



Artificial intelligence

Artificial Intelligence (AI) refers to IT systems that sense, comprehend, act and learn. AI consists of multiple technologies that enable computers to perceive the world (such as computer vision, audio processing and sensor processing), analyze and understand the information collected (for example, natural language processing or knowledge representation), make informed decisions or recommend action (for instance, inference engines or expert systems) and learn from experience (including machine learning). Intelligent machines are computers and applications with AI embedded. Intelligent systems connect multiple machines, processes and people.



Manager

A manager is anyone in a managerial or supervisory position at any level of an organization—from the C-suite executive to the team lead in a store or on the factory floor. We distinguish between three levels of management: 1) C-suite executive/top manager—a member of an organization's top management group, such as the CEO or CFO. 2) Middle manager—for instance, plant manager, regional manager, divisional manager, senior administrative manager, vice president or manager of large-scale projects and programs. 3) Front-line manager—such as an office manager, shift supervisor, department manager, foreperson, crew leader, store manager, team lead, junior administrative manager or manager of smaller projects.

Readiness and resistance

The subject of artificial intelligence generates strong reactions, with some believing in its seemingly unbridled potential and others viewing it as a harbinger of doom. As much as 84 percent of all managers in our survey expect AI to make their work more effective and interesting, yet 36 percent express fear that it will threaten their jobs.

Optimism in the C-suite, skepticism in the ranks

Although top managers relish the opportunity to integrate AI into work practices, mid-level and front-line managers are less optimistic. When asked if they would be comfortable with AI monitoring and evaluating their work, 42 percent of top managers "strongly agree" with the statement, but only 26 percent of middle managers and 15 percent of front-line managers demonstrated the same level of enthusiasm. Willingness to accept responsibility for intelligent machines' actions follows the same pattern, with top managers being most accepting and front-line managers being least (45 percent versus 17 percent "strongly agree," respectively) (see Figure 2).

Similarly, age makes a difference when it comes to attitudes toward AI. When asked whether they would trust AI's advice while making decisions in the future, 33 percent of managers 35 years old and younger strongly agreed, while only 13 percent of managers over the age of 50 gave the same response.

Hesitancy by older managers to embrace AI may be linked to complacency. Consider survey results for the question "If intelligent systems could enable you to free up time at work, how would you spend it?" The top three activities cited by managers aged 35 and younger were: adopt new responsibilities, experiment and collaborate. For the 36 to 50 age cohort, the answers were: adopt new responsibilities, experiment, and coach and strengthen relationships with direct reports. Managers aged 51 and upwards said they would distribute time across existing tasks, coach colleagues, and improve their work-life balance. Our oldest study participants selected the least forward-thinking options, suggesting lack of motivation to take part in or contribute to the advancement of new work practices.

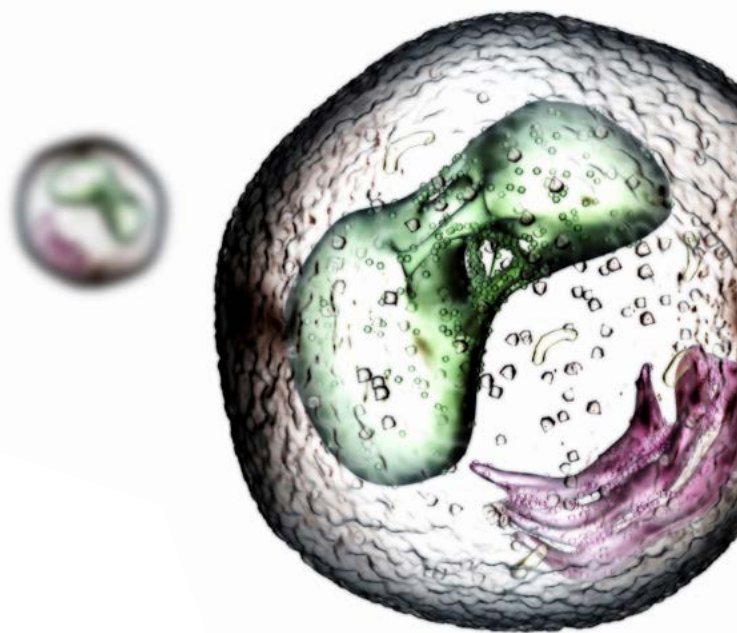


Figure 2. Differences in managerial ranks

Lower level managers are much more skeptical about taking advice from intelligent systems than their bosses. The confidence in and comfort with these applications decline the further away a manager operates from the C-suite.



High hopes for AI in emerging economies

When we drilled down further into our survey results, we saw that managerial acceptance of AI also differs across geographies. Specifically, managers in emerging economies appear far more likely to embrace artificial intelligence than their counterparts in developed economies (46 percent versus 18 percent, respectively, strongly agree that they would trust intelligent machines' advice while making business decisions in the future). Similar to their embrace of BYOD (Bring Your Own Device),⁴ managers in emerging economies are keen to adopt forward-looking tools, such as AI, in an effort to achieve global best practice and leapfrog the competition.

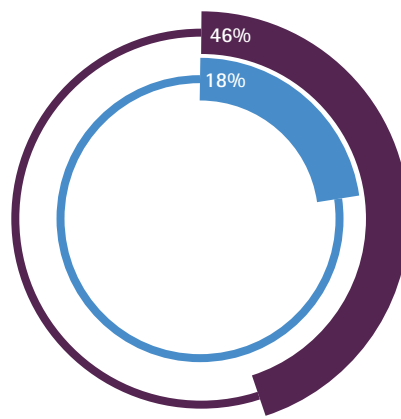
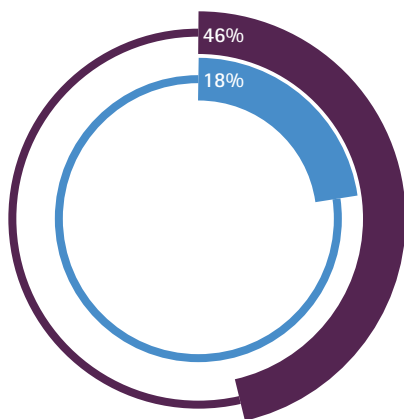
By contrast, in mature and tech-savvy markets like the United States and the Nordic region, managers may have more experience with technology adoption and the associated challenges. They may also more clearly understand what works and what does not. These characteristics may make them more skeptical about AI but also more qualified to lead its adoption. Privacy concerns could discourage managers in developed economies from embracing artificial intelligence. Forty-six percent of our survey respondents from emerging economies strongly agreed that they are comfortable with AI monitoring and evaluating their work, yet only 18 percent of respondents from developed economies agreed (see Figure 3).

Figure 3. A world of difference

Managers in emerging economies seem more open to AI and intelligent systems than those in developed economies.

"I would trust the advice of intelligent systems in making business decisions in the future."

"I am comfortable with an intelligent system monitoring and evaluating my work."



○ Emerging ○ Developed

Adoption requires adaptation

The differences in readiness for and resistance to AI across managerial ranks, age groups and geographies indicate that companies should tailor their AI adoption strategies to local and organizational conditions. Involvement of managers across ranks in adopting AI-embedded computers and applications—intelligent machines—will deliver at least two important benefits for businesses.

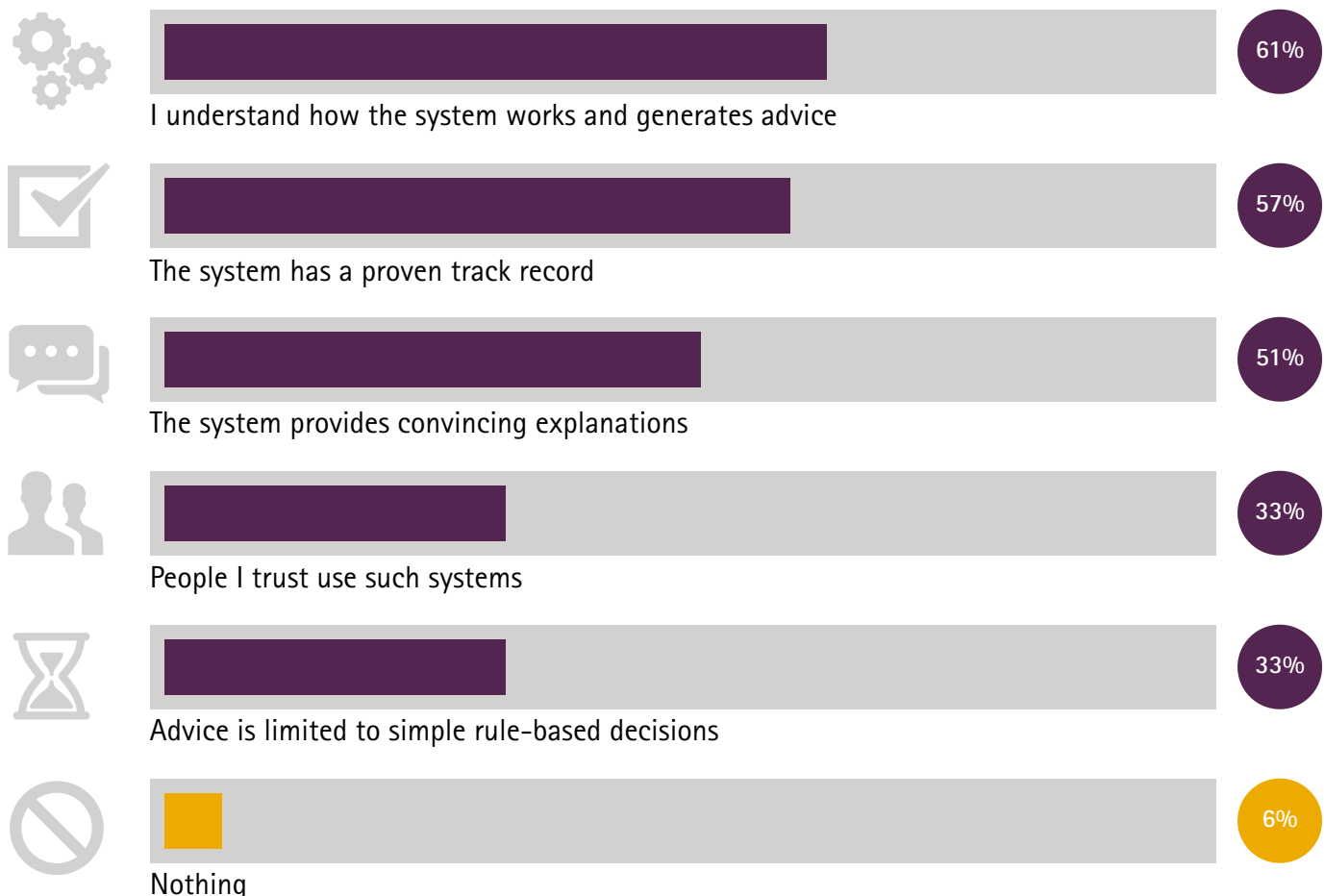
First, intelligent machines must be trained in context. Just like humans, on-the-job training is a requirement for such machines because they

typically arrive with only very general capabilities. To get the most from AI, managers at all levels must take part in the instructional experience. This leads to the second point. Our survey shows that willingness to trust AI-generated advice hinges on a manager's understanding of how the AI system in question functions (61 percent of respondents selected this option. See Figure 4). Involving managers in AI training fosters a sense of ownership in the learning process and provides managers' familiarity with such systems. The result could be a shared belief that AI extends, not eliminates, human potential—and a greater willingness to embrace the technology.

Figure 4. The drive to understand AI

Managers are more willing to put their trust in an intelligent system if they understand how it works.

"What would allow you to trust advice generated by an intelligent system?"



Judgment work

Although AI will invariably take on more routine work and even augment human decision-making, it will not cover all of the bases—in particular, what we call “judgment work”; the application of human experience and expertise to critical business decisions and practices when the information available is insufficient to suggest a successful course of action or reliable enough to suggest an obvious best course of action. For a sharper sense of the nature of judgment work, consider big data marketing and sales analytics. Such analytics often provide insights that can inform promotional campaigns—including predicting which promotions will generate desired sales outcomes. But there is increasing concern that analytics-driven short-term results may come at the expense of long-term brand building, strategies for which cannot easily be suggested by data. Failure to attend to long-term brand building could erode a company's future revenues and strategic position. To keep strengthening their brand further into the future, marketing executives must use judgment—combining analytics with their own and others' insight and experience, and by balancing short- and long-term priorities.⁵

This application of experience and expertise to critical business decisions and practices represents the real value of human judgment. In “Judgment calls: preparing managers to thrive in the age of intelligent machines,” Accenture identified three forms of judgment work that managers will gravitate toward as AI liberates more of their time and mental bandwidth: data interpretation, idea development and the application of context and history to the decision-making process.⁶

Earlier, we described an AI system that evaluates job applicants. Even if such applications can measure and opine on a candidate's facial expressions,

mannerisms and vocal inflections, they may not be able to assess that individual's compatibility with the attitudes and history of the company's existing workforce. These decisions require human awareness of the organization's context and history.

Judgment work requires new skills

Managers have a sense of what judgment work involves, even if they don't fully recognize the concept. In our survey, the new top skills that managers think will be required in the future include digital aptitude, creative thinking and experimentation, data analysis and interpretation, and strategy development (see Figure 5). While creative, analytical and strategic skills are crucial for judgment work, digital capabilities will enable managers to collaborate effectively with machines—unlocking their true potential as fellow colleagues, not just devices. Layne Thompson, Director of ERP Services for a United States Navy IT services organization, pointed to the intersection of technology, creativity and experimentation when he suggested that:

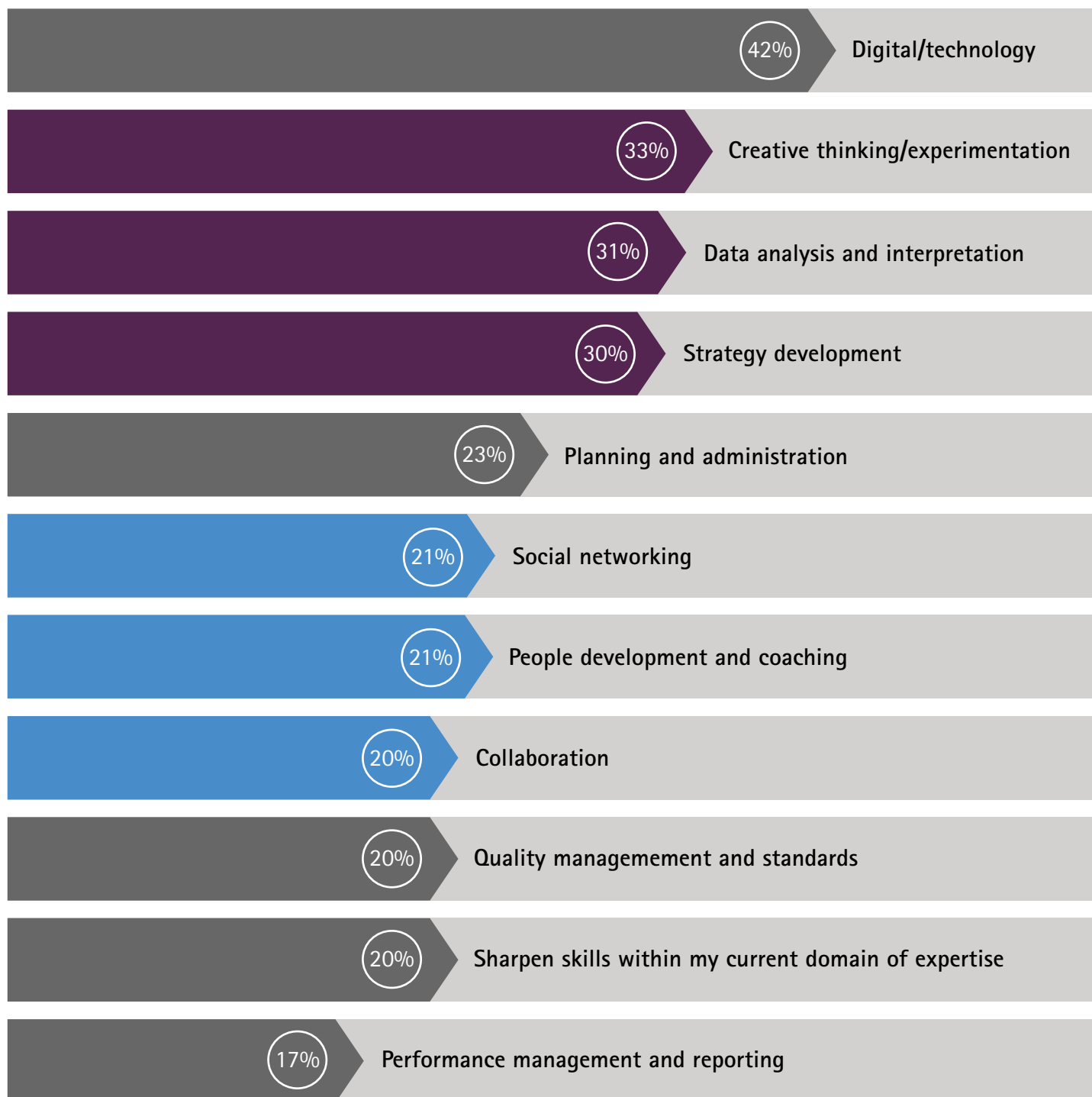
“More often than not, managers think of what they're doing as requiring judgment, discretion, experience, as well as the capacity to improvise as opposed to simply applying rules. And if one of the potential promises of machine learning [...] is the ability to help make decisions, then we should think of technology as being intended to support rather than replace.”



Figure 5. Skills managers need to succeed

While managers recognize the value of judgment work, they exhibit a blind spot for interpersonal skills—distinctly human qualities that will help to set them apart from AI in the workplace.

Percentage of managers that selected the given skills as the top three skills someone needs to succeed in their role in five years' time.



● Individual judgment skills ● Interpersonal skills

Judgment is a team sport

Many managers mistakenly view judgment work as only an individual discipline, failing to appreciate that it can also involve decidedly interpersonal and organizational practices. In more complex settings, judgment is typically a collective outcome of individuals' and teams' diverse perspectives, insights and experiences. And often, the resulting choices are better informed than decisions that an individual would have arrived at on his or her own.

Collective judgment requires specific interpersonal skills; namely, social networking, people development and coaching, and collaboration. Yet our survey findings reveal that managers do not place much of a premium on such skills. As Figure 5 showed, survey participants ranked social networking, coaching and collaboration lower in importance than other skills they believe will be required to succeed in the AI era. When engaging in collective judgment, leaders must recognize the value of social networks at play in their enterprise—understanding how these networks operate and how to leverage them to build productive relationships as well as draw on diverse insights.⁷

In some cases, organizations can create the conditions for effective collective judgment by establishing structures, such as "shadow advisory boards," that prompt managers and employees to source and synthesize multiple perspectives. In our interview with Peter Harmer, Chief Executive Officer of IAG (Insurance Australia Group), he predicted the following future:

"I think one of the ways that [a traditional firm] might freshen [its] thinking is to put together a shadow advisory board, comprised of young, digital-savvy people, who represent the consumer of today and tomorrow."

The human advantage

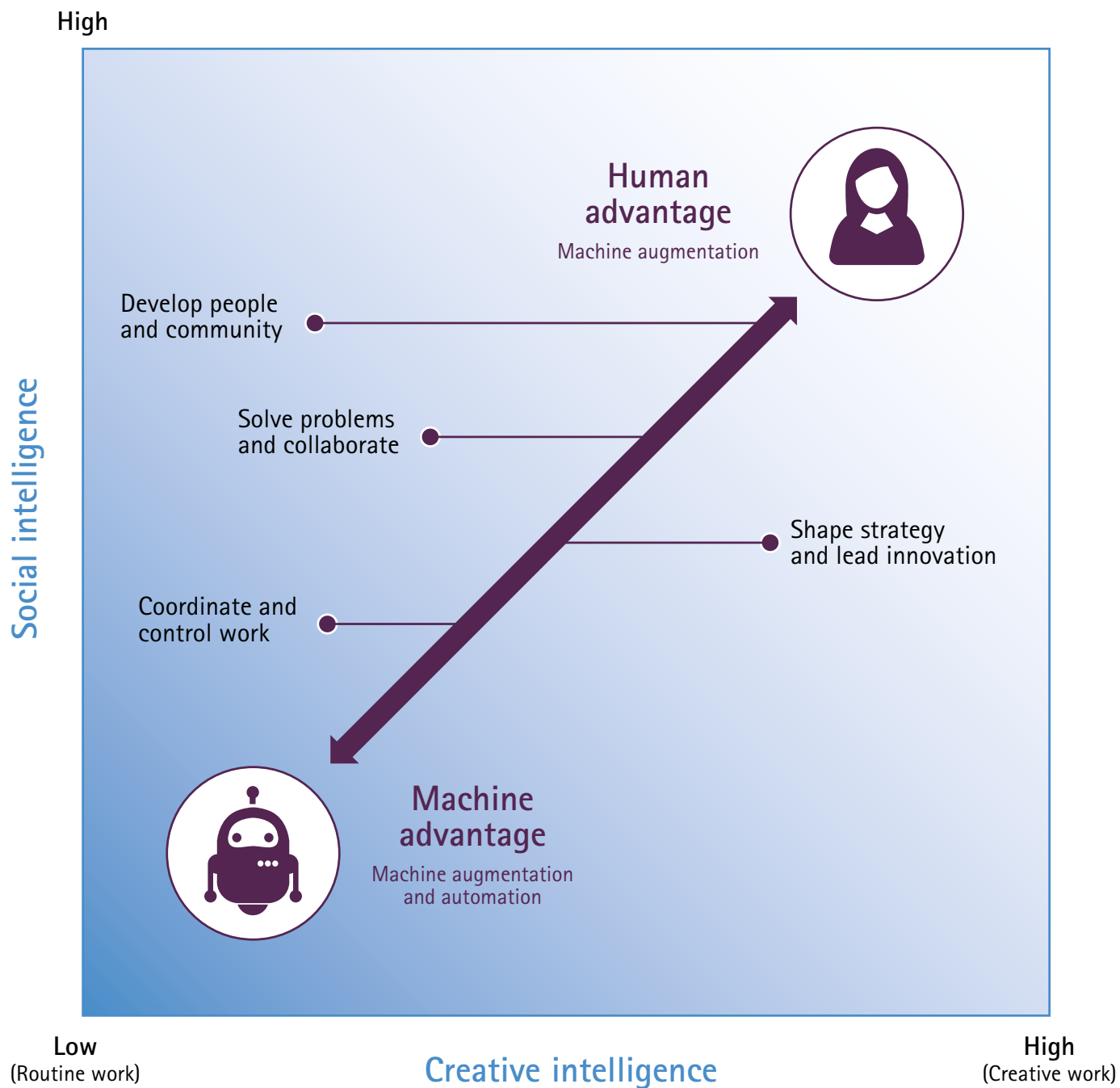
Given the value that organizations are increasingly placing on experimentation and collaboration, creative and social intelligence will undoubtedly grow in importance as AI takes on more rules-based responsibilities (see Figure 6). Both forms of intelligence underpin judgment and give humans an advantage over AI in part because they continue to befuddle computers.⁸ Even as machines try to emulate these qualities, it never feels quite like the real thing. Consequently, creative and social intelligence will be in even greater demand as AI makes inroads in management and the workforce. This development will represent an acceleration of a long-term trend in labor markets—one characterized by intensifying demand and reward for social skills.⁹ With a growing desire for creative capabilities, managers will seek to fashion bricolages of ideas and hypotheses from inside and outside of the enterprise to shape solutions to their most pressing business problems.¹⁰ Professor Øystein D. Fjeldstad at BI Norwegian Business School, a scholar in strategic management and artificial intelligence, maintains that:

"There's going to be a premium on design thinking [...] as well as empathy—the ability to motivate and engage with humans on an emotional level. Qualities that computers are not very good at. This comes back to the origins of leadership—setting direction and getting people to believe in that direction and to follow you."



Figure 6. People power

Judgment work—whether related to people development, problem-solving or strategizing and innovating—calls for considerable degrees of creative and social intelligence.



People first

As noted earlier, AI enables both cost-cutting automation of routine work and value-adding augmentation of human capabilities. Our study finds that in the context of management, augmentation—putting people first and amplifying what they can achieve—holds the greatest potential for value creation in organizations. Automation of routine management work will certainly remain important, but mostly in terms of freeing up managers' and employees' time to focus on more value-creating activities, such as those related to judgment work.¹¹

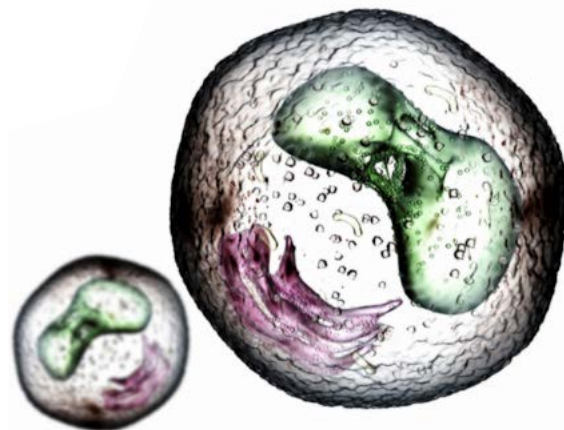
The good news is that this conclusion mirrors managers' expectations. Our survey respondents welcomed the notion of augmentation of most of their tasks (augmentation being the preferred option on 10 of 11 tasks). However, managers should not expect calm waters ahead. If such augmentation comes to pass, they will no longer be able to seek refuge in the safe haven of routine work. Instead, they will have to navigate uncharted territories—including experimentation, rapid learning and complex problem-solving—all of which require greater creativity, collaboration and good judgment.

Instead of wondering "What responsibilities will be left for me following the arrival of AI?" forward-thinking managers will ask themselves, "What else can I accomplish?" Truthfully, this will be a difficult transition for most managers, but the possibilities of more interesting and impactful work—as well as exciting career prospects—are awaiting those eager to take on the challenge.

Experiment and learn

How do you steer into an uncertain future? Executives and managers must be willing to experiment in an effort to identify AI uses that make the most sense for their organizations and teams. Many of our survey respondents sense this—noting "creative thinking and experimentation" as the second most sought after new skill (33 percent). Launching structured experiments with AI will help them zero in on the most promising opportunities, including the use of intelligent machines to accelerate human learning. AI will make it possible for managers to explore scenarios (possible futures) through simulation at low cost and without incurring many of the hazards associated with live experiments, such as jeopardizing customer relationships or risking health and safety.

Guided by human questions and problem framing, intelligent machines can help managers sift through vast volumes of data to uncover patterns. This is analogous to how computational biology and chemistry tools and models are used in modern drug discovery. Researchers use such technologies to curate large datasets, build models of human cells and pathogens, and identify drug targets and high-potential chemical compounds. Findings from these studies inform choices about subsequent wet lab experiments and clinical trials involving living subjects.



The next-generation manager

Drawing on our survey results and executive interviews, we have identified five characteristics of the next-generation manager—one who will thrive in the age of AI:



Treats intelligent machines as colleagues

The next-generation manager will view intelligent machines as colleagues. While judgment is a distinctly human skill, intelligent machines can accelerate human learning that supports it, assisting in data-driven simulations, scenarios and search and discovery activities.



Focuses on judgment work

Some decisions require insight beyond what data can tell us. This is the sweet spot for human judgment—the application of experience and expertise to critical business decisions and practices.



Does “real” work—passing off administrative tasks to AI

As the conventional role of the manager—coordinating and controlling other people's work—waned or even vanished, managers will turn their attention to “real” work. They will become leading practitioners, not just administrators, sharing much in common with managers in creative and problem-solving businesses, such as art directors at design agencies, chief surgeons at hospitals, principle investigators in science, or project managers in management consulting.



Collaborates digitally across boundaries

The next-generation manager will need high social intelligence to collaborate effectively in teams and networks—teasing out and bringing together diverse perspectives, insights and experiences to support collective judgment, complex problem-solving and ideation. He or she will also find ways to use digital technologies to tap into the knowledge and judgment of partners, customers, external stakeholders and role models in other industries.



Works like a designer

While a manager's creative abilities are vital, perhaps even more important is the ability to harness others' creativity. Manager-designers master the craft of bringing together diverse ideas into integrated, workable and appealing solutions. They embed design thinking into the practices of their teams and organizations.¹² Intelligent machines will enable and accelerate design-like work processes, such as supporting problem representation, data and solution visualization, in addition to digital and physical prototyping.

AI's role on leadership teams

Intelligent machines will fill a variety of roles in management. In a recent article ("A machine in the C-suite"),¹³ we identified three roles characterized by varying degrees of autonomy and proactivity—assistant, advisor and actor (see Figure 7). The **assistant** reactively supports a manager and her team, for instance by taking notes, scheduling, reporting or maintaining scorecards. Examples of such uses of AI include virtual assistant systems, including applications like X.ai's Amy, which schedules meetings by reading and writing e-mails, coordinating with participants and managing calendar invites. More advanced systems, such as IPsoft's Amelia, can fulfill help desk and customer service functions—answering questions and taking required actions. It does so while gradually improving and expanding its knowledge and service domain by learning from experience, both its own and that of human colleagues. These systems advance the definition of artificial intelligence in the workplace and lead to what we call advisor systems.

The **advisor** role provides support in more complex problem solving and decision-making situations by asking and answering questions as well as building scenarios and simulations. Recently, OnCorps—a Cambridge, Massachusetts tech start-up—unveiled a decision analytics platform that performs real-time benchmarking and nudges users to make better decisions. IBM's Watson platform enables organizations of any size to leverage cloud-based applications as advisors in contexts such as medical diagnosis, security analytics, drug discovery, financial advice, online concierge travel services and sales coaching.¹⁴

In the **actor** role, intelligent machines may proactively and autonomously evaluate options—making decisions or challenging the status quo. To date, we see few truly autonomous AI systems in management settings. But rule-based applications capable of making business decisions, such as trading robots and automatic handling of loan applications, are increasingly becoming commonplace.

We expect that businesses will adopt intelligent machines in a step-wise fashion, advancing from assistant to advisor to actor roles that grow in sophistication. Technological and organizational considerations support this assumption. AI-based assistant applications are currently the most mature—with Apple's Siri a well-known example to consumers globally. Currently, advisor-type applications are being piloted at scale across a number of domains, while actor-type applications are still in the developmental phase.

From an organizational-readiness point of view, we see a similar pattern. Applications used in an assistant role are easy to understand and non-threatening. Managers are open to the idea of taking advice from intelligent machines in business decisions (78 percent strongly or somewhat believe that they will trust the advice of intelligent machines in future business decisions). But advisor systems are more complex and difficult to comprehend. And in our survey, most managers (61 percent) said they would need to understand how an intelligent machine works before they would trust its advice. This suggests that full-fledged adoption of more sophisticated forms of AI will take time and effort. Last, given that AI is still relatively unknown for most organizations, the notion of intelligent systems serving as managers in the actor role is not on their horizon.

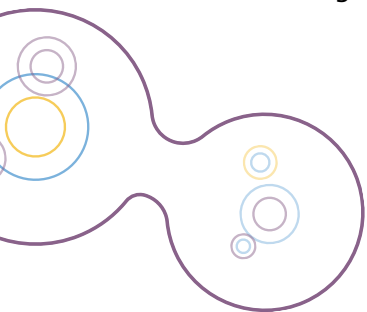
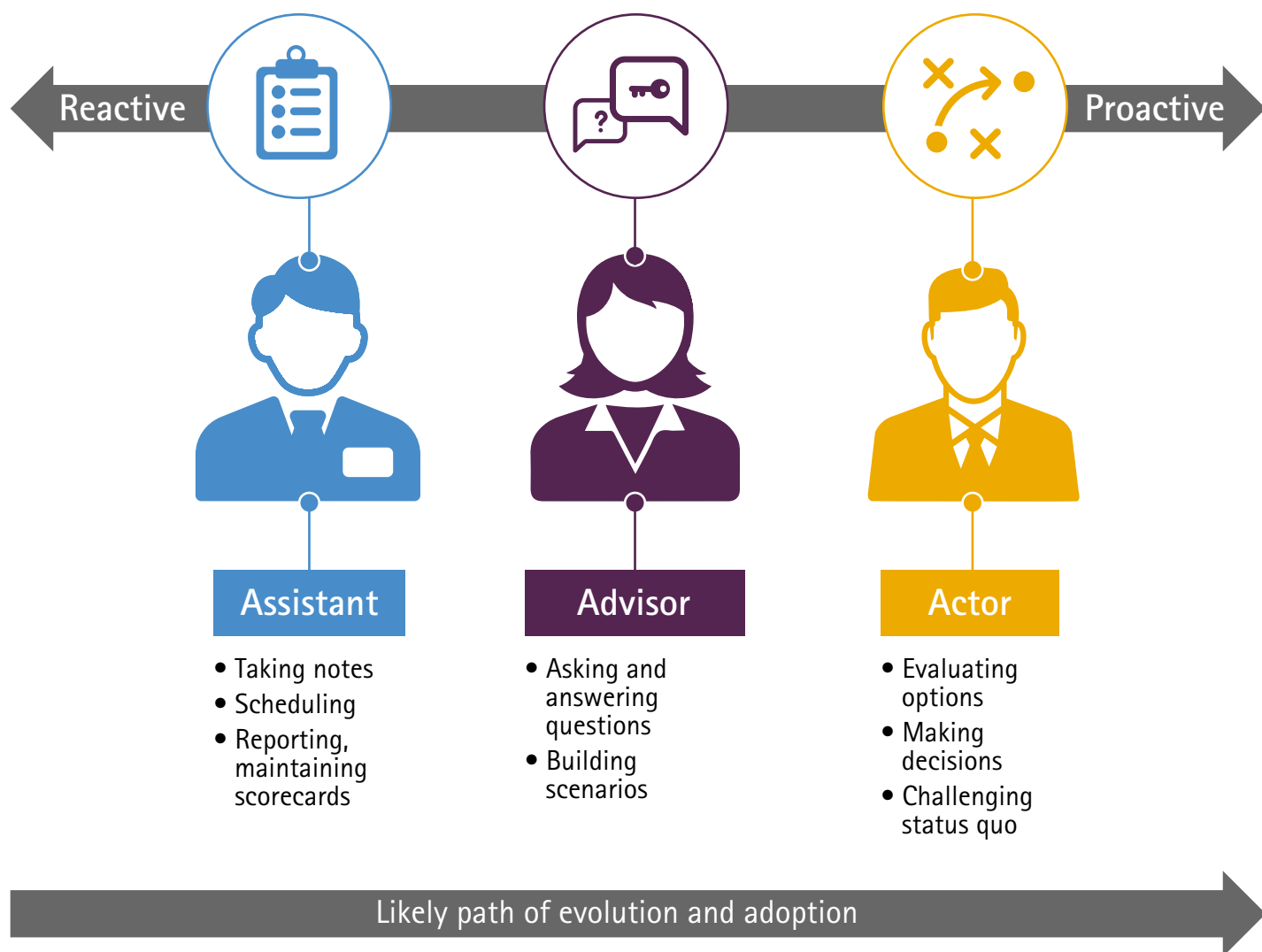


Figure 7. A machine on your team

As applications of AI evolve—growing more advanced with each iteration—their ability to take on greater and more impactful roles in management will improve, too.



Steps to success

If the current shortage of analytical talent is any indication, organizations can ill afford to “wait and see” whether their managers are equipped to work alongside AI. To prepare themselves and their organizations for the kinds of human-led work that will gain prominence as technology takes on more routine tasks, leaders must take the following steps.





Start exploring now

Organizations are entering a landscape characterized by unprecedented collaboration among managers and intelligent machines. There are no maps available yet for navigating through this challenging and unknown terrain. Instead, executives must go exploring. They can do so by experimenting with AI, learning rapidly, and applying their new insights to the next cycle of experiments.



Engage managers at all levels in early AI pilots

Lower-level managers demonstrate considerable skepticism toward intelligent machines and a need to understand how AI systems work and generate advice before trusting. Involving such managers in early experiments and later scaling efforts will foster a sense of familiarity with AI, which could make them willing to not only embrace AI, but also help train intelligent machines.



Keep track of AI

The exponentially growing powers of machine intelligence and big data can be both used and abused. Leaders need to keep tabs on the application of sensitive data and AI in their enterprises—for legal, ethical and trust reasons. The emphasis is on privacy issues in this study and the need for executives to manage them carefully. This is especially so in developed economies, where managers are particularly concerned about AI monitoring and evaluating their work and where data privacy legislation and enforcement tend to be strict.



Redefine success in the age of intelligent machines

AI will bring new criteria for success—defined by collaboration capabilities, information sharing, experimentation, learning and decision-making effectiveness, as well as the ability to reach beyond the organization for insights. Failure to shift key performance indicators for your managers could delay adoption of AI in your organization. It could also prevent managers from mastering the new skills and behaviors critical to attaining maximum value from AI.



Craft new training and recruitment strategies

Despite top managers' excitement about AI, they have yet to account for imminent talent acquisition and training challenges. Leaders must seek out talent both willing and able to engage in human-machine collaboration. They must identify candidates who bring creativity, collaboration, empathy and judgment skills to the table and train current workers in these capabilities. The existing workforce may embody a valuable understanding of the organization's context and history, but not necessarily have the skills related to creativity and hypothesis testing. Leaders should therefore develop a diversified workforce and a team of managers that balances experience with creative and social intelligence—each side complementing the other to support sound collective judgment.



Draw insights from crowds and ecosystems

In some organizations, guidance for the next-generation manager will be hard to come by, especially if executives and managers have built their careers on routine responsibilities. For such companies, leaders will need to look beyond the organization for guidance, ideas, insights and role models. Enterprises and individuals steeped in judgment-based tasks (start-ups, advertising agencies, and humanitarian groups) can provide valuable lessons to more conventional organizations. Executives in routine-heavy companies can also benefit by tapping into the knowledge and judgment of partners, customers, role models in other industries and even the general public. Crowdsourcing and prediction markets are cases in point.

Empowering the intelligent enterprise

Your enterprise may not be as intelligent as you think. You may well employ bright people, but how do you connect and combine them to enhance collective intelligence? And how will AI augment their capabilities for good-quality judgment work? Recent studies show that teams and organizations exhibit collective intelligence beyond what can be derived from participants' individual intelligence and that such collective cognitive abilities can be explained by group composition, behavior and organizing principles.¹⁵ Most organizations have huge untapped potential in making the most of their collective human intelligence—imagine what the emergence of AI can bring.

We believe that the emergence of AI, combined with a move toward new collaborative forms of organizing, exposes opportunities for unprecedented organizational intelligence. A recent study of predictions made by human and artificial intelligence agents shows that their combined

predictions are more accurate and robust than those made by groups of just humans or just machines.¹⁶ Organizations based on such principles—what we call intelligent enterprises—are communities of humans and machines pulsing with knowledge. They will combine complementary sources of information and intelligence, both inside and outside their boundaries, to set new standards for complex problem solving, innovation, and discovery—leaving their less progressive peers behind.

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