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Artificial Intelligence (AI), a field of data science that educates computers to learn from experience, has been evolving for more than 60 years. In the past few years, both Indian private and public sector companies and the central and state governments have invested in multiple AI use cases across diverse application areas. In fact, AI is already transforming the operational, functional, and strategic landscapes within various industry sectors. The scope and role of AI is also expanding. Organisations are infusing more of their enterprise applications and processes across functions with AI.

As AI technologies proliferate, businesses looking to maintain a competitive edge must start developing and leveraging these capabilities. Nearly half of the respondents to our survey view AI as critically essential for their businesses. Start-ups and established players alike are using AI and ML to tap into new opportunities. According to a NASSCOM report, data and AI could add US$ 450 – 500 billion to India’s GDP by 2025, representing ~10 percent of India’s US$ 5 trillion economy aspiration.

Our survey of executives from different industries, driving AI initiatives within organisations of various sizes, helps us assess the extent and nature of use of AI technologies across such organisations. We also attempt to understand the impact of AI on the people and processes at these organisations, their preparedness for various associated risks, and the benefits they expect or have achieved from AI.

This report shares the most significant insights from this survey and a glimpse of the overall state of AI in India.

1 NASSCOM, “Unlocking Value from Data and AI – The India Opportunity”, August 2020
Executive summary

Deloitte surveyed over 300 senior executives in India to know their organisations’ plans and approaches for adopting AI technologies. We were particularly keen to understand what it will take for organisations to succeed in the age of AI. To this end, the study lends additional focus on what AI leaders and GCCs or captive firms are doing to successfully embrace AI for their business growth. Through the extensive conversations we had on the subject with business leaders, we uncovered a wealth of insights that we present in this report.

Industry is optimistic and bullish about AI
The survey respondents are convinced that AI will transform both organisations and industries in the near future. It will be a significant driver of national and global economic growth. This optimism is reflected in AI investments made to date and planned by respondents. The encouraging rates of return and shortening payback periods organisations are seeing on AI investments made so far are sustaining their optimism. About 86 percent respondents plan to increase their AI spend in the next fiscal year.

Early adopters are beginning to use AI for strategic outcomes
Organisations that were first movers in AI and have since grown in maturity are shifting focus in terms of target outcomes from extracting quick efficiency gains to more strategic outcomes (such as creating new products and services, enabling new business models, and enhancing customer relationships).

Start-ups are seeing faster returns on AI investments
Start-ups are in a position to use AI for high-impact areas, such as building customer relationship, creating new products and services, and enabling new business models right from the inception. This gives start-ups a competitive edge at a crucial stage of their lifecycle. A smaller size, flexible operations, and innovation friendly learning culture enables a majority of the start-ups to achieve payback on AI investments within a two-year time horizon.

GCCs are mature AI adopters
GCCs started their AI journey early and have moved past the initial stage of using AI for efficiencies. They now focus their efforts on more strategic and value generating outcomes. GCCs are usually ahead of the curve with respect to AI adoption due to their willingness to experiment, experience in scaling proofs of concept to full-fledged implementations, and their continuous efforts to bring AI enablement to newer business functions.

A well-defined strategy is essential for success
The choice of operating model, execution approach, and enabling commercial models and technologies are key aspects of any AI strategy. Organisations need to have a clear vision for AI and a target operating model in place that outlines relevant roles and responsibilities. While picking the right operating model (centralised vs. decentralised) will help in smooth execution, choosing the right approach between build and buy can have a significant impact on the execution speed and the total cost of ownership.

A significant risk preparedness gap exists
Most surveyed organisations find themselves ill-prepared to address AI-related risks despite being aware of them, exposing themselves to significant operational, reputational, and strategic threats. Organisations should begin with fundamental governance practices, including establishment and institutionalisation of processes for audit, maintenance, and testing of AI systems. More AI-mature organisations should invest in establishing a robust AI risk management framework and aligning it with their broader risk management strategy.

Demand still outpaces supply of AI skills
Most surveyed organisations are facing an AI skill gap, with some facing an extreme shortage of niche AI skill sets, such as data scientists. Organisations are simultaneously investing in acquisition of fresh talent and AI-skilling their existing workforce. Acquisition of AI talent through hiring or outsourcing can only address the short-term skill deficit. These skills will remain in high demand, and therefore are scarce and expensive to source externally in the long run. As AI proliferates, companies that reskill and train existing employees in AI will realise significant competitive gains.
AI maturity in India

To provide a consistent framework for classifying surveyed organisations and help better contextualise results, we grouped organisations into four segments based on their AI maturity and aspirations. The yardstick for organisations’ AI maturity is a combination of the number of successful AI implementations undertaken and the duration for which they have been using some form of AI techniques. The strategic importance that the companies associate with AI has been taken as a measure of their AI aspirations.
State of AI in India

Pioneers (22 percent) are organisations setting the pace in terms of AI adoption and expressing continued AI aspirations. Almost every pioneer has undertaken more than five AI deployments. Over half of them have undertaken more than 20 deployments. This level of deployment has helped them develop in-depth expertise across AI technologies. Pioneers also believe that AI is either of “critical strategic importance” or “very important” to their organisations’ business success today, indicating their continually growing AI ambitions.

Path-seekers (3 percent) have high levels of AI maturity relative to their industries, with a majority of them having more than five AI deployments. However, they have held back on their relative commitment to AI and alignment between their strategic goals and AI initiatives is limited. More than three-fourths of them believed AI to be only “somewhat important” to their business success and the remaining did not attribute any strategic importance to AI in this regard. Path-seekers prefer investing in AI use cases that have demonstrated value in their areas. This strategy often leads to an opportunistic and piecemeal approach to AI.

Undecideds (25 percent) have only just embarked on their AI journeys and are still in the experimenting phase. Nearly all of them have less than five AI deployments and some are unsure of deploying AI in any form. The lack of widespread deployment is explained by the fact that most respondents from this segment believe AI to be only “somewhat important” or “minimally important” to business success. The remaining respondents did not attribute any strategic importance to AI at all. This hesitancy could put these organisations at a risk of falling behind in the AI race. In the long-term, it might cost them in terms of eroding competitiveness as their peers and competitors start transforming into AI-powered organisations.

Dreamers (50 percent) understand the potential benefits of AI, with most of them having defined AI roadmaps in some shape or form. However, their AI efforts are still less mature compared with those of Pioneers. More than half of the Dreamers have fewer than five AI deployments, and hence would be at relatively early stages of building AI expertise. Dreamers share Pioneers’ sentiments and believe that AI is either “very important” or of “critical strategic importance” to their business success. Hence, Dreamers are highly AI-aware and have actively started integrating AI into the organisational fabric.

The growth of AI technologies has been one of the defining trends in the past couple of years. One of the most significant drivers of this trend has been the need for, and AI’s success in helping organisations manage the pandemic-linked business disruption. About 72 percent of the surveyed respondents believe AI holds “critical strategic importance” or “is very important” for their organisations’ continued growth. Gaining competitive advantage through better AI-informed decisions emerged as the primary driver for AI initiatives amongst Pioneers and Dreamers. However, Path-seekers and Undecideds were more likely to use AI as an enabler to unlock cost efficiencies.
Traditionally digitised sectors tend to be early AI adopters

The pace and extent of AI adoption varies across industry sectors. Highly digitised industries, such as technology, financial services, telecom and media, and retail and consumer have taken the lead in AI implementation; they also have the most ambitious AI investment plans. As Pioneers in these sectors accelerate their AI adoption and expertise, the resultant capability gap will only keep widening and put late adopters at a significant disadvantage. For organisations in relatively low AI adoption sectors, such as healthcare and pharma, energy and natural resources, and manufacturing, there is a clear opportunity to gain first movers’ advantage and reap the resulting competitive benefits.

The technology, financial services, retail and consumer, and telecom and media sectors also ranked high on average functional penetration of AI and scored above the cross-industry average. From a business function perspective, customer service, operations, and engineering and product development emerged as the most AI-mature functions amongst respondents. The relatively lower penetration of AI in functions such as supply chain and procurement presents an opportunity for businesses to introduce AI-based efficiencies into these areas. Pharmaceutical and chemical companies, which have lower AI adoption rates, also stand to gain competitive advantage over their peers by becoming the first movers to invest in AI initiatives.

**AI functional penetration rating – Average number of business functions where AI is embedded**

<table>
<thead>
<tr>
<th>Average number of business functions where AI is embedded</th>
<th>Retail and consumer</th>
<th>Telecom and media</th>
<th>Financial services</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.9</td>
<td>11.0</td>
<td>10.5</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td>Travel and hospitality</td>
<td>Industrial manufacturing</td>
<td>Energy and natural resources</td>
<td>Healthcare and pharma</td>
<td>Others</td>
</tr>
<tr>
<td>8.4</td>
<td>8.3</td>
<td>7.2</td>
<td>7.0</td>
<td>5.8</td>
</tr>
</tbody>
</table>

*The above rating is on the basis of usage of AI across 15 functions from organisations across industries.*
Spotlight on GCCs – Gaining an early lead in AI implementation

According to a Deloitte and NASSCOM joint study, India is currently home to more than 1,300 GCCs employing about 1.3 million people. These GCCs generated revenues of close to US$ 33.8 billion in FY2020 alone. In terms of AI implementation, MNCs and their GCCs have gained early movers’ advantages. Other companies could use GCCs’ best practices, including approach, initiatives, and business solutions within their respective industries to further accelerate their own AI adoption and reduce the competitive gap.

As GCCs make the shift from being “doers” of transactional work to delivering cutting-edge capabilities, AI’s value to them as an enabler of this transition becomes increasingly significant. More than 30 percent of GCCs believe that AI is currently critical to their businesses, while another 50 percent believe this will be true for them over the next couple of years. Most GCC respondents believe their long-term success will depend on their ability to hone their AI strategies and skills within this small time horizon. About 37 percent GCCs said AI would significantly transform their organisations within three years. Another 26 percent said this transformation will take between three years and five years, acknowledging the critical role AI technologies will play in driving change across lines of business. They are optimistic of being able to navigate this change and emerge stronger from it.

The efforts GCCs are making to build on their AI advantage is evident from the extent of AI penetration across their business functions. In fact, every fifth GCC is using AI across key business functions mentioned in the survey. These include customer service, cybersecurity, operations, and supply chain.

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2 Deloitte, NASSCOM Analysis, “GCC Value Proposition for India”, June 2021
The earlier referenced Deloitte–NASSCOM study also found that GCCs invested ~US$ 1.5 billion in Indian start-ups in 2019 and directly contributed ~US$ 15 million to start-ups’ annual revenues by engaging more than 300 of them as vendors. A large number of these start-ups are involved in deep tech, such as AI, IoT, and AR/VR. This gives further evidence of the deep and mutually beneficial relationship between GCCs’ growth in India and the maturity of these high technologies in the country.

<table>
<thead>
<tr>
<th>Business Function</th>
<th>Indian Cos</th>
<th>GCCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer service</td>
<td>27%</td>
<td>45%</td>
</tr>
<tr>
<td>Cybersecurity</td>
<td>25%</td>
<td>38%</td>
</tr>
<tr>
<td>Engg./product development</td>
<td>26%</td>
<td>41%</td>
</tr>
<tr>
<td>Finance</td>
<td>25%</td>
<td>36%</td>
</tr>
<tr>
<td>HR</td>
<td>20%</td>
<td>34%</td>
</tr>
<tr>
<td>IT</td>
<td>24%</td>
<td>38%</td>
</tr>
<tr>
<td>Legal/compliance</td>
<td>17%</td>
<td>27%</td>
</tr>
<tr>
<td>Marketing</td>
<td>20%</td>
<td>36%</td>
</tr>
<tr>
<td>Operations</td>
<td>26%</td>
<td>45%</td>
</tr>
<tr>
<td>Procurement</td>
<td>20%</td>
<td>34%</td>
</tr>
<tr>
<td>Production/manufacturing</td>
<td>20%</td>
<td>38%</td>
</tr>
<tr>
<td>Sales/business development</td>
<td>24%</td>
<td>34%</td>
</tr>
<tr>
<td>Strategy</td>
<td>19%</td>
<td>38%</td>
</tr>
<tr>
<td>Supply</td>
<td>20%</td>
<td>34%</td>
</tr>
<tr>
<td>Chain/logistics/distribution</td>
<td>21%</td>
<td>38%</td>
</tr>
</tbody>
</table>

The earlier referenced Deloitte–NASSCOM study also found that GCCs invested ~US$ 1.5 billion in Indian start-ups in 2019 and directly contributed ~US$ 15 million to start-ups' annual revenues by engaging more than 300 of them as vendors. A large number of these start-ups are involved in deep tech, such as AI, IoT, and AR/VR. This gives further evidence of the deep and mutually beneficial relationship between GCCs’ growth in India and the maturity of these high technologies in the country.
AI technology portfolio

**Machine learning (ML):** It involves systems that can learn from data, and make decisions and predictions based on data, without the need of being explicitly programmed to do that.

**Deep learning (DL):** It is a type of ML that uses multiple layers of artificial neural networks, built taking inspiration from how the human brain functions.

**MLOps:** It is a set of practices that combines ML, DevOps, and data engineering, and aims to deploy and maintain ML systems in production reliably and efficiently.

**Natural Language Processing/Generation (NLP/G):** It involves systems that understand, process, and/or produce human language, such as chatbots or virtual assistants with voice/text recognition.

**Computer vision (CV):** It involves analysing digital images or videos, and creating classifications and descriptions that can be used for decision-making.

**Robotic Process Automation (RPA):** It involves software that mimics human activities to carry out routine tasks, such as customer order processing, forms processing, and call centre operations.

**Reinforcement learning (RL):** It is a type of ML technique that enables an agent to learn in an interactive environment by trial and error using the feedback from its own actions and experiences.

Of the seven technologies surveyed, machine learning (ML) (87 percent) and deep learning (DL) (74 percent) are currently in use at most of the responding organisations. More than 60 percent respondents said their companies have started embedding these technologies into their business processes. This signals the maturing of AI implementations beyond the experimentation phase, with leaders testing waters for more transformational implementations.

GCCs, by virtue of being technological delivery centres for their parent organisations, have been able to leverage their know-how and technically trained workforces to adopt advanced AI technologies relatively faster. For example, in reinforcement learning and MLOps, adoption in GCCs is twice that in non-GCCs. Moreover, a large share of GCCs have been using other advanced AI technologies, such as ML (67 percent) and RPA (50 percent) for a significant period of time (more than three years). Among Indian companies, we saw more spend capacity translate directly into advanced AI adoption, with ultra large companies leading the charge both in terms of AI sophistication and techniques used.

Organisational maturity though does not necessarily equate to AI maturity. Many young start-ups rely heavily on ML as the preferred AI technology with more than 90 percent having deployed it already, followed by deep learning with more than 85 start-up respondents using it.
We see significant impact of AI investment on both the demand and supply sides

Organisations across sectors and sizes are investing in AI; 45 percent of all respondents and 68 percent of Pioneers have spent more than INR 5 crore in the past fiscal year on AI-related technology and talent. AI investments are primarily driven by ultra-large organisations, with 64 percent having spent more than INR 5 crore. Nearly half of small and mid-sized companies also spent more than INR 2 crore on AI in the past fiscal year. About 86 percent organisations expect to increase AI investment by an average of 29 percent in the next fiscal year.

Strong support of the parent organisation and larger technology budgets have allowed GCCs to invest heavily in AI. About 21 percent executives from GCCs confirmed investing more than INR 50 crore in the past fiscal year compared with only 6 percent from non-GCCs.

Investments on the supply side of AI technologies are also critical as they contribute to the increasing availability and capability of AI solutions and services in the Indian market. The rapid increase in such investments has resulted in the phenomenal growth of companies, especially newer start-ups offering AI services in the country. AI startups in India attracted total funding of US$836.3 million in 2020.3

Pioneers are drawing quick returns on their AI investments

AI excites business leaders not just due to its potential for business transformation but also the arguably shorter time to outcome realisation it offers. Two in every three Pioneers in our survey were able to payback their AI investments within or earlier than the expected time period. Moreover, 72 percent Pioneers and 61 percent respondents were able to payback their AI investments within two years. Such quick break-even periods help ease concerns related to initial AI Investments, and give organisations the confidence to reinvest into successful AI initiatives. The optimal approach would be to target a good mix of low cost, quick wins, and large-scale transformational programmes to ensure a steady realisation of returns over the AI implementation lifecycle.

Distribution of respondents based on expected payback period from their AI investments

<table>
<thead>
<tr>
<th>Payback period</th>
<th>Overall</th>
<th>Pioneers</th>
<th>Dreamer</th>
<th>Path-seekers</th>
<th>Undecideds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 years (%)</td>
<td>61</td>
<td>72</td>
<td>61</td>
<td>56</td>
<td>50</td>
</tr>
<tr>
<td>2 years or more (%)</td>
<td>17</td>
<td>21</td>
<td>15</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td>Unsure / Too early to tell (%)</td>
<td>23</td>
<td>7</td>
<td>24</td>
<td>22</td>
<td>34</td>
</tr>
</tbody>
</table>

Process efficiency tops the list of expected outcomes from AI

Most organisations appear to focus on deriving tactical benefits, such as gaining process and cost efficiencies from their AI efforts early on. Only after they gain some level of AI maturity and experience do they begin refocusing their efforts on more strategic and value-generating outcomes. Across industries, making processes more efficient (38 percent) and improving decision-making (28 percent) emerged as both the most expected and most often realised benefits from AI. Over half of the respondents also realised organic benefits they were not actively seeking such as discovering new insights (expected by 19 percent), enhanced customer relationships (expected by 18 percent), and enhancements to existing products and services (expected by 16 percent). As organisations grow in their AI maturity, they discover newer areas for potential application of AI that deliver more strategic outcomes.

Expectation v/s achievement of outcomes from AI implementation

Despite having attained higher AI maturity and functional penetration, only half of the surveyed GCCs are able to achieve payback in under two years. This is likely because their investments are towards longer-term, enterprise-scale initiatives with longer payback periods. In contrast, two in every three Indian companies are achieving the milestone within two years. Amongst Indian companies, start-ups are even more likely to reach break-even within this timeframe, with over 70 percent reporting their payback period to be less than two years.

Start-ups can achieve faster paybacks compared with more established organisations due to their ability to embed AI into their business model early in their journey. More established entities trying to incorporate AI at a much later stage of their organisational maturity must deal with much greater operational and cultural change. Start-ups are also likely to have more flexible and nimble IT landscapes, allowing them to better use technologies and models such as cloud assets and AI-as-a-Service. On the other hand, older organisations have more expensive, and often complicated and rigid IT set-ups requiring large integration efforts. This lowers the entry barriers into AI for start-ups.
In terms of achieved outcomes, a larger percentage of Pioneers achieved outcomes in the middle-to-higher range of the strategic value spectrum. These outcomes include improving employee productivity (56 percent), discovering new insights (51 percent), creating new products and services (49 percent), and enabling new business models (43 percent). Dreamers most frequently achieved mid-tier outcomes, such as enhancements to existing products and services (44 percent) and improved process efficiencies (42 percent), while Path-seekers achieved less strategic outcomes, such as improved ability for decision-making (67 percent) and enhanced process efficiencies or cost savings (33 percent each).

Hierarchy of benefits with AI maturity

Companies with high AI maturity are deriving benefits from the higher end of the spectrum of outcomes from their implementations.

Start-ups have proved capable of exploiting AI for its strategic applications early on in their journeys. Nine of every 10 start-ups reported that AI technologies are not only helping them create new products and services but also enhancing existing ones. Further, 92 percent start-ups use AI technologies to discover new insights to drive business growth. In terms of achieving these outcomes, 37 percent reported success in discovering new business insights and 41 percent are able to enhance their existing products and services.
Succeeding in the AI era

Successful adoption of AI involves more than just technology deployment from both a means and measure of success perspective. AI can only deliver to its full potential when an organisation-wide strategic, cultural, and operational transformation is brought about.

For organisations to achieve this deep AI-business integration and ensure value realisation, they must put together three key pieces of the AI puzzle – implementation and execution strategy, risk management, and AI-enabled workforce. In the following sections, we discuss each of these in detail.
Implementation and execution strategy

While an organisation’s AI strategy may involve considerable technical restructuring and recalibration, revisiting organisational silos and ways of working is equally critical and often taken for granted. Executing these changes requires considerable change management and transformational thinking.

Putting in place a roadmap for this transformation goes a long way towards minimising the risk of business disruption and easing change anxiety. Most organisations have gaps in their existing processes, skill sets, and technology stacks that they need to bridge before deploying and using AI within their business. We believe that certain key decisions would help organisations balance business continuity with transformation, and bridge the gap between conceptualisation and execution of AI initiatives. Some of these have been discussed here.

Centralise for tighter control or decentralise for better business alignment

A key decision with regards to the operating model for AI and analytics functions within organisations is the extent of centralisation. More centralised operations offer tighter control over resources, close monitoring of outcomes, and some protection against business disruption in the experimentation phase. On the other hand, more federated operating models typically enable better business alignment and organisational integration, allowing AI to pervade throughout organisational processes and culture. Organisations typically start off with a highly centralised set-up to ensure value realisation and shift towards more decentralised or hybrid set-ups as leadership confidence grows. The survey validates this hypothesis – most organisations scoring high in AI maturity preferred either a hybrid approach (38 percent) or a decentralised one (16 percent). In contrast, most organisations scoring low on AI maturity either chose the centralised approach (44 percent) or had not yet made their choice of operating model (18 percent).
**Build or buy**

Amongst the primary considerations for decision makers with regards to any new technology implementation is whether to build the capability in-house or source it from the market. Organisations would tend to lean towards buying more greenfield technologies while building technologies with a high strategic importance. As both these philosophies hold true for AI, it is no surprise that most organisations (71 percent) we surveyed chose a hybrid of the two approaches. This approach has the best of both the worlds – building foundational AI assets and capabilities enables organisations to ensure long-term value creation, and buying off-the-shelf AI and related solutions allows organisations to begin reaping AI’s benefits in the short term (while they ramp up in-house capabilities).

### Distribution of surveyed organisations on the basis of preferred implementation approach

<table>
<thead>
<tr>
<th>Approach</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only build</td>
<td>14%</td>
</tr>
<tr>
<td>Build more than buy</td>
<td>25%</td>
</tr>
<tr>
<td>Even blend</td>
<td>26%</td>
</tr>
<tr>
<td>Buy more than build</td>
<td>20%</td>
</tr>
<tr>
<td>Only buy</td>
<td>16%</td>
</tr>
</tbody>
</table>

However, organisations do prefer the build approach in certain circumstances – when they want to be cautious with their AI spends or have lingering reservations about being able to justify them. In our survey, a large proportion (42 percent) of non-GCC companies would prefer to either exclusively “build” or “build more than buy” their AI assets. In contrast, one in every three GCCs surveyed would prefer an “even blend” of building and buying AI capabilities.

Similarly, one fourth of the small organisations in our survey said they currently prefer building their own AI capabilities from scratch. Amongst start-ups too, over half preferred a build-heavy approach – 25 percent preferred “build only” and another 27 percent preferred “build more than buy”. While this approach does present the risk of an initially slower AI adoption, it can turn into a source of competitive advantage if these organisations manage to accelerate and broad-base AI enablement with increasing in-house capabilities.

### Key trends enabling AI adoption for organisations

**Cloud – The preferred platform for AI**

Traditionally, organisations have chosen to retain most of their data and analytics infrastructure and assets on premise. This preference is due to their unwillingness to expose themselves to data security and regulatory compliance risks. However, the increasing capability, widespread availability, robustness of security mechanisms, and rising regulatory acceptability of cloud resources are rapidly changing this scenario. More companies are now comfortable moving their customer and other business critical data to cloud. This is evident from the fact that 90 percent of our survey respondents use cloud-based, AI development tools and techniques; the most popular amongst these being AI-as-a-Service followed by ML-Ops.

**AI-as-a-Service – Helping manage capex on AI**

As more organisations seek solutions that help them move to an opex-centric IT cost structure, service-based commercial models are gaining popularity. The increasing availability of server-less, subscription-based AI services addresses this need and are especially beneficial for non-technology companies wanting to benefit from AI. Most of them would be hesitant in committing large capex to AI given their limited technical resources and lack of technical expertise. AI-as-a-Service enables such organisations to test out AI solutions through a “pay-per-use” model before making long-term commitments in terms of investments and resources. The preference for AI-as-a-Service is borne out by the fact that two of every three executives in our survey picked it as their top choice and confirmed having started using it within their organisations already.
Most global cloud providers recognise this trend and are developing subscription-based AI services aimed at specific business functions. This may be the easiest and fastest path for most organisations to introduce AI into high-impact functions, such as product design, and sales and marketing.

MLOps – The key to industrialised AI
As organisations begin building portfolios of AI/ML models spread across the development–piloting–deploying–scaling lifecycle, they feel the need for a reliable and repeatable framework to manage such portfolios. MLOps, a discipline that brings together the benefits of DevOps and ML, addresses this need and helps synchronise and manage AI/ML efforts. Organisations’ past success with DevOps is helping drive MLOps adoption. The MLOps market is expected to expand to nearly US$4 billion by 2025⁴, demonstrating the growing global demand for it.

In India too, MLOps is emerging as a sought-after AI discipline. About 55 percent survey respondents, two-thirds of Pioneers, and half of Dreamers confirmed using MLOps in some form within their organisations. Adoption rates were more than 70 percent in the retail and consumer, financial services, industrial manufacturing, and healthcare and pharma sectors.

Intelligent automation – The next frontier for AI
Process automation has been amongst the most popular applications of AI for organisations due to its ability to provide faster efficiency gains. However, its use is usually limited to automation of repetitive, rule-based tasks. The next stage of evolution for automation is intelligent automation – a combination of RPA technologies with advanced cognitive capabilities.

Intelligent automation provides the ability to work with both structured and unstructured data to automate across complex, multi-process workflows. This is enabled by its use of advanced cognitive technologies, such as OCR, NLP, ML, DL, and text mining.

In our survey, 48 percent respondents said their organisations have embarked on the journey to intelligent automation through initial forays into integrated RPA. For Pioneers, this percentage is as high as 72 percent, whereas Dreamers (47 percent) and Path-seekers (44 percent) are catching up. The challenge is no longer if we will accept intelligent automation in the workplace, but how can we apply it wisely and maximise its benefits.

AI risk management

The rapid growth of AI, like any major transformation, presents its share of risks. These risks are compounded by the nature of AI – its potential for automated decision-making (autonomy) and our limited ability to follow and troubleshoot AI logic (explainability). Moreover, any new technology, especially a technology such as AI that might directly compete with humans in some respects, faces workforce resistance. Considering these nuances of AI, organisations must anticipate AI-related risks and build comprehensive frameworks to pre-emptively mitigate them. The implications of being reactive could range from reputational damage and revenue losses to severe regulatory and litigious consequences.

Organisations are aware of AI-related risks but feel unprepared to address them
With an increase in AI adoption, the awareness of various AI-related risks is also rising. However, mitigation strategies do not seem to have kept pace. A significant “preparedness gap” exists for organisations across potential risk areas – strategic, operational, and ethical. Four of every five organisations surveyed are aware of the potential risks associated with their AI initiatives, but only one in four felt well prepared to address them. Experience and expertise do contribute to organisations’ confidence in their ability to manage AI risks. Most Pioneers in our survey (54 percent) felt fully prepared to deal with AI-related risks. In contrast, levels of complete perceived preparedness were much lower amongst Dreamers (23 percent), Path-seekers (22 percent), and Undecideds (7 percent). The sense of AI risk preparedness was relatively higher amongst GCCs as well (nearly half felt fully prepared) compared with non-GCCs (a fifth felt prepared).

Organisations take time to develop a matured appreciation of risks and risk governance mechanisms; this is no different for AI risks. While the low levels of perceived AI risk preparedness within start-ups (only 16 percent feel prepared to manage AI risks) fit this pattern, the scale and potential for damage from AI risk that start-ups face might be more significant. Hence, this is an area requiring urgent attention.

Awareness and perceived preparedness across surveyed organisations for various AI-related risks

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Preparedness</th>
<th>Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making bad decisions based on AI recommendations</td>
<td>52%</td>
<td>91%</td>
</tr>
<tr>
<td>AI failures affecting business operations</td>
<td>54%</td>
<td>89%</td>
</tr>
<tr>
<td>Cybersecurity vulnerabilities in AI-powered systems</td>
<td>54%</td>
<td>89%</td>
</tr>
<tr>
<td>Liability for decisions and actions made by AI systems</td>
<td>54%</td>
<td>89%</td>
</tr>
<tr>
<td>Issues relating to ethics of AI systems</td>
<td>50%</td>
<td>88%</td>
</tr>
<tr>
<td>Consequences of using personal data in AI systems without consent</td>
<td>51%</td>
<td>87%</td>
</tr>
<tr>
<td>Lack of transparency of AI systems</td>
<td>50%</td>
<td>87%</td>
</tr>
<tr>
<td>New and changing regulations that could affect our AI efforts</td>
<td>44%</td>
<td>85%</td>
</tr>
<tr>
<td>Backlash from customers using AI systems</td>
<td>51%</td>
<td>75%</td>
</tr>
<tr>
<td>Potential job losses from AI-driven automation</td>
<td>49%</td>
<td>75%</td>
</tr>
<tr>
<td>Negative employee reactions due to using AI systems</td>
<td>50%</td>
<td>74%</td>
</tr>
</tbody>
</table>

Organisations need to switch from a tactical to strategic approach towards AI risk management

Both the potential applications and risks of AI are organisation wide; and so should be the actions needed to address these risks. Operational risk management activities popular amongst the survey respondents (internal audits and testing, inventory of AI implementations, resolution of ethical AI issues, etc.) certainly have their value. However, as AI is embedded deeper into business processes and decision-making, risk management interventions need to become more policy and process oriented. Some measures that will help AI risk management become a part of the organisation strategy and culture include alignment of AI risk management to the organisation's broader risk management framework and sourcing strategy, inclusion of AI risk management in the boardroom agenda, and establishment of clear ownership and accountability for AI risk management.

Pioneers in our survey understand this. More than half of them are already aligning their AI risk management with their organisations' broader risk management efforts. Unfortunately, about two-thirds of the rest of survey respondents were yet to start acting towards this critical objective.
State of AI in India

Percentage of the surveyed organisations where listed activities are undertaken for AI risk management

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal audits &amp; testing AI systems</td>
<td>42%</td>
</tr>
<tr>
<td>Formal inventory of AI implementations</td>
<td>41%</td>
</tr>
<tr>
<td>Train workforce to build AI systems, resolve ethical AI issues</td>
<td>38%</td>
</tr>
<tr>
<td>Ensure that our AI vendors provide unbiased systems</td>
<td>37%</td>
</tr>
<tr>
<td>Align AI risk management with organisation’s broader efforts towards Risk</td>
<td>37%</td>
</tr>
<tr>
<td>Establishing policies or a board to guide AI ethics for our organisation</td>
<td>35%</td>
</tr>
<tr>
<td>Collaborate with external parties on leading practices around AI ethics</td>
<td>26%</td>
</tr>
<tr>
<td>Using third-party vendors to conduct independent audits and testing AI systems</td>
<td>23%</td>
</tr>
<tr>
<td>Have a single executive in charge of AI-related risks</td>
<td>17%</td>
</tr>
</tbody>
</table>

GCCs led Indian companies in eight of the nine risk mitigation activities listed in our survey. Risk management traditionally is a priority in the outsourcing ecosystem. The same culture would play a pivotal part in allowing GCCs to adopt risk practices faster even for newer technologies such as AI.

Organisations using AI should also consider adopting ethical AI frameworks. These frameworks provide a directional guidance for AI implementations and are based on principles such as environmental well-being, transparency, and human agency.

AI-enabled workforce

Arguably the most obvious and yet enormously stubborn problem for organisations to solve is ensuring availability of AI talent. The advancements in AI technologies and use cases have far outpaced the availability of an AI-ready workforce. Organisations need to focus across stages of talent management, including attracting, engaging, managing, retaining, and upskilling to be able to address the huge supply-demand gap for AI skills.

Talent shortage is slowing AI adoption
As the demand for AI professionals accelerates, most respondents (89 percent) said their organisations are experiencing skill gaps. About 28 percent of these respondents admit to experiencing an extreme or major skill gap, 44 percent report a moderate skill gap, and another 28 percent claim a minimal gap. The near universal skill deficit is forcing employers to compete fiercely to attract talent. The limited supply of new AI talent in the country means this competition will only become more intense in the foreseeable future. This will also mean employers will have to shell out oversized premiums for this coveted skill set.
AI skill gap as experienced by surveyed organisations across segments

<table>
<thead>
<tr>
<th>Overall</th>
<th>Pioneers</th>
<th>Dreamers</th>
<th>Path-seekers</th>
<th>Undecideds</th>
</tr>
</thead>
<tbody>
<tr>
<td>11%</td>
<td>24%</td>
<td>21%</td>
<td>22%</td>
<td>5%</td>
</tr>
<tr>
<td>28%</td>
<td>25%</td>
<td>29%</td>
<td>28%</td>
<td>16%</td>
</tr>
<tr>
<td>38%</td>
<td>22%</td>
<td>40%</td>
<td>56%</td>
<td>41%</td>
</tr>
<tr>
<td>6%</td>
<td>16%</td>
<td>5%</td>
<td>22%</td>
<td>30%</td>
</tr>
<tr>
<td>22%</td>
<td>1%</td>
<td>21%</td>
<td>22%</td>
<td>8%</td>
</tr>
</tbody>
</table>

A well-staffed AI skilled workforce can enable organisations gain major ground towards AI maturity. Consider the organisations we classify as Pioneers from our survey. More than half of them reported facing no or minimal AI skill gaps. This is one of the advantages (if not the primary one) keeping them at the forefront of AI adoption. These organisations would also see the benefits of a virtuous cycle – their highly skilled AI workforce keeps them ahead in AI enablement, and the resulting perception as AI leaders making them even more attractive to AI talent, ultimately allowing them to pay lower wage premiums.

Data scientists are in high demand
Given the level of enthusiasm and aggressive adoption of AI that we have seen in responses to other aspects of this survey, the findings on talent are perhaps unsurprising. AI projects often flounder because the relevant technology skills are in short supply. Hence, organisations should recognise that success depends on talent just as much as it does on technology. However, some skills are needed more than others. Respondents report the highest level of need for data scientists, followed by AI researchers, and developers, and engineers.
There is also a pronounced skill gap in organisations across a maturity-aspiration bucket. As Pioneers try to scale their AI implementations to enterprise level, they experience a pronounced need for AI-savvy business leaders to steer them through this journey. Amongst Dreamers investing in building foundational data infrastructure to realise their AI aspirations, data engineering is a much sought-after skill set.

We may see a widening “AI wealth gap”

With increasing competition for AI talent and rising wage premiums, acquiring these skills from external sources – whether through hiring or outsourcing – will keep getting prohibitively expensive at least for the next few years. Even if the cost of AI talent peaks and begins rationalising in the next couple of years, organisations wanting to remain competitive, especially those in sectors seeing rapid AI adoption, can ill afford to delay their AI initiatives. This will lead to organisations with greater spend capacities acquiring disproportionate numbers of AI professionals, helping them become more competitive and wealthier. On the other hand, organisations that cannot afford to pay the increasing AI wage premiums will lag in AI adoption, potentially leading to erosion of competitiveness and overall valuation.

At present, two-thirds of the surveyed organisations list external sources – hiring new AI professionals, staffing external consultants or partnering with AI companies – as among their top two most preferred sources for AI talent. More organisations need to shift their focus towards more sustainable sources. Training and re-skilling or up-skilling existing talent pool in AI might be more painful and require massive organisational effort in the short term but will pay rich dividends in the long run.

GCCs in our survey appeared to rely heavily on hiring external AI professionals with 58 percent considering it the preferred means to fill their skill gap. While these companies already have large pools of AI talent, the continued large-scale talent acquisition is a measure of their AI ambitions. Their massive talent budgets allow them to outcompete other organisations and widen the competitive gap for their parent organisations.

Interestingly, more than half of the start-ups we surveyed chose to invest in skilling their existing workforce in AI. Constraints such as limited spend capacities and absence of a strong brand to attract talent must play a big part in this choice. However, their flexible organisation structures and smaller scale also allow start-ups to better manage and execute up and cross-skilling initiatives. About 53 percent start-up executives in the survey indicated that AI training programmes are already underway in their organisations, compared with 41 percent executives from established organisations.
Top two preferred AI talent sources for surveyed organisations

**Hiring**
- Experienced professionals: 53%
- New graduates from universities: 22%

**Training**
- Internal resources trained in AI: 39%
- Internal resources re-trained in AI: 29%

**External partnerships**
- Partnerships with companies with AI experts: 29%
- Professional services firms, consultants, other third parties that have AI expertise: 27%

Note: In instances where organisations have listed only one choice, the stated response was taken as the default second choice.
Conclusion

Corporate India’s conviction in the certainty of AI-led transformation is leading organisations to approach AI as part of their core business strategies rather than just an area of innovation and experimentation. The organisations we surveyed have plans to either maintain or more often ramp up their AI investments. The pandemic has afforded Indian companies the opportunity to accelerate digitisation and better demonstrate the value of AI as a force multiplier for competitive advantage. The supply of AI-enabled and AI-enabling solutions also went up to meet this increased demand. The coming together of these factors makes this the perfect inflection point for organisations that are yet to participate in the AI revolution.

However, to develop AI maturity and realise the benefits of repeatable outcomes, organisations will have to form a well thought-out and articulated AI strategy encompassing operating models, investment plans, and technology choices. AI risk management also needs to feature in boardroom conversations rather than remain just a departmental concern. The last change but probably the one with most significance and impact will be the development of AI-capable workforces. If AI is the weapon of choice for the next generation of business warfare, organisations with any ambitions will need to prepare their armies to be able to wield this weapon.
Methodology

To understand how Indian organisations are adopting, benefiting from, and managing AI technologies, Deloitte surveyed 309 senior executives across the business and IT functions between April 2021 and July 2021.

The surveyed organisations constitute a varied set at different stages of AI adoption, and include a mix of start-ups, established companies, and GCCs from across industry sectors. The individuals we spoke to within these organisations were executives and leaders responsible for and/or directly influencing key AI-related decisions around vision and strategy, investments, implementations, and management.

The survey included C-level executives (35 percent), senior management (41 percent), and other key decision makers (24 percent). To complement the blind survey, Deloitte also conducted in-depth tele-interviews with AI experts from various industries. The survey covered a wide cross-section of organisations with varied sizes (based on their annual revenues). About 34 percent of participating organisations were GCCs supporting large multinational organisations.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Revenue</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>INR 0–75 crore</td>
<td>20%</td>
</tr>
<tr>
<td>Medium</td>
<td>INR 75–250 crore</td>
<td>12%</td>
</tr>
<tr>
<td>Large</td>
<td>INR 250–5,000 crore</td>
<td>29%</td>
</tr>
<tr>
<td>Ultra Large</td>
<td>&gt; INR 5,000 crore</td>
<td>28%</td>
</tr>
</tbody>
</table>

*11% survey respondents have not disclosed revenue.
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