

# *How AI is reshaping jobs in India*





# Message from PwC

Artificial intelligence is at the forefront of the next technological revolution, with some of the recent public focus being linked to India's vision of a digital future. The launch of the AI Task Force under the Ministry of Commerce and Industry to drive the use of AI for India's economic transformation has added the necessary thrust. The task force, as part of its findings and recommendations to the government, released a report in June 2018, identifying the key industries for AI adoption while exploring the specific challenges and enabling factors for each.

Shortly thereafter, the National Institution for Transforming India (NITI) Aayog, a government think tank, released a discussion paper on the 'National Strategy for AI'. Both the AI Task Force's as well as NITI Aayog's reports have stressed the vision of inclusivity when it comes to AI's benefits—that is, the application of AI solutions in areas where it is expected to extend outcomes to the masses (e.g. agriculture, healthcare, education, manufacturing).

However, the true realisation of AI's benefits also hinges on setting up appropriate frameworks and ecosystems where humans and machines can collaborate effectively to achieve improved outcomes. This will allow humans to turn their attention to more strategic pursuits and use their tacit knowledge and experience to govern the workings of AI systems.

In this report, we have tried to bring out the Indian perspective by focusing on the benefits that individuals across sectors (manufacturing, healthcare, education, ITeS, and banking and financial services, etc.) perceive AI has for businesses and society. We have also tried to analyse how AI is poised to transform the business landscape—be it in terms of improved efficiency or reshuffling of roles. Finally, we have highlighted the focus areas to ensure future readiness and skill fitment in a collaborative future between humans and machines.

Sudipta Ghosh  
Partner and Leader, Data and Analytics  
PwC India





# Message from AIMA

I am pleased to bring to you the AIMA–PwC report on ‘How AI is reshaping jobs in India’. The report is based on a survey which was conducted to gain insights from Indian industry into how AI is going to impact jobs and the industry readiness to adapt to an AI-led job scenario.

Employment dynamics are fast changing with the adoption of emerging technologies such as robotics and artificial intelligence (AI), which reduces the need for human involvement in many tasks. Technology has reshaped the workplace over the past two centuries—the speed with which automation technologies are developing today and the scale at which they could disrupt the world of work are largely without precedent. The rise of AI and machine learning (ML) has already started to impact the employment market.

According to a 2017 McKinsey Global Institute (MGI) report,<sup>1</sup> on a global scale, the adoption of currently demonstrated automation technologies could affect 50% of the world economy, or 1.2 billion employees and 14.6 trillion USD in wages. Just four countries—China, India, Japan and the United States—account for over half of these totals.

The objective of the AIMA–PwC report is to understand the tectonic shift which is taking place across industries due to the increased use of AI and automation and its implications for the current workforce in India.

I hope this report will be useful for industry, academia and the government.

**T V Mohandas Pai**  
President, AIMA

1. McKinsey Global Institute. (January 2017). A future that works: Automation, employment and productivity. Retrieved from <https://www.mckinsey.com/mgi/overview/2017-in-review/automation-and-the-future-of-work/a-future-that-works-automation-employment-and-productivity> (last accessed on 18 September 2018)





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# Introduction

Artificial intelligence (AI), propelled by machine learning (ML), computer vision and the Internet of things (IoT), is fast evolving as a significant general purpose technology. It is no longer restricted to technology companies and is currently being pursued widely across all major sectors, such as manufacturing, agriculture, healthcare, retail, banking and financial services, and public utilities. AI is even being implemented in the fields of national defence and security. While an increasing number of industries have already embraced AI and started to reap its benefits, many others seem willing to explore the significant business opportunities and societal value offered by AI. Companies that are at a relatively lower maturity level along their digital roadmap need to identify the potential business cases for cautious AI application.

The government's enthusiasm, support and initiatives undertaken for building AI-led solutions have provided a further push to their adoption. This traction has already motivated innovators and early adopters to develop solutions integrating human touch and machine capability. A vast

majority of the tech giants and digital natives are currently in the space of augmented and assisted intelligence, wherein they are deploying AI to augment the human ability to perform tasks more efficiently with decision rights either held solely by humans or shared with machines. Chatbots, connected worker spaces, predictive asset maintenance, smart agriculture and many other such business cases serve as precedents for successful human-machine interaction models.

Given the extensive applicability of AI, it has managed to create both excitement as well as perceived uncertainty regarding future employability and the role of humans and AI collaborative ecosystems. In this report, we lay emphasis on the current state of AI development in India across key sectors. We further examine the perception of industry professionals regarding the impact of AI on businesses and the risk of job automation across these industries and functional roles. The report also assesses their readiness and requirements in terms of skill sets, infrastructure, etc., to adapt to a post-AI environment.





# How has AI percolated into the Indian workforce?

The advancements in hardware and decreasing cost of computing resources have accelerated the application of AI across various sectors. Accordingly, private organisations, academic institutions and even government bodies started recognising the plethora of benefits offered by AI and its potential to help resolve some of the most challenging issues across the key sectors.

As recommended by the Artificial Intelligence Task Force in its latest report to the Government of India,<sup>2</sup> the following areas may hold some of the most pertinent opportunities to realise gains from AI-led developments:

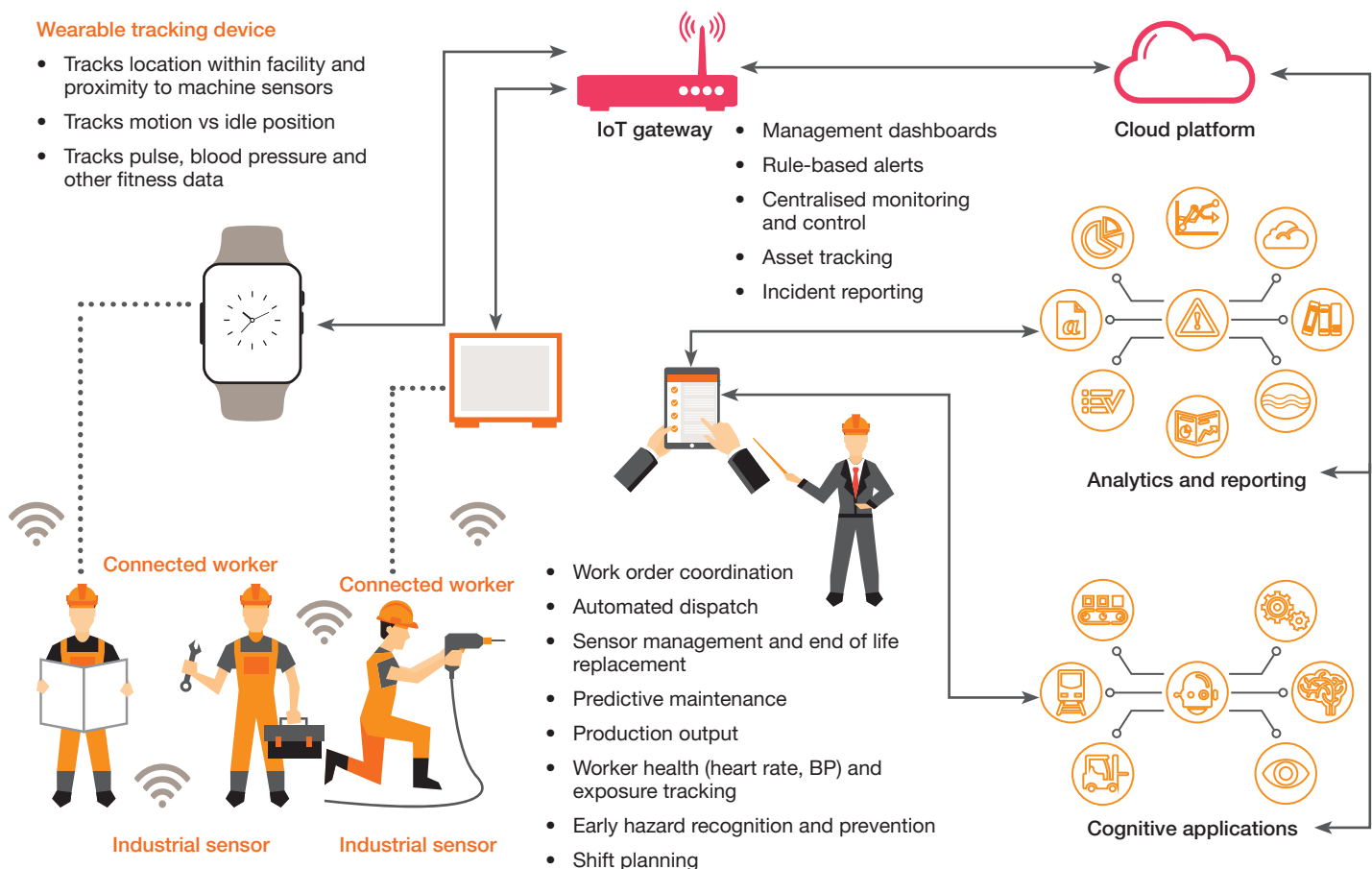
- Manufacturing and supply chain
- Healthcare
- Financial services
- Education
- Consumer and retail
- Public and utility services
- Agriculture

The adoption and implementation of AI across all these sectors are driven by its power to automate repetitive jobs, improve efficiency and productivity, and reduce errors in tandem with the wider objective of serving more people/businesses and helping them perform better.

The following sections elaborate the prominent developments and applications in the above-mentioned sectors:

## Manufacturing and supply chain

The manufacturing sector has resorted to IoT enablement and AI/ML techniques for inventory optimisation, predictive asset maintenance, robust demand forecasting, structured scenario analysis, defect detection of raw materials and inefficient machines, yield optimisation, and reduction in cost of poor quality, to name a few.



2. Kamakoti, V. & others. (20 March 2018). Report of the Artificial Intelligence Task Force. Retrieved from <http://dipp.nic.in/whats-new/report-task-force-artificial-intelligence> (last accessed on 30 August 2018)



In the transportation function, data on geolocation, traffic and weather can be used for AI-driven smart scheduling and real-time route adjustments to overcome traffic jams. Automated vehicles and driver assistance systems enabled using computer vision can now transport goods more efficiently. These technologies help in building advanced supply chains that are more resilient to uncontrollable events like traffic, weather or accidents.

## Healthcare

The healthcare sector in India already bears the burden of a rocketing population and a dearth of trained doctors and nurses, thus depriving a large segment of people of primary healthcare services. As an immediate increase in the count of care providers seems an impossible task, AI-powered intelligent systems could assist in meeting this unmet demand for quality and affordable healthcare in the country. Unhindered by time and accessibility constraints, these systems can serve more patients with the added advantage of lowered healthcare expense.

AI-enabled systems are already being used for diagnosing and detecting diseases from reports and medical images, building personalised health trackers and predicting health risks; they are also connecting patients with doctors via a chat interface. AI-enabled robots can also assist surgeons in conducting precise surgical procedures. AI in India has thus been enhancing the productivity and availability of doctors.

## Financial services

The high volume of transactions, accurate historical records and quantitative nature of the financial world provide an enabling environment for the implementation of AI/ML in this sector. Currently, financial services giants and FinTech firms leverage AI to facilitate efficient customer service by building chatbots for automated conversational flows and robo-advisors for calibrating their financial portfolio to the goals and risk tolerance of individuals. They also facilitate algorithmic trading (high frequency trading), fraud detection and prevention of money laundering. With the government promoting digitisation and cashless India, there is a huge avenue in the finance domain where analytics capability can be implemented to ensure transparency, efficiency and regulatory compliance.

## Education

AI has been percolating into the education sector at a slower pace as compared to the other sectors and its application is mostly prevalent across start-ups, which aim at improving the quality of education by providing personalised recommendations to teachers and students using an AI platform. In the process, teachers identify and rectify the gaps in the areas where students lack clarity and the students can also learn at their own pace.<sup>3</sup>

These emerging technologies could be further leveraged to alleviate the inaccessibility of experienced knowledge practitioners in remote locations through robotic teaching assistants that emulating their teaching style, either on a standalone basis or in real-time collaboration with human teachers.

## Consumer and retail

The integration of AI has been seamless across the consumer and retail sector and its impact on our lives can be witnessed on a daily basis. AI-powered products and services such as digital assistants, customer service bots, and recommendation engines for e-commerce and entertainment portals are just a few examples of AI making inroads into the lives of consumers. AI also finds application in offline stores for optimising inventory, logistics and product placement, among other uses.

With the advent of robotics and augmented and virtual reality, the sector is geared towards further improving customer experience.

## Public and utility services

AI, ML and IoT form a crucial component of the government's vision of smart cities and smart industrial zones. Some of the key aspects of smart cities where the potential of these emerging technologies can be unleashed are smart parking, intelligent transport systems, smart urban lighting, waste management, smart city maintenance, telecare, citizen safety, smart grid, smart energy and water management. Large energy, power and utility companies are vouching for smart metering to establish secure supplies and fewer outages.

3. Ranjan, S. (3 April 2018). AI-based Edtech startup Bodhi AI is helping students improve their scores. YourStory. Retrieved from <https://yourstory.com/2018/04/ai-based-edtech-startup-bodhi-ai-helping-students-improve-scores/> (last accessed on 30 August 2018)





## Agriculture

Being an agrarian economy, it is important for India to be open to adopting the latest technologies to boost crop yield. AI/ML can be integrated across the entire value chain of agricultural practices. Currently, state governments have collaborated with technology giants for developing ML-based multi-variant agro-commodity price forecasting models which determine the minimum support price (MSP) for products.<sup>4</sup> Further, AI is also being used to assist farmers in smart farming by informing them of the optimal time for sowing, providing timely and site-specific information about crop health and disease spreads.<sup>5</sup>

AI can also pave the way for intelligent farm mechanisation by building autonomous/semi-autonomous vehicles for harvesting. Further down the value chain, it can be leveraged to reduce wastage and spoilage through effective commodity packaging and storage. However, the true potential of AI/ML across agriculture remains unrealised in our country.

## Aligning business processes and governance structures

AI has percolated across all major sectors and offered compelling benefits, thus making it imperative for India to on-board its workforce to the digital economy.

Although India may take time to catch up with the global leaders in AI, the Indian government is supportive of building AI-powered solutions that are 'made to work for India'<sup>6</sup> as indicated by the precedence given to AI, ML and IoT in Union Budget 2018.<sup>7</sup> The other notable effort is the setting up of an Artificial Intelligence Task Force by the Ministry of Commerce and Industry, Government of India, to leverage AI for economic benefits. National Institution for Transforming India (NITI) Aayog, a think tank of the Government of India, was tasked with establishing a national programme to conduct

research and development in the above and other new age technologies. The government is also to be credited for the recent launch of the country's first non-profit AI research institute aimed at developing AI-based solutions for health, agriculture, education and infrastructure.<sup>8</sup> A national-level data and analytics portal has also been launched to broaden access to data. The government should aim at improving the quality of this data bank to facilitate training and dataset sharing between organisations for widespread applicability.

The integration of AI is also causing organisations to build multidisciplinary teams that collaborate with each other. Internal teams comprising experts in ML, data engineering and decision making, responsible for conceptualising an application, work in close association with the delivery services team.<sup>9</sup> With the implementation of AI, individual roles are no longer restricted, and employees need to continuously learn and acquire newer skill sets in order to keep pace with the development rate of the technology. As such, companies have started laying greater emphasis on cultural fit and adaptability.<sup>10</sup>



4. Microsoft News Center India. (n.d.). Digital agriculture: Farmers in India are using AI to increase crop yields. Retrieved from <https://news.microsoft.com/en-in/features/ai-agriculture-icrisat-upl-india/> (last accessed on 30 August 2018)

5. Ibid.

6. Agarwal, M. (29 March 2018). Indian Government gears up to make AI work for India. Inc42. Retrieved from <https://inc42.com/features/indian-government-gears-up-to-make-ai-work-for-india/> (last accessed on 30 August 2018)

7. Mendonca, J. (01 February 2018). Budget 2018: Government to push research efforts in artificial intelligence, says Arun Jaitley. The Economic Times. Retrieved from <https://economictimes.indiatimes.com/tech/software/budget-2018-government-to-push-research-efforts-in-artificial-intelligence-says-arun-jaitley/articleshow/62738437.cms> (last accessed on 30 August 2018)

8. Christopher, N. (20 February 2018). India's first AI research institute opened in Mumbai. The Economic Times. Retrieved from <https://economictimes.indiatimes.com/tech/ites/indias-first-ai-research-institute-opened-in-mumbai/articleshow/63000704.cms> (last accessed on 30 August 2018)

9. Lindzon, J. (28 February 2017). How AI is changing the ways companies are organized. Fast Company. Retrieved from <https://www.fastcompany.com/3068492/how-ai-is-changing-the-way-companies-are-organized> (last accessed on 30 August 2018)

10. Ibid.



## Emergence of a rich start-up landscape

Start-up firms are competing successfully with existing market leaders in the AI space, with market conditions favouring emerging AI solutions from smaller niche start-up firms as more investors and venture capitalists become willing to support potentially impactful business proposals. There are further cost advantages that may be realised since some of the mainstream tools and technologies used for designing AI products are open source (such as application programming interfaces (APIs) and software development kits (SDKs)) and as such, significantly reduce barriers to entry. Moreover, recent government policies such as Jan Dhan, Startup India and Make India have further paved the way for start-ups and small and medium enterprises to thrive.<sup>11</sup>

Many industrial sectors have been targeted by start-up based solutions—most importantly, financial services, consumer and retail, education, logistics and healthcare.

While Indian AI start-ups have witnessed exponential growth, the size of funding received is substantially lower than the global trends, reflecting their limited success in achieving scale thus far.<sup>12</sup>

## Growth via collaboration

As India lays down a framework for its sweeping vision for AI-led innovation, the government's think tank NITI Aayog has swung into action to accelerate development by partnering with international experts to lend expertise on drawing an AI blueprint for India. Such consultations would enable robust AI adoption balanced with ethical considerations.

The government body has also collaborated with a multinational technology giant to learn how AI can be leveraged for enabling more effective governance.<sup>13</sup>

Collaborations have also been undertaken with other players in the technology sector to tend to issues related to agriculture and healthcare. For example, a crop yield prediction model is helping Indian farmers across 10 districts with real-time advice.<sup>14</sup> Elsewhere, eye check camps in villages are assisting with early detection of diabetic retinopathy.<sup>15</sup>

The government is also keen on learning by exchanging best practices and has launched its first joint project with China in the field of AI and big data, which is aimed at boosting cooperation between Indian software companies and Chinese firms in high-tech manufacturing in big data and IoT projects. An AI-powered platform, called the Sino Indian Digital Collaborative Opportunities Plaza (SIDCOP), has also been launched to enable matchmaking between the Indian and Chinese ecosystems to leverage each other's strengths in technology. Government departments like the Ministry of External Affairs and Department of Science and Technology may take the lead in developing such cooperative relationships with the frontrunners in AI.

Besides government initiatives, collaborations are also taking place between industries and academia which foster an ecosystem that is supportive of research, innovation and commercialisation of applications.<sup>16</sup> These collaborations are an important step towards democratisation of AI so that it contributes to building a positive shared future for all and includes the population at large as beneficiaries of the fourth industrial revolution.



11. Bhatia, R. (21 February 2018). Can Andrew Ng's collaboration with the Indian govt open doors for an AI-led economy. Analytics India Magazine. Retrieved from <https://www.analyticsindiamag.com/how-can-andrew-ng-partnership-with-indian-government-open-the-door-for-an-ai-led-economy/> (last accessed on 30 August 2018)
12. Ibid.
13. PTI. (7 May 2018). How tech giant Google and Niti Aayog collaboration is set to expand India's artificial intelligence ecosystem. Financial Express. Retrieved from <https://www.financialexpress.com/industry/how-tech-giant-google-and-niti-aayog-collaboration-is-set-to-expand-indias-artificial-intelligence-ecosystem/1158874/> (last accessed on 30 August 2018)
14. Sen, S. & Sharma, S. (11 June 2018). How India wants to turn an elitist technology to serve the masses. Factor Daily. Retrieved from <https://factordaily.com/india-wants-to-get-ai-to-serve-all/> (last accessed on 30 August 2018)
15. Ibid.
16. PTI. (17 June 2018). Need to collaborate with UK, Japan, Germany in artificial intelligence: Report. The Economic Times. Retrieved from [https://economictimes.indiatimes.com/news/economy/policy/india-should-collaborate-in-ai-with-leading-countries-assochoam/articleshow/64621158.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](https://economictimes.indiatimes.com/news/economy/policy/india-should-collaborate-in-ai-with-leading-countries-assochoam/articleshow/64621158.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst) (last accessed on 30 August 2018)



# Research findings

## Objective and methodology of the research

A detailed survey questionnaire was prepared and administered to a sample of over 600 industry professionals working in different sectors—manufacturing, healthcare, education, ITeS, and banking and financial services, etc.—in India to understand how AI is reshaping jobs within the country and whether the workforce is ready to adapt to the AI-driven change.

The survey was designed primarily to gain insights into four pertinent themes:

1. Demographic and employment details
2. Openness to AI-led services
3. Impact of AI on workforce
4. Readiness to adapt to a post-automation job environment

Professionals responsible for managing a department/business unit/people were considered as business decision makers and influencers.

## Will AI benefit humans, and if so how?

AI is expected to transform the way we humans live and work. This could be by helping with automating repetitive tasks and personalising or customising products and services for consumers with the ability to learn from specific preferences and interests. AI has the potential to help people across varied fields.

While AI has significantly started influencing the lives of people through e-commerce and consumer goods, its promising dominance across the transportation sector is driven by a strong demand from people (81% of survey participants) for more affordable, convenient and reliable taxi services. This need resonates across legal matters as well, where 87% desired affordable legal advice. Besides, 80% of the respondents recognised the need for quality customer service assistance. These numbers also suggest that accessibility of these services holds more relevance to consumers than ensuring jobs to representatives.

However, for health and educational concerns, participants indicated that they would prefer humans over AI assistants. Only 32% of participants were willing to take a health assessment at home with a robotic smart kit, and 30% would prefer chatbot assistant teachers at colleges and universities at a potentially lowered cost of tuition fees. Further, 36% of the respondents would prefer an AI assistant over a human representative across retail showrooms to help them identify and shop for their desired product.

For customer services, 62% of the respondents preferred online chats, messaging through mobile channels and automated systems with rapid in-transfer to persons when needed for resolving their queries.

## Advent of AI assistants

In a world where competition is stiffening by the day and making it increasingly difficult for companies to build their own identity, efficient customer service can help them make a remarkable impact. Changing customer preferences are leading companies to focus on text-based customer service channel.

AI integration with this channel may help improve the relevance of responses from representatives and is capable of improving the overall customer experience. By learning customer preferences, the technology continually improves itself. Further, the survey revealed that 26% of the participants (for whom it was applicable) weren't sure whether their last customer service interaction through text was with a human or with a chatbot. This is suggestive of efforts already taken by industries to integrate AI in their customer service for a seamless interactive experience for their customers.

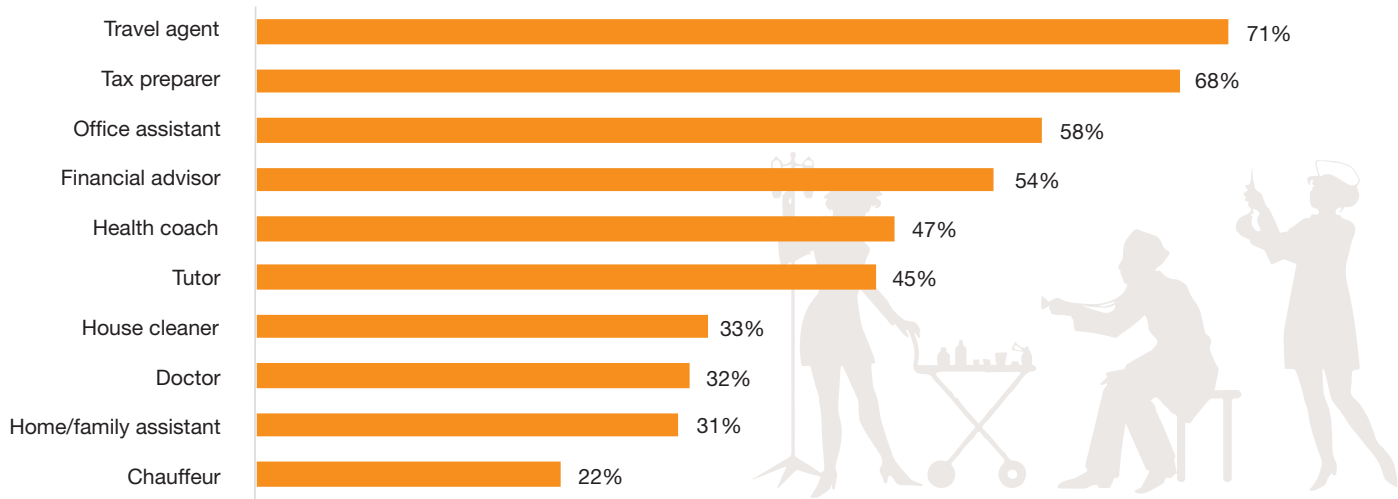
### *In the next 5 years, how likely it is for you to turn to AI assistants versus real humans within the following categories?*

Based on the research, a majority of the respondents would prefer automated services via AI assistants in place of human travel agents (71%), tax preparers (68%) and office assistants (58%). The preference of 45% of respondents for AI-based tutors in the next 5 years is indicative of a growing reliance on AI to carry out more complex roles beyond merely repetitive tasks. However, the trend of people not preferring digitised models over human forms of medical assistance would also prevail in the near future, as observed by 32% of the respondents.



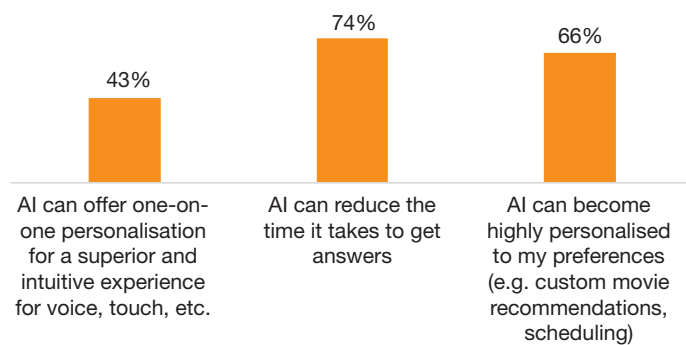


### Preference for AI assistants over real humans



AI has already started percolating into the lives of people by means of personalised recommendations for e-commerce, entertainment, etc., refining of web pages based on search history and improved customer services, to name a few. A majority of the survey respondents attested to the usefulness of AI by agreeing that it could help resolve queries faster (74%) and could cater to personalised preferences (66%). However, only 43% stated that AI was capable of offering a superior and intuitive experience for voice and touch.

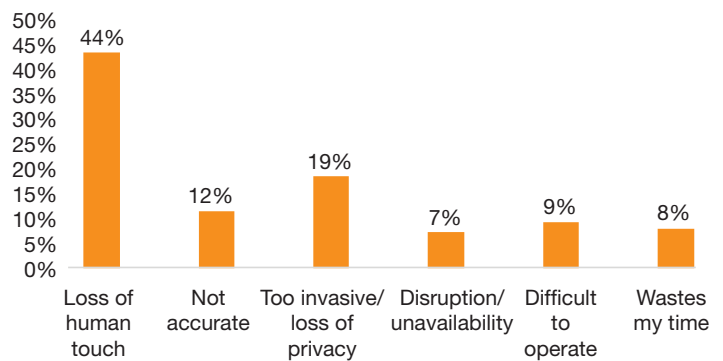
### AI-based assistance offered to humans



### Key concerns of AI-run customer service

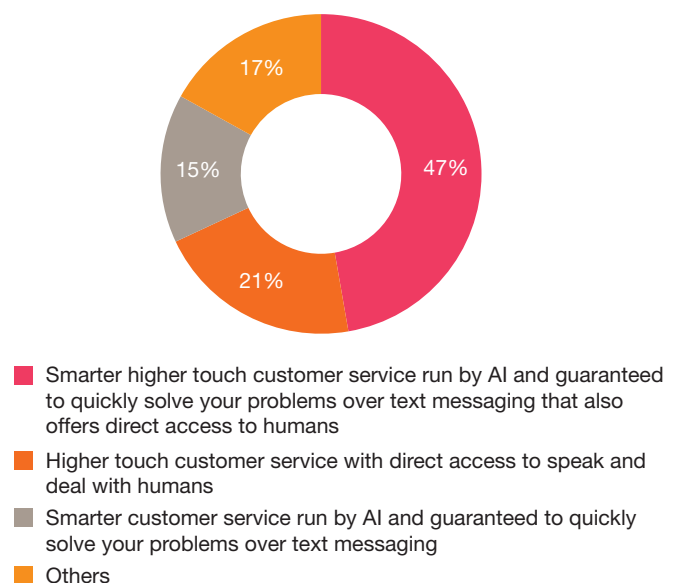
Though people seem open to AI assistants (45% of the respondents), they have inhibitions when it comes to sharing medical information with AI platforms to further medical breakthrough for others. However, more than 50% of the people were open to sharing information across other, less personal scenarios such as sharing transportation patterns for helping self as well as others, and online entertainment and media consumption for lowered costs.

### Key concerns associated with AI-run customer service



When it comes to AI-run customer services, some of the key concerns indicated by the participants include loss of 'human touch' (44% of the participants), among others.

### Preferred premium service





Investments in developing AI-based customer service models could bring in high returns for businesses as 47% of the survey respondents were willing to pay a premium price for a smarter AI-based customer service that could quickly resolve issues over text while also providing the safety net of reaching out to human stakeholders if need be. AI-based customer service models could be said to be gaining acceptance among end users. However, in the present scenario, organisations might require the ‘human touch’ so that customers do not feel uncared for or cheated and continue to have greater engagement with a unique, convenient and seamless experience. This in turn would provide customers an ‘adjustment period’ while companies work towards automating customer service interfaces without the fear of making their customers feel neglected.

## How AI is transforming businesses and the workplace

Recent advances in AI, coupled with hardware accessibility, have led to the widespread adoption of AI, notably across the private sector. This has encouraged industries to redesign as well as engineer products with AI capability. Our survey revealed that 49% of the respondents have implemented AI solutions in their businesses and are reaping productivity benefits. Further, 74% agreed that AI-driven automated communications and alerts helped businesses become more proactive.

The onset of the digital age has favoured the quick evolution of AI into a key tool for data-driven decisions that are shaping day-to-day business processes. The increasing reliability on the predictive capability of AI to augment decisions is reflected by the support of 74% of the decision makers/influencers.

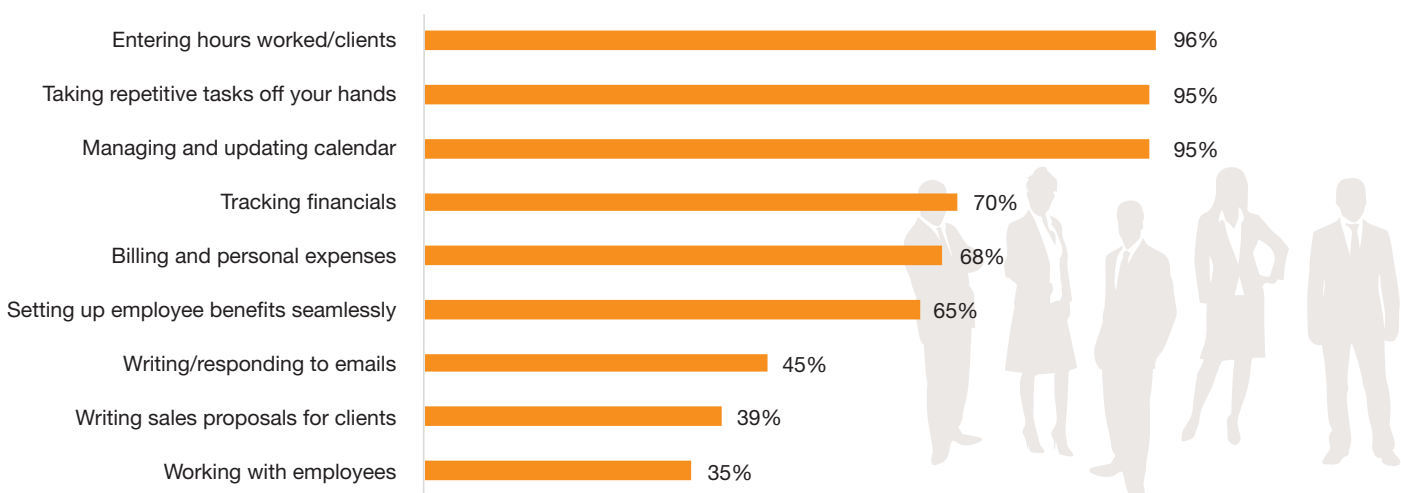
As businesses become more ‘data aware’, traditional reporting tools would be inefficient at handling big data. AI-powered business intelligence systems can transform this data into consumable real-time narratives and reports. In our survey, 67% of the decision makers/influencers agreed that these systems could improve data visualisation, business intelligence and analytics

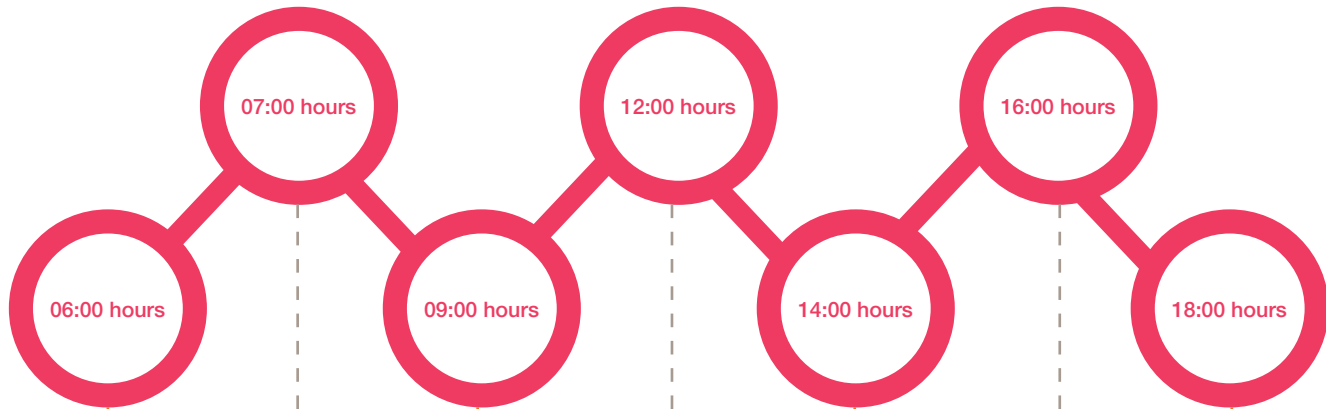
Moreover, 77% of the decision makers/influencers indicated that leveraging AI would be the business advantage for the future, keeping them competitive in the tech-powered business landscape.


## Improving productivity and reducing manual labour


Professionals would prefer to have systems or digital assistants for filling time sheets, updating calendars, tracking financials, managing emails as well as other routine paperwork. The proportion of employees who would prefer digital assistants for their routine tasks takes a significant dip when it comes to activities such as writing proposals, responding to emails and working with other employees. These undertakings, to a certain extent, are still dependent on human cognition and contextual awareness. Nevertheless, a majority indicated their preference for automation in their daily work routines. Also, 70% of the respondents were positive that human-AI collaboration would allow them to focus their attention on meaningful work while also sparing time for pursuing creative interests. This in turn provides enhanced value to both the employee and the company.


### Job elements that can be outsourced to digital assistants









  
 Digital assistant shows ETA at office based on traffic data and sends an alert in case of a clash with calendar events.



  
 NLP application helps in extracting the key terms from the vendor proposal for quick review by the employee.


  
 Employee interacts with an HR chatbot to apply for leave.


  
 Digital assistant notifies employee about unread mails, scheduled meetings, trainings.

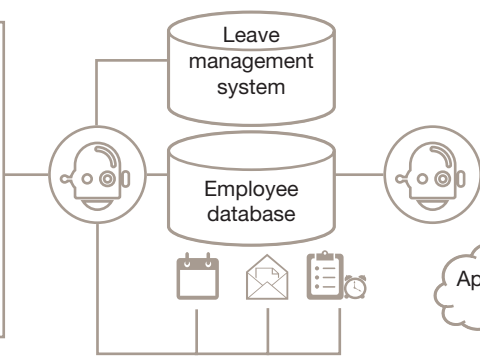

  
 Employee arrives at office premises. Camera sensors capture the employee's face and physical access is granted based on a recognised 'match'.


  
 Employee gets into a meeting. All attendees agree to 'activate' voice recording and transcription. Speech-to-text module integrated with conferencing application auto-generates meeting transcript and mails it to attendees.


  
 AI assistant creates a summary of activities from emails, calendar meetings, completed training, last day's time code, and requests employee to accept recommended time allocation or modify and submit.



<ul style="list-style-type: none"> <li>How many leaves do I have?</li> <li>Yes, from 22 Dec to 1 Jan</li> <li>Siddharth Vaid</li> </ul>	<ul style="list-style-type: none"> <li>You have 15 left. Apply for leave?</li> <li>OK. Send application to?</li> <li>Application sent....Approved. Out-of-office message set. Timesheet updated.</li> </ul>
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Hi Siddharth, Vinay has requested leave from 22 Dec to 1 Jan

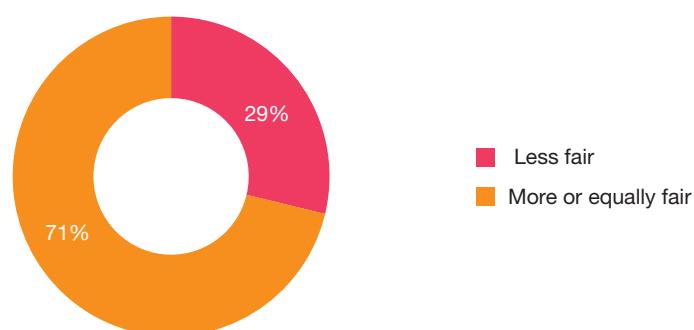




## Building trust for AI advisors and managers

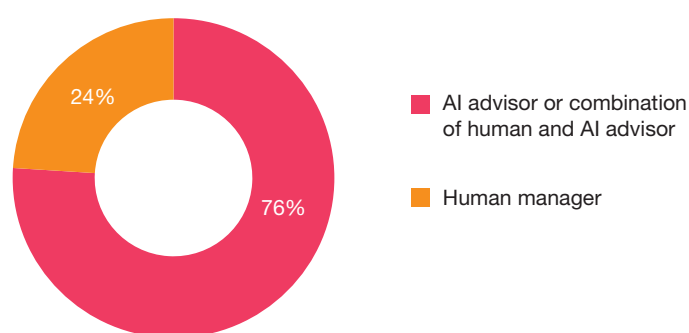
AI and other emerging technologies are promising to transform the workplace, even when it comes to AI in the form of advisors and managers.

How are AI advisors perceived in terms of fairness in giving promotions and raises?

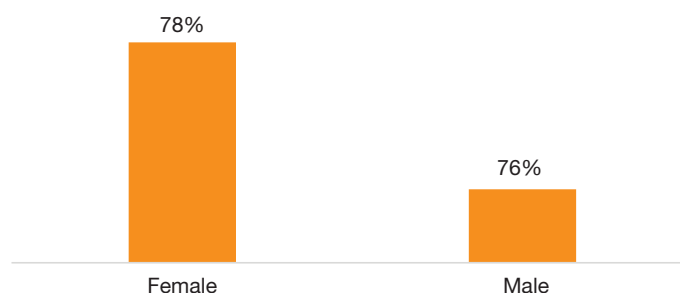


A majority of the respondents (71%) perceived AI advisors to be fair. Moreover, when it came to the ultimate decisions regarding promotions, respondents would rather trust an AI advisor or both a human and an AI advisor (76%) rather than purely a human manager to make an unbiased decision. This perception prevails across both the genders as well, with 78% of female and 76% of male respondents opting for an AI advisor/a combination of AI and human for promotion decisions over another employee. The above findings indicate a latent need for impartiality and transparency in evaluating the performance of employees—an opportunity that organisations can employ AI solutions to address.

If you were up for a promotion against another employee, who would you want to make the decision?

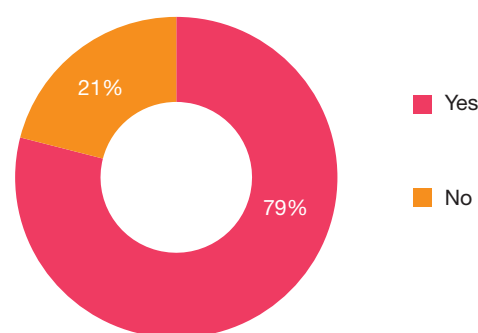


Percentage of participants who would trust the decision of an AI advisor or a combination of a human and AI advisor if they were up for a promotion against another employee – gender-wise comparison



However, 79% of the participants expressed a willingness to meet a human advisor for a follow-up or feedback post review or recommendation for a promotion from a human manager/AI advisor/combination of human and AI.

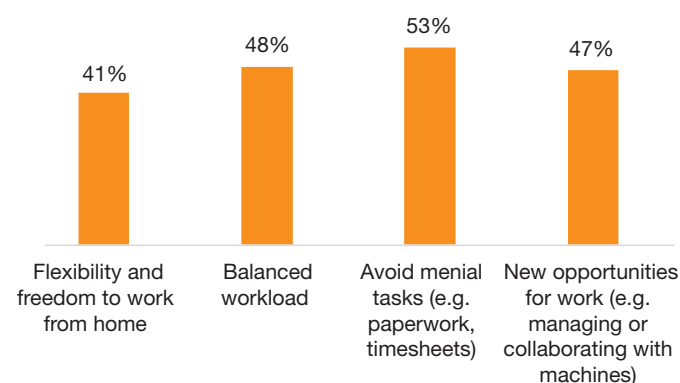
If an AI advisor recommended you for a promotion, would you want to meet a human advisor for a follow-up round of feedback?



## What drives the desire to work with AI advisors at the workplace?

Participants are keen on working with AI managers provided they offer greater flexibility, a balanced workload and the freedom to work from home. They feel that AI solutions will create new opportunities for work and will free them from mundane tasks.

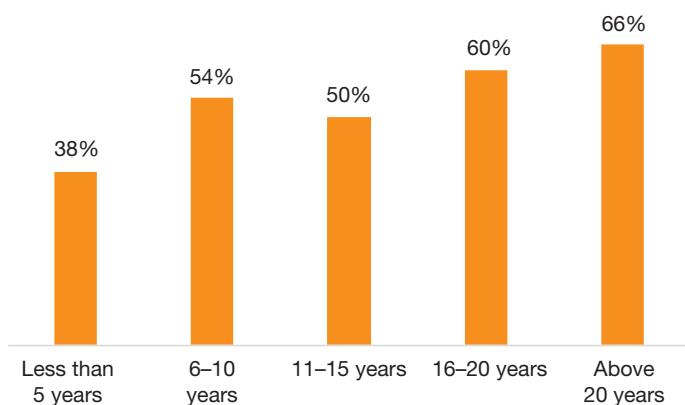
Reasons why executive would prefer working with AI managers



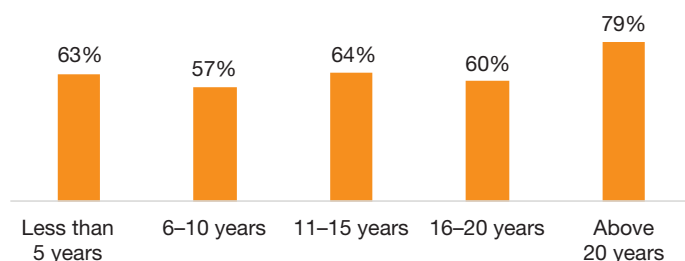


Further, professionals with over 20 years of experience attached more value to ‘balanced workload’ and ‘flexibility and freedom to work from home’ as reasons for wanting to work with AI advisors.

**AI managers would lead to flexibility and freedom to work from home – by years of experience**



**AI managers would lead to a balanced workload – by years of experience**

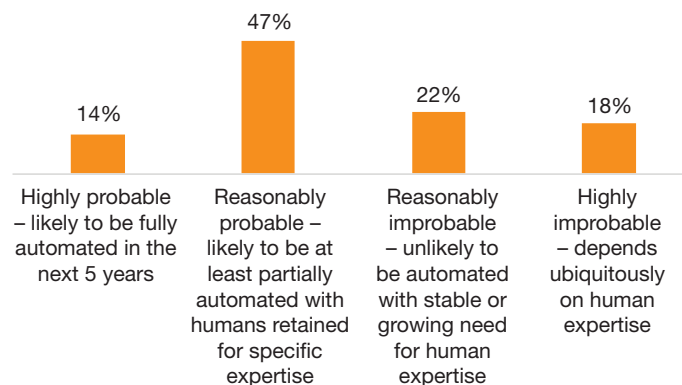


In addition, 59% of the respondents asserted that they would follow the plan proposed by an AI system to manage a project and 40% confirmed that they may follow it partially. Further, participants who identified as business decision makers were particularly supportive of the notion of following AI-managed projects and plans (99%).

## AI is transforming the job landscape

As AI systems continue to disrupt traditional industrial practices with their increasing prowess at tackling complex problems, they also continue to raise employment-related concerns. While 36% of decision makers stated that overall, advancements in automation and technology had not displaced jobs, 46% of the decision makers/influencers indicated that they would have a severe impact on employment in India. Further, nearly half of the participants surveyed felt that job automation was reasonably probable; however, it was likely to be partial, with humans retained for specific expertise.

**Perceived likelihood of job automation**



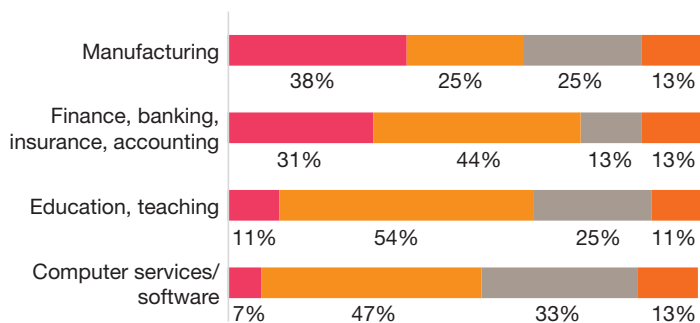
Based on the views of professionals working across different industrial sectors, we can conclude that most of the sectors are likely to be partially automated, but the chances of complete automation in the next 5 years are the highest in the manufacturing sector (38%), followed by the finance sector (31%).







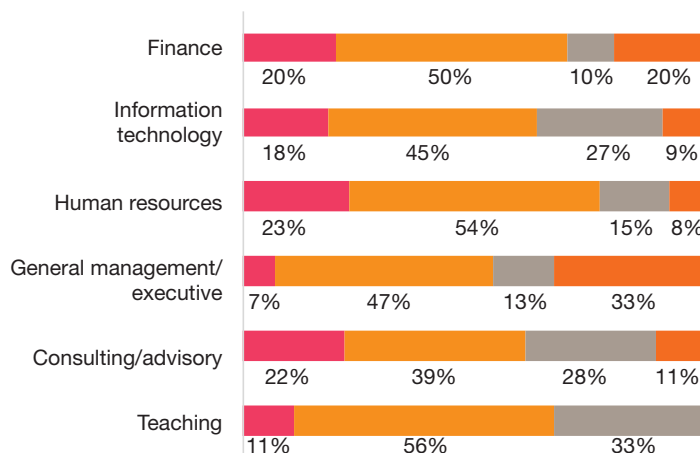
### Perceived likelihood of job automation across sectors



- Highly probable – likely to be fully automated in the next 5 years
- Reasonably probable – likely to be at least partially automated with humans retained for specific expertise
- Reasonably improbable – unlikely to be automated with stable or growing need for human expertise
- Highly improbable – depends ubiquitously on human expertise

Moreover, 56% of the participants with a teaching profile stated that their roles would be subjected to partial automation, with humans retained for specific expertise.

### Perceived likelihood of job automation across functional roles



- Highly probable - likely to be fully automated in the next 5 years
- Reasonably probable - likely to be at least partially automated with humans retained for specific expertise
- Reasonably improbable - unlikely to be automated with stable or growing need for human expertise
- Highly improbable - depends ubiquitously on human expertise

Nevertheless, more than 60% of the decision makers of all the industries felt that the benefit of AI in boosting productivity and generating growth would outweigh the potential downside of employment concerns.

### Recruiting the right talent

AI has been in the market for quite some time and has gained a lot of traction in the recent years, with industries strengthening their workforce by recruiting professionals possessing the skills required for building/understanding/implementing AI systems. This trend is the most widespread in the manufacturing industry, where 63% of the participants responsible for hiring have attempted to recruit the best people for the job. This is followed by computer services/software (42%), education and teaching (39%), and finance, banking, insurance and accounting (27%).

Overall, 55% of these participants have attempted to hire such candidates, of which only 17% have been successful in hiring the desired candidates. This is suggestive of a huge unmet demand for such skilled professionals in the field of AI and ML. Catching up in the AI race may therefore require a two-pronged approach, namely upskilling existing employees on the one hand and attracting AI experts on the other.

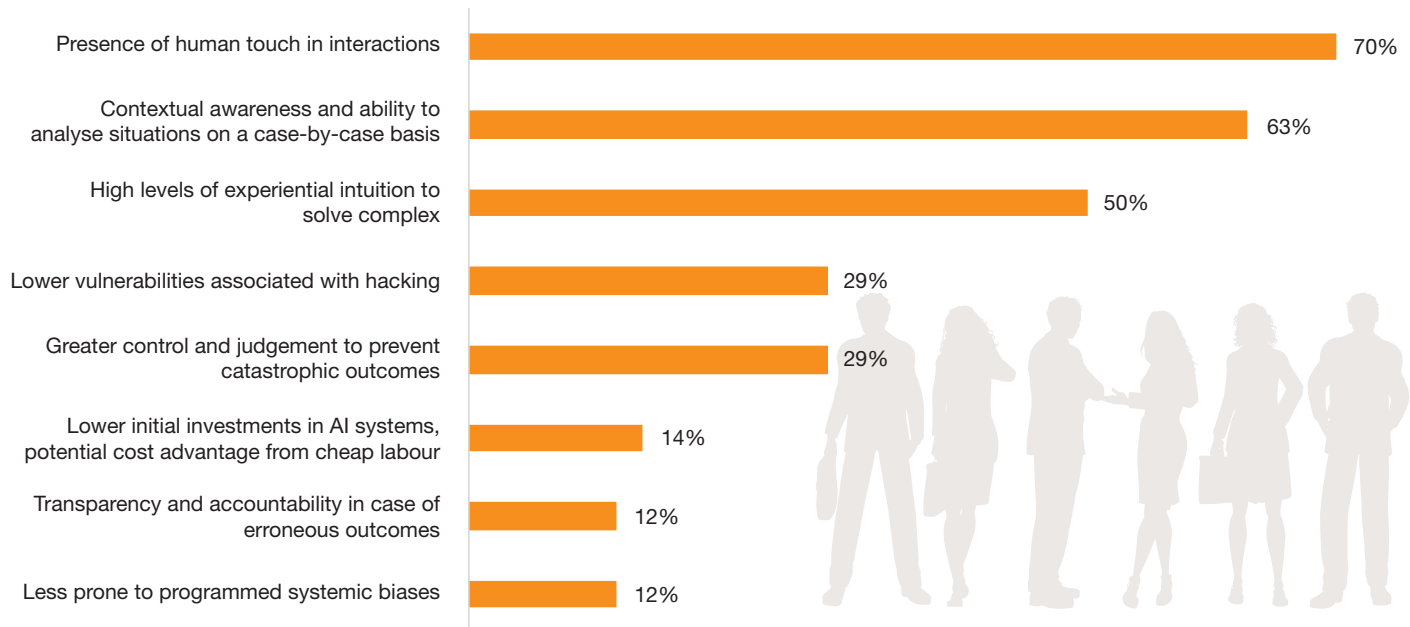
### Readiness to adapt to the workforce of the future

AI still lags behind humans in fields where human touch based interaction is required. Also, it faces tough competition from humans in fields where high levels of experiential intuition for problem solving and contextual awareness and the ability to analyse situations on a case-by-case basis are necessary.





### Key reasons why manual labour may be preferred over AI-led automation



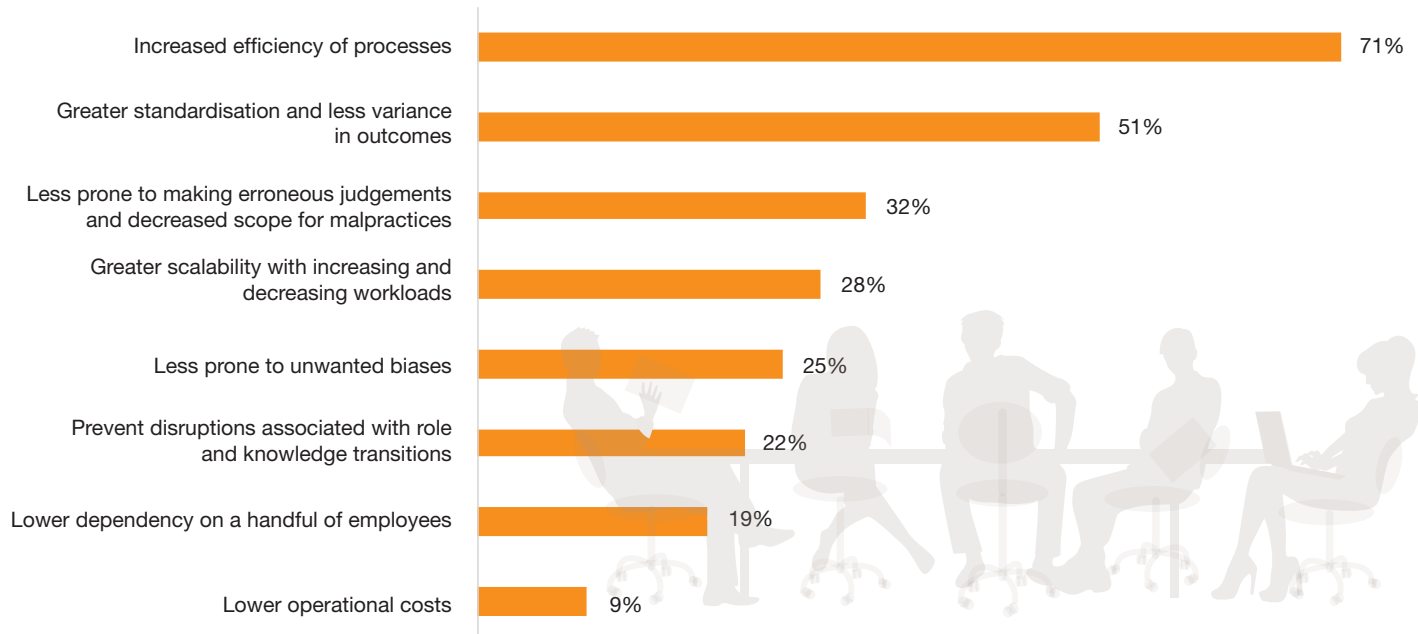
However, a majority of the participants stated that adopting AI-led automation in place of manual labour helped in

increasing the efficiency of processes and establishing greater standardisation and less variance in output.



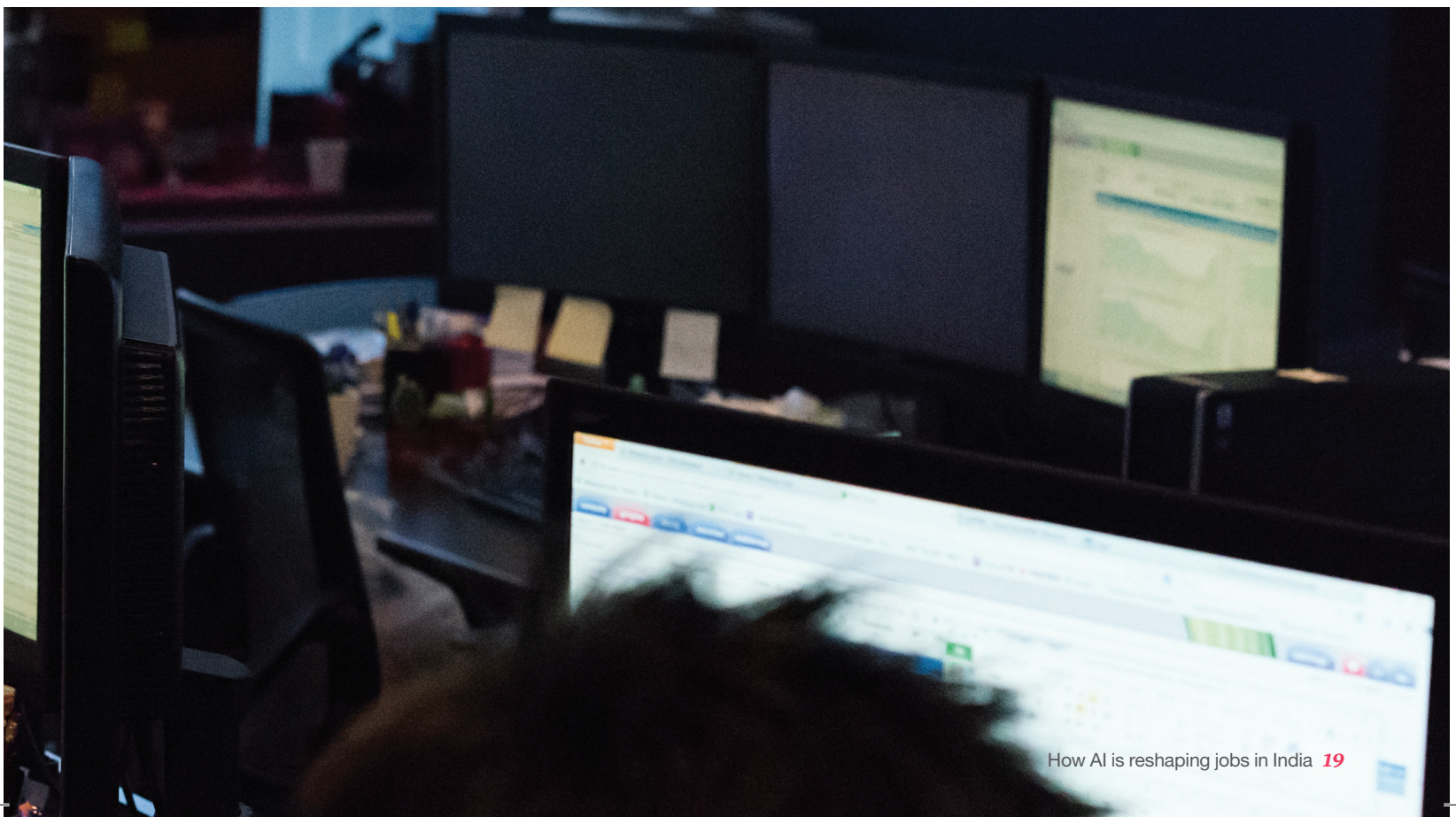


### Key reasons why AI-led automation may be preferred over manual labour



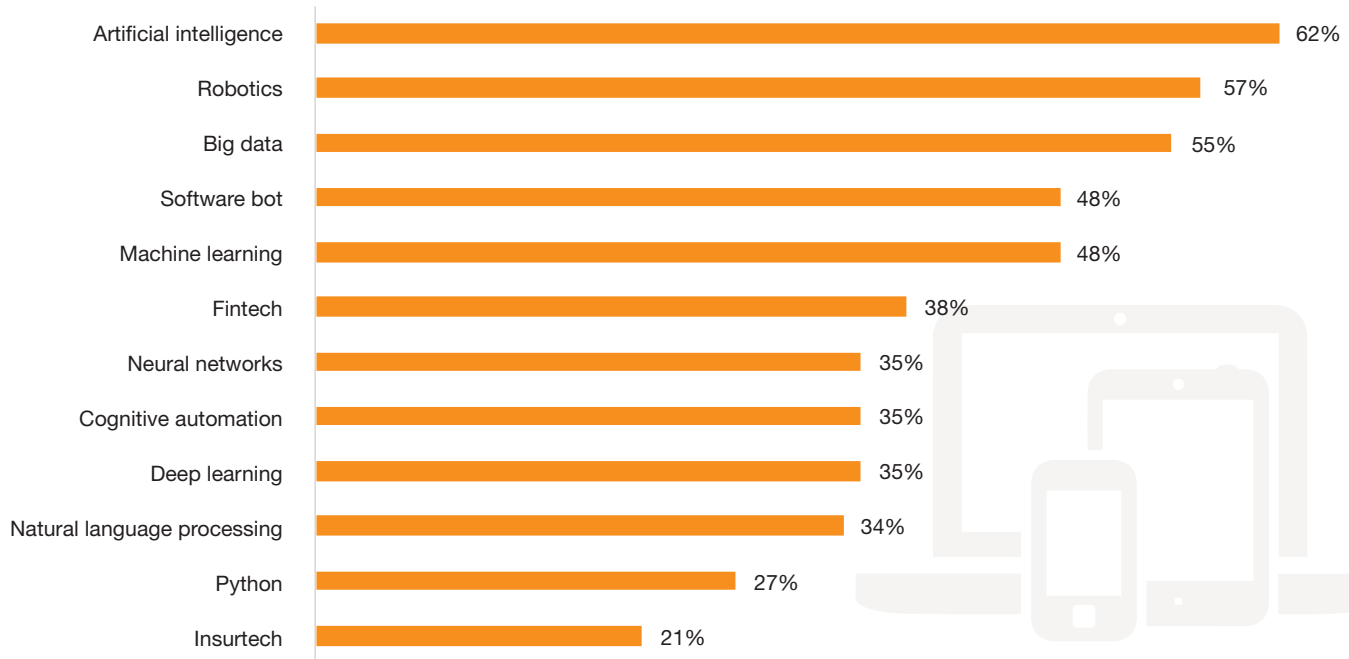
Experts who are either skilled at conceptualising algorithms or at strategic and operational decision making are required to facilitate the widespread adoption of AI. Given that more than 50% of the sample population was unaware of the particulars

of AI, namely neural networks, deep learning, machine learning and cognitive automation, it can be inferred that there is a lack of such skilled professionals in this field.





### Awareness about emerging technologies



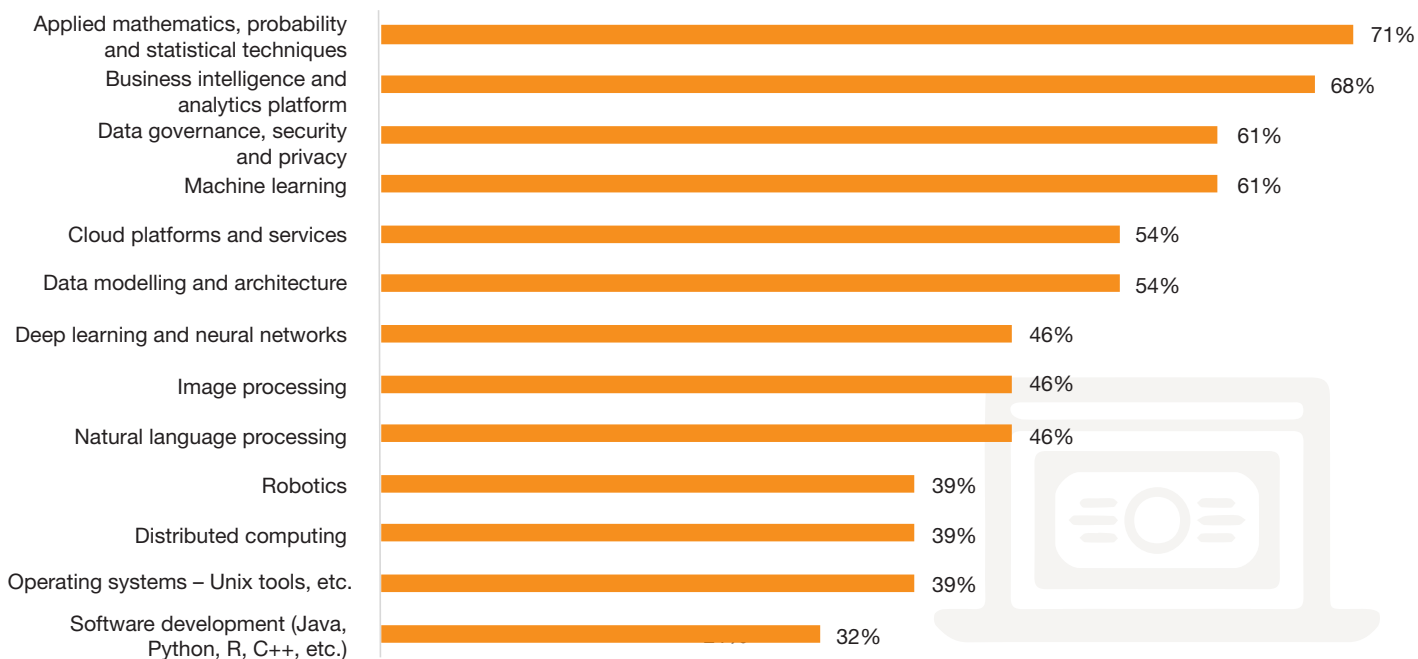
Accordingly, employees have started recognising the need for upgrading skills in these emerging areas over the next

5 years to support the current roles and responsibilities in their respective industries.





**Skill upgrade across education and teaching to maintain current roles and responsibilities in the next 5 years**



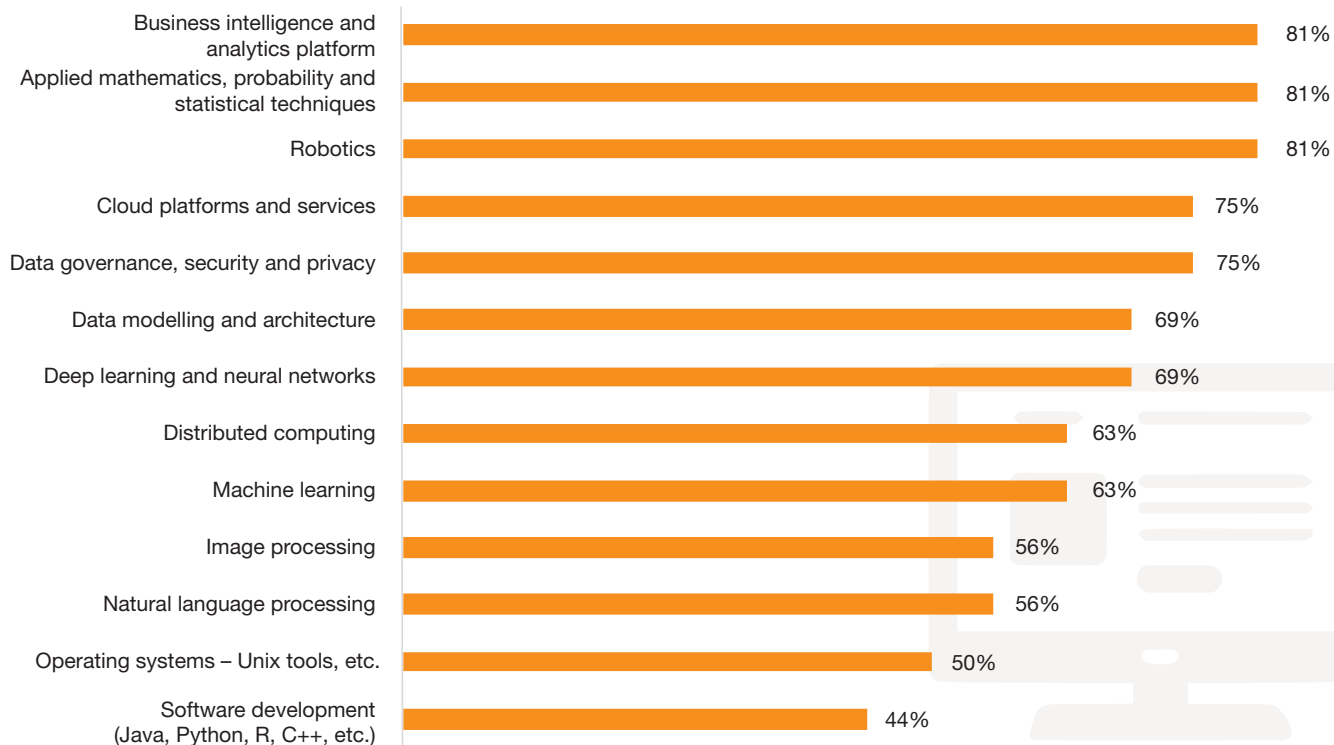
Of the respondents surveyed, 71% of those who belonged to the education sector stated that applied mathematics,

probability and statistical techniques would be the most sought-after skills to remain relevant in the sector.





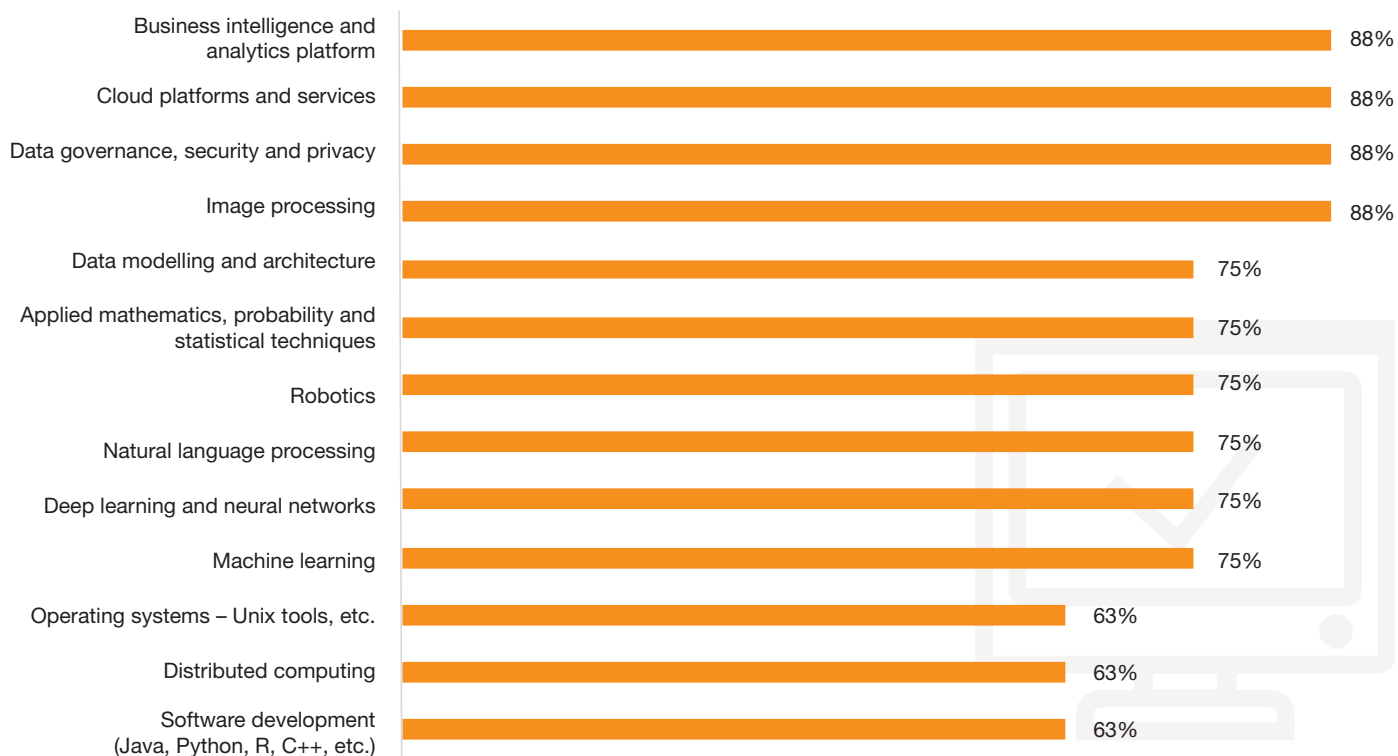
**Skill upgrade across finance, banking, insurance and accounting to maintain current roles and responsibilities in the next 5 years**



Applied mathematics finds relevance in the financial services as well, with 81% of the respondents working in this industry stating that they needed to upgrade their skills in robotics and

business intelligence and analytical platforms to stay relevant in the market.

**Skill upgrade across manufacturing to maintain current roles and responsibilities in the next 5 years**



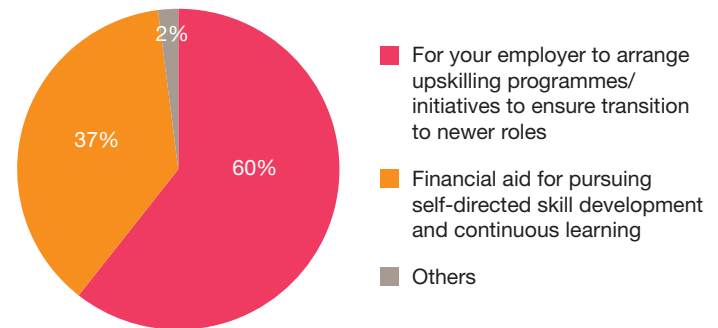


Further, 88% of the industry professionals in the manufacturing sector believed that upskilling in image processing; the cloud platform; data governance, security and privacy; and business intelligence and analytical platforms would help them tackle job responsibilities in the near future. A comparison of the need for upskilling across the sectors suggests that employees of the manufacturing sector felt the need to upgrade their skills nearly across all the components of AI. It can thus be inferred that AI percolation would be the fastest in this sector.

In order to enhance their preparedness for the automation era, 60% of the participants were willing to upgrade their skills via training programmes/initiatives organised by employers.

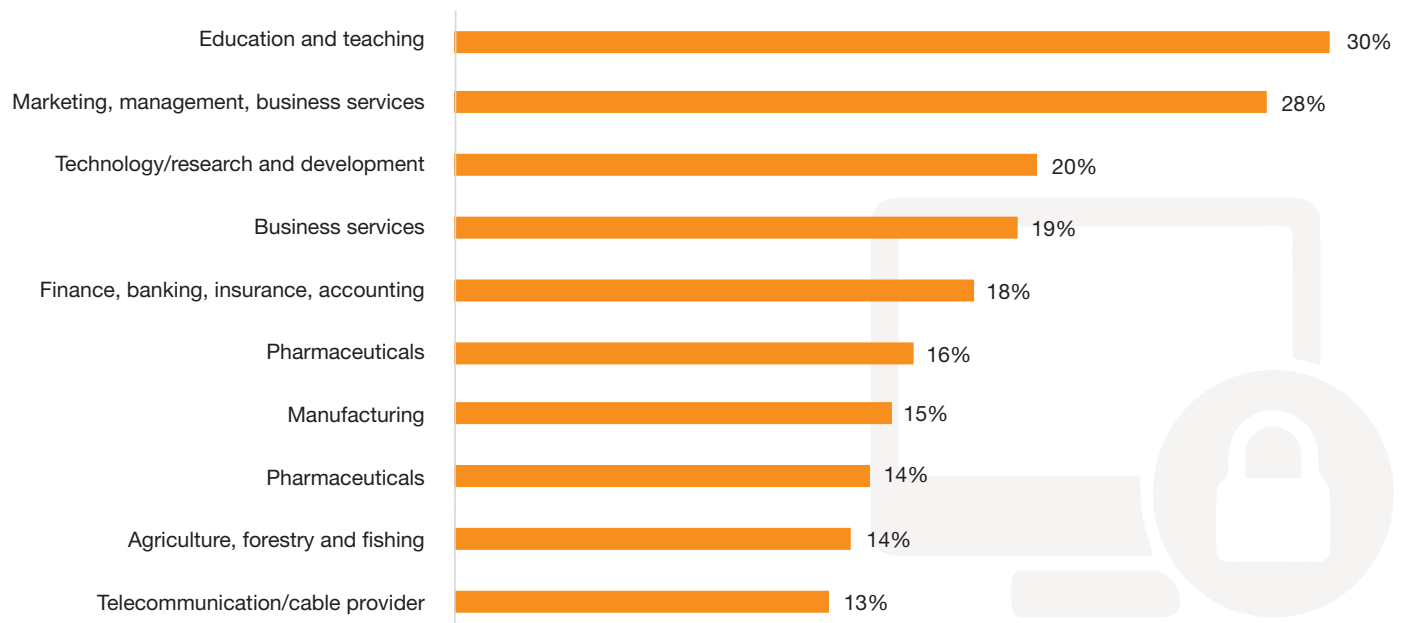


#### Preferred channels for upskilling



The survey results indicate that people believe that education and teaching, followed by marketing, management and business services, offer the most realistic opportunities for them to re-enter the workforce if their current job undergoes automation. This indicates that in a post-automation workforce, roles that require accumulated knowledge, expertise and people-centric qualities such as persuasiveness and empathy might stand out as differentiating factors to ensure employability.

#### Industries perceived as likely re-entry points into the workforce in the event of automation of one existing job





# Way forward

## Creating opportunities for collaboration between humans and AI

With the initiation of automation and implementation of AI in organisations, employment-related concerns cannot be dismissed altogether. While AI would make certain forms of labour obsolete, it would also allow humans to get more involved in tasks which require greater knowledge, critical thinking and conscience.

The economic opportunity created by AI would in turn create new jobs. The 'Report of the Task Force on Artificial Intelligence'<sup>17</sup> has highlighted a few noteworthy cases of new jobs that may be created by AI. We need to find/train enough people with skill sets that fit such jobs. They include:

- **Data creation hubs:** While humans are innately capable of recognising images, interpreting languages, drawing inferences and differentiating objects, machines require an exhaustive dataset to learn and mimic such skills. These hubs could employ people with primitive computer literacy to generate training material for AI systems.
- **Advisory solutions compressing human expertise into machines:** This offers a lucrative opportunity for humans to digitise their field expertise by building advisory solutions through AI. This could significantly improve the accessibility of expert advice to a large population across agriculture, rural healthcare and finance.
- **Greater involvement of healthcare professionals:** AI will help physicians, radiologists, nurses and other healthcare providers to devote their time and expertise towards critical cases, as routine tasks would be attended to by AI assistants. Healthcare providers could also focus on the humane and empathetic side of care delivery.
- **Creation of new roles within IT services:** AI-focused automation will cause shifts in IT service requirements such that jobs like research analysts, data entry operators, system engineers and test engineers become obsolete while paving the way for newer roles such as research scientists, language processing specialists, robotic process automation (RPA) developers, and man-machine teaming managers.

Given the widespread employment of the Indian workforce in IT services and BPOs, the short-term impact of automation is expected to be high. Overseas clients have been of paramount importance for revenue generation of many Indian IT companies. As these clients work upon strengthening their in-house AI systems, the Indian IT sector would need to reskill a large part of its workforce in AI and ML solutions and engagement offerings to mitigate potential job losses.<sup>18</sup>

## Reskilling the workforce for new age employability

There is a high demand for skilled personnel in the field of AI as companies work towards implementing this technology for a wide range of applications. These skills are no longer confined to the technology sector and have widespread usability across healthcare, banking, retail and other sectors as well.<sup>19</sup> Leaders of AI and ML start-ups and established firms have indicated time and again that they are facing a dearth of applicants for their advertised positions.<sup>20</sup> As such, significant measures should be taken now to reskill employees for new age employability around human-AI collaboration.

The skill sets that the workforce of the future is expected to hold can be broadly classified into the following categories:

- **Technology, algorithmic and programmatic know-how:** It is essential for professionals working closely with the development of AI-driven solutions to possess science, technology, engineering and mathematics (STEM) education which fosters critical thinking, increases science literacy and enables innovation.<sup>21</sup> This is required to design varied applications by borrowing knowledge from multidisciplinary fields.
- **Strategic and operational decision making:** This skill would be required to take major decisions around cost reduction, competitive strategy, performance improvement and investment focus based on the actionable insights gained from AI applications.

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## Role of individuals

It is primarily the responsibility of individuals to keep themselves updated and relevant to the job by continuously adapting and evolving with the organisational changes and market dynamics. As such, they should invest time in acquiring new and upcoming skills and capabilities throughout their lifetimes. They should build their adaptive capability so that they learn, unlearn and relearn new tasks even in the middle of their career.

## Role of educational institutes

The educational bodies should migrate from their traditional curriculum to incorporate coursework that is in sync with new age technology and emerging industry demands. This is required to bridge the skill gap and would educate students for the future. Academic institutes could collaborate with industries so that students get hands-on industry experience by working on a range of real-life challenges pertaining to current technologies and practices. A continuous skill improvement system is also required so that young minds are taught to adapt themselves from an early stage and learn to transfer their skills according to the job landscape. This holds great significance in an economic environment that is progressing towards automation and where skills gain and lose value within a few years. The above measures could prove beneficial for India which produces a large number of engineering graduates every year.

## Role of businesses

With the increasing percolation of AI within companies and adoption of new technologies, on-the-job training would become more vital to transition people into new roles. HR's function would focus more on improving the employee experience across an increasingly contingent workforce. It would be helpful if employees are aware about the complete AI ecosystem rather than only their function. Overall, fostering a culture of innovation holds enormous significance for businesses to identify unique ways of using technology to address the sectoral challenges.<sup>22</sup> Every organisation would need to develop its own AI strategy in order to stay competitive.<sup>23</sup>

## Role of the government

AI-driven automation is highly likely to have an adverse impact on middle-skill order people employed as workers and technicians for manual labour in factories. The Skill India initiative should actively work towards upskilling the population so as to strike a market balance between job availability and employee readiness. Part of the workforce could be trained in higher-level skills such as designing, monitoring and oversight, and adjusting machine algorithms to enable AI systems to operate in a reliable and transparent manner. The middle-skill order group could be equipped with basic computer literacy so that they could take up jobs available at data creation hubs and also assist in the basic operation of AI-driven systems.

The government should also plan for the strategic distribution of niche AI talent across universities and industries, in order to foster a culture where academic research and industry implementation coexist and benefit each other.

The Make in India programme must create incentives for manufacturers so that they build research labs and design studios in India. This might aid the flagship programme in fulfilling its promise of creating more jobs and strengthening in-house production capabilities.

In conclusion, progress in AI should be aligned with meeting the needs of businesses and individuals. As AI continues to evolve, the threat of job loss also rises, but it should be noted that these displacements will be accompanied by the creation of new job profiles requiring greater human involvement and critical thinking. Thus, AI provides an opportunity to reshape the workforce. In order to ensure that innovation and reskilling are directed towards effective pursuits, collaborative efforts between the government, academia and the private sector should be encouraged.



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# About AIMA

All India Management Association (AIMA) is the national apex body of the management profession in India. Over the last six decades, AIMA has contributed immensely to the enhancement of management capability in the country.

AIMA has a broad base of 67 Local Management Associations including two cooperating LMAs abroad, with a membership crossing 30,000 in number. AIMA is a non-lobbying organisation, working closely with Industry, Government, Academia and students to further the cause of the management profession in India. AIMA is represented on the Boards of India's premier Business Institutions like Indian Institute of Management – IIMs. AIMA is also represented on Boards of Government bodies including the All India Council for Technical Education, National Board of Accreditation, National Productivity Council to name a few.

AIMA makes a salutary contribution to management learning and practice in the country by offering various services in the areas of testing, distance education, research, training & consultancy, publications and management development programmes.

AIMA brings to the Indian managers, the best management practices and techniques through numerous foreign collaborations with professional bodies and institutions. AIMA is a member of the Asian Association of Management Organisations (AAMO) and works closely with several international management institutions like Robert H Smith School of Business at the University of Maryland, St Gallen Foundation etc. in organising international conferences and management development programmes.

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# Notes



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