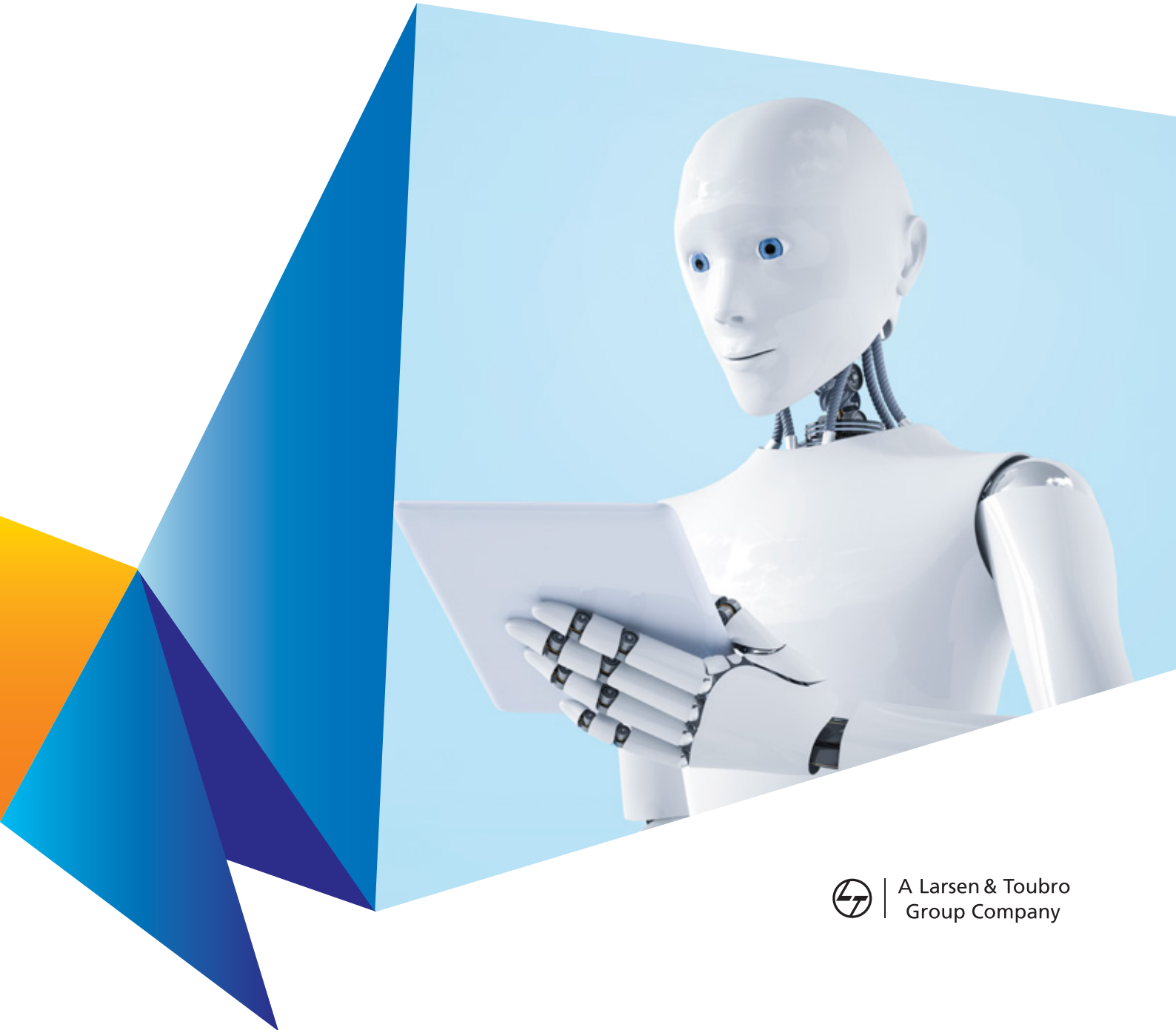
LTI

Let's Solve

Whitepaper

On the Road to AI-fication

Author: Subhash Bhaskaran

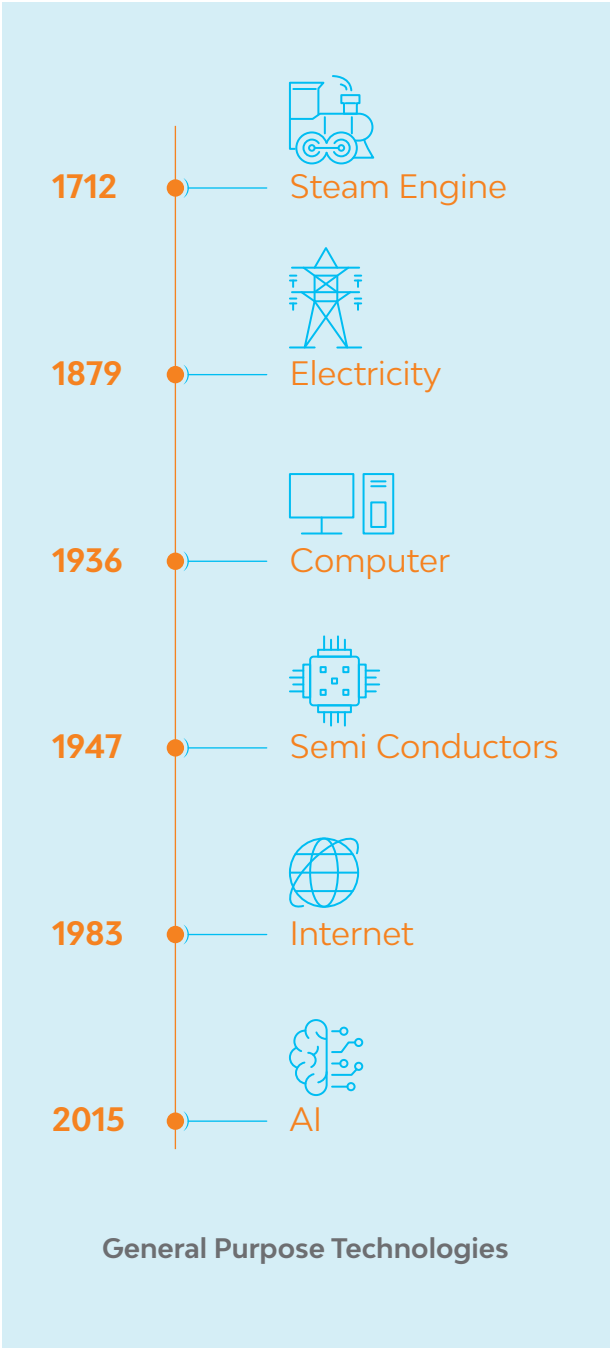


A Larsen & Toubro Group Company

Artificial Intelligence – the biggest technology wave

Throughout the history of modern civilization, there have been innovations which helped dramatically improve wealth creation and human living standards, as well as unlock new business opportunities worldwide. These so-called General Purpose Technologies, such as steam engine, electricity and Internet, transformed their respective eras by significantly reshaping consumer and business behavior. The latest GPT to join this exclusive club of innovations is Artificial Intelligence (AI), which today is increasingly making its presence felt in the digital era by upending traditional business and operating models.

Take, for instance, US ride-hailing pioneer Uber, which uses machine learning (ML) to forecast customer demand, estimate time of arrival (ETA) for cabs, and figure out optimal pickup locations. Swedish online music company Spotify is leveraging the deep learning technology to assess which acoustic elements of songs enhance their appeal among music listeners, and accordingly push content recommendations. In Japan, telecommunication major NTT Communications is in the process of rolling out an AI-based customer service channel that would respond to requests and execute client instructions for issuing invoices and sending emails.



General Purpose Technologies

The enthusiasm for adopting AI, ML and other cognitive technologies is prevalent across the enterprise landscape, spanning industries and functions including IT, sales, customer service, marketing, finance and accounting, R&D, HR, warehousing and supply chain.

The 'State Of Artificial Intelligence For Enterprises' study unveiled in 2017 by Vanson Bourne found customer experience, product innovation and operational efficiency as the three key drivers of AI adoption. And, 75% of executives polled by the Economist Intelligence Unit said they intend to 'actively implement' AI in their organizations over the next three years. Research published by the MIT Sloan Management Review revealed that almost 85% of global executives believe AI will allow their companies to attain a competitive advantage.

Tech majors leading the way

While companies across the board recognize the massive potential of AI to help them reimagine their value proposition, technology majors have clearly gotten a head start by placing big bets early on. The most famous example in this regard, arguably, is Amazon, whose recommendation engines built on ML and huge user data sets enable it to suggest relevant products and purchases, and thereby increase up-selling and cross-selling. Over-the-top content streaming platform Netflix, too, has harnessed ML and Big Data to deliver wide-ranging personalized recommendations to individual customers.

Internet search titan Google revealed in 2016 that voice searches based on AI accounted for 20% of its total mobile traffic. The technology company has also upgraded its Google Maps product using ML, wherein the former uses anonymized location data from smartphones to analyze the speed of traffic movement at any given time.

Corporates too making a splash

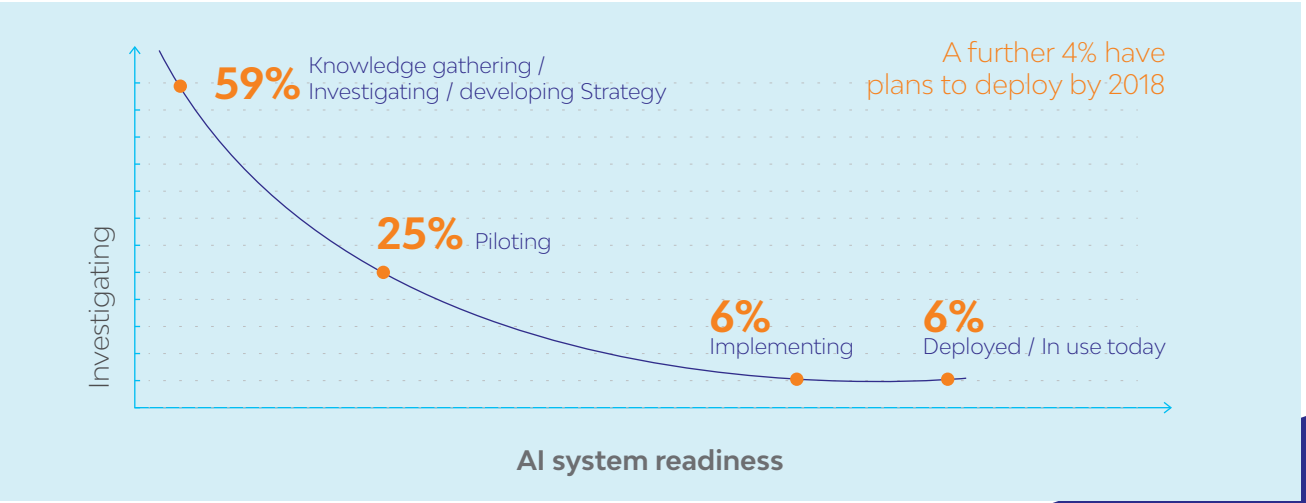
Not to be left behind, leading enterprises across different industries have unveiled aggressive plans to roll out AI throughout their organization, for better profitability and accelerated innovation. Toyota has committed to invest $1bn in AI research by 2020, while rival automaker BMW is deploying machine learning to respond to inquiries about first electric cars from potential customers round the clock.

Meanwhile, Olay, the skin care brand owned by Procter & Gamble, has reaped rich dividends from an AI-driven marketing initiative it launched in 2016. Olay Skin Advisor, the brand's online recommendation tool, gives women an accurate skin-age estimate and relevant suggestions for care, besides outlining a personalized product regimen.

The growing role of AI in influencing industries is evident in health care as well. GE Healthcare recently unveiled LOGIQ E10, a digital radiology ultrasound system that integrates AI, cloud connectivity and advanced algorithms to collect and reconstruct imaging data faster. By provisioning enhanced image quality, the tool enables clinicians to better diagnose cases, GE claims.

There is a long way to go

While there is much euphoria about Artificial Intelligence, only a select number of companies–ones that have attained maturity in their digital journey–have got a head start in AI adoption. Our interactions with clients also indicate that few companies have moved beyond experimentation, and are leveraging AI to create new value.



Source: gartner.com/SmarterWithGartner

'You are here' locator on the AI maturity framework

How can then organizations embark on their journey of AI-fication–the process of embedding AI capabilities into all aspects of the business – to become an 'AI First' organization?

To begin any journey, it is imperative to first identify your current location. The white paper proposes an AI Maturity framework to help organizations establish their current state of affairs in relation to AI adoption, and define the desired end state. The framework is designed to help organizations chalk out the optimal operating model, using various dimensions ranging from governance to awareness.

	AI Aware	AI Ready	AI First
Governance	None	Part of IT governance	Part of Business Governance. Top Leadership & Board actively involved. Owners identified cross functions/LoB
	None	AI is part of IT strategy and majorly focuses around technology demonstration	Well defined and communicated strategy. AI is fundamental to all business transformation programs. Leverage heavily on organizational AI capabilities
	Evaluation of AI services using trial accounts or PoC with AI service providers	Have identified one or two platforms, AI service providers and/or startups	Hybrid AI landscape leveraging best of the breed. Have a repository of organizational specific AI building blocks
Competency	No SME, mostly internal resources with self acquired knowledge. Restricted to IT part of organization	Have a couple of experts. Rely on AI service provider for execution	Have CoE setup with expertise at par with Industry . Close association with academic and leading AI service providers.
Use Cases	No concrete use cases identified	Completed PoC for couple of Use Cases. Good understanding to build AI into standard business functions/ workflow	Have a couple of projects running in production. Have a proven methodology to convert the traditional business model to ones leveraging AI.
Awareness	Beginner level awareness restricted to certain individuals or group	Greater awareness across the organization both IT and Business	Across the board awareness. Clear understanding of AI nuances specific to their organization. Deep understanding of AI's potential and limitation.

AI Aware: The framework assesses an organization's AI maturity across three levels – AI Aware, AI Ready and AI First. The first one, AI Aware, refers to enterprises that have explored AI in silos across the organizations. Business groups such as operations and customer service will be the likely ones talking about AI in such organizations, with the IT department evaluating multiple service providers and startups. Such organizations might even float RFI to help them understand the various available solutions and the relevance of the same for their organization.

Despite being excited and eager to ride the AI wave, most organizations currently remain at the AI Aware maturity level only, since they struggle to identify concrete use cases. Companies in the consumer product goods (CPG), health care, utilities and oil and gas industries are mostly at the AI Aware level presently. Most conversations within such organizations revolve around defining possible implementation scenarios that deliver real business value and performing proof of concept (POC) to demonstrate how AI will work within their organizational context.

AI Ready: The second type of organization, as far as AI maturity is concerned, is the AI Ready organization. Here, the IT department leads from the front in driving AI adoption, after having undertaken a comprehensive evaluation of the prevailing technology landscape. IT department in such organizations–predominantly in the banking, insurance and manufacturing sectors– possess the requisite knowhow to engage with various internal business groups and explore different use cases.

AI Ready organizations will have the desired governance mechanisms in place to engage with a set of short-listed service providers and startups. These organizations will have in place the basic architectural artifacts pertaining to business, data and technology, which help smoothen integration discussions with other technical groups within the IT department.

AI First: Only a select group of organizations have so far successfully gone through the Awareness and Readiness phases to reach the third and ultimate level in the AI maturity graph, i.e. AI First. Put simply, these organizations–mostly belonging to hi-tech, media and e-commerce industries–consider AI not as an IT initiative but one that is actively driven by different business units. Various business groups are empowered to develop their own 'new normal' operating model, with the AI capabilities seamlessly interwoven. AI First organizations will also have a well-defined governance process throughout their organization that ensures continuous idea generation, quick and inexpensive proof of concept, and high quality and faster development and delivery. The IT department within AI First organizations will be a mature partner for their business counterparts, swiftly leveraging the exhaustive repository of building blocks to assemble an AI system.

Charting the AI-fication journey

Once organizations determine their respective AI maturity levels, they should put in place the necessary organizational structures and processes to ensure successful deployment of scalable AI solutions. Doing so would allow organizations to accelerate their AI-fication journey, and become "AI First" organizations.

a) Awareness building

Organizations need to set in motion an AI awareness program for their CXOs and board members. These sessions should deliver a lucid understanding of AI jargons, and have regular updates on the available AI technologies and their limitations. CXOs and directors should be well equipped to ask the right questions, and formulate strategies to safeguard the organization as it deploys AI at scale. Organizations can invite academicians, AI practitioners and IT service providers to help conduct these awareness sessions for all relevant stakeholders within the business and IT. Technology giants like Google, Facebook, Tesla and Alibaba have hired leading academicians to head their AI programs, and build awareness and internal AI capabilities within their organization.

b) Mindset shift & Skill building

Multiple research studies and media reports have warned of AI triggering large-scale job losses due to intelligent automation. While layoffs remain an inescapable reality of our technology-driven world, AI will also create new jobs. In order to capitalize on these new job opportunities created by AI, organizations must orchestrate effective change management. Workforce reskilling should target both the business and IT workforce. Organizations should conduct training programs to build the required skills internally for managing these AI systems, and up-skilling people to take up tasks that still need higher levels of human cognition.

c) Governance using AI board

Organizations should establish an apex group like an AI board that would govern the AI-fication journey. Depending on the size of the enterprise, the board could be led by the CEO or CIO, and include representation from various business groups. The board can also appoint an AI advisory council consisting of the CTO, academicians and industry experts, to give guidance on the state of AI technology and, help structure various organizational initiatives.

It is interesting to note that governments worldwide have set up such boards to appraise them on AI. The AI Council and Ministry for AI established by the Dubai government aims to make Dubai the AI destination of the world, and the Office of AI and AI Council instituted by the UK government aims to drive accelerated adoption of AI across the enterprise landscape in Britain, are some of the examples of governmental AI initiatives.

d) Ideate-build-operate cycle for AI-fication

Organizations should institutionalize a mature process for effective development and management of AI systems. The process should enable organizations to quickly create pools of ideas, and develop and deploy scalable AI systems leveraging some of the standard methodologies like SAFe and DevOps.

A key component of this process will be having a well-established AI lab, which will be responsible for building a list of use cases that can be taken up as proof of concept or development projects. Using robust processes and toolkit, AI labs should be able to identify and prioritize use cases and quickly develop the business case along with the ROI, so that the necessary support can be garnered from key stakeholders. The AI lab will have pre-trained models and process templates for rapid prototyping to demonstrate the technical feasibility. The other main responsibility of the lab will be to define the AI technology stack, in terms of which AI capabilities need to be developed internally and which ones can be built leveraging AI service providers. The lab will work with startups and AI service providers to organize hackathons to scout for ideas and drive co-creations.

The next step in the cycle is for the AI lab to hand over these use cases and artifacts to the development team which picks these as user stories for their sprints. The development team should have the appropriate infrastructure in the form of sandboxes to quickly build and test AI systems. Once deployed in production, the IT operations group should have a robust mechanism for managing the AI systems and monitoring multiple aspects like AI bias, adversarial threats and explainable AI, to avert potential issues in production. These aspects are described in detail next

i) AI bias oversight

Bias in an AI system is the equivalent of a bug in traditional software development, and can creep in either intentionally or unintentionally in multiple ways. For instance, biases can arise from skewed and poisoned training datasets, as well as from the feedback mechanism adopted for self-learning in an AI systems. Recently, the Canadian government announced a plan to build an AI system for screening immigration applications. Concerns are already being raised on whether any historical bias based on race, country and demographic may creep into such an AI system. Finally, bias can be also be introduced into an AI system while selecting the algorithm or tuning of the algorithm itself.

AI bias affects the business as it leads to either an excessive focus on certain customer segments, while totally disregarding certain customer segments, thereby skewing the decision-making

ability of the AI system. The development team must deploy multiple safeguards to mitigate the risks associated with AI bias. A good starting point would be to lay down standards around the sources to be considered for building the training dataset, verifying it statistically, and getting it peer reviewed.

To minimize the risk of AI bias, organizations should promote gender and cultural diversity in their AI development team, adopt heterogeneous technologies, and ensure broader representation of internal stakeholders. The IT operations group should deploy a review process similar to the 4Eye principle to audit the feedback and decisions taken by AI systems, and uncover such biases before they adversely impact business. The IT operations group should report the findings of these audits to the AI board on a regular basis.

ii) Adversarial threats

Like any traditional IT system, AI systems are vulnerable to attacks. These vulnerabilities are distinct as compared to those of traditional software. Organizations having AI systems in production must closely monitor their applications to prevent any malicious actor from gaming the system. Installing such a setup enabled Microsoft to shut down Microsoft Tau before cyber attackers could cause damage with rogue chat responses. Organizations that have installed chatbots, which learn from feedback like 'Likes' and 'Ratings', should perform manual screening to figure out whether there is any malicious intent to induce incorrect responses or recommendations. Image processing systems are also vulnerable to attacks. Numerous examples have shown how tweaking of pixels in an image which are undetectable to humans can change the prediction capability of an image processing system. An experiment by NYU showed how a simple 'Post It' note stuck on top of a road side sign made the AI system identify it as a speed sign rather than a stop sign. An e-commerce company relying on image detection to identify prohibited products needs to have regular sampling checks to see if banned items are not being classified as legitimate due to tampered images.

Such monitoring is critical as most of the cloud-based AI services do not provide the necessary details for companies to be able to predict or prevent attacks. A proactive screening process can help uncover such risks in time. The IT operations group needs to have such monitoring in place. They may also engage ethical AI hackers from the academic field to identify and plug vulnerabilities.

iii) Explainable AI

As more and more tasks or functions are increasingly automated using AI, explaining how these AI systems take decisions will be essential. In future, regulatory directives may mandate industries like banking and health care to make the decision-making process of their AI systems transparent for relevant stakeholders. In a driverless car, explainable AI might form the evidence in courts to settle a lawsuit or settle insurance claims. Hospitals relying on AI systems for disease prognosis will require explainable AI to provide transparent advice, and even protect themselves from patient litigation. It could also be mandated by internal stakeholders, for example to explain why the AI system recommended increased production of a product line.

Most of the cloud-based AI services are like black boxes, and are yet to develop standards for a transparent and auditable algorithm. Therefore, organizations should document both decisions that can and cannot be explained, and deploy safeguards policies around the same.

Conclusion

Artificial Intelligence is here to stay, and no enterprise will be immune from its impact, irrespective of the sector they operate in. Organizations will have to change their organizational structures and mindsets to capitalize on the immense opportunities AI offers. Beside setting up control mechanisms to mitigate risks associated with large-scale AI deployment, organizations will have to develop a strategic view, with the highest level of commitment to build an AI First organization. Doing so would strengthen their efforts to reimagine themselves for the digital era, and help them gain an edge over competitors.

About the Author

Subhash Bhaskaran
Solution Architect, LTI

Subhash Bhaskaran heads business development for AI practice at LTI. He has 21 years of rich, diversified IT experience, and is a TOGAF-certified solution architect. With a successful track record of overseeing transformation engagements for multiple clients worldwide, he specializes in developing compelling business solutions based on data warehousing, data science and AI.

LTI (NSE: LTI, BSE: 540005) is a global technology consulting and digital solutions Company helping more than 300 clients succeed in a converging world. With operations in 30 countries, we go the extra mile for our clients and accelerate their digital transformation with LTI's Mosaic platform enabling their mobile, social, analytics, IoT and cloud journeys. Founded in 1997 as a subsidiary of Larsen & Toubro Limited, our unique heritage gives us unrivaled real-world expertise to solve the most complex challenges of enterprises across all industries. Each day, our team of more than 26,000 LTItes enable our clients to improve the effectiveness of their business and technology operations, and deliver value to their customers, employees and shareholders. Find more at www.Lntinfotech.com or follow us at @LTI_Global

info@Lntinfotech.com

A Larsen & Toubro Group Company