nasscom

Deloitte.

Advancing India's AI skills:

Interventions and programmes needed

August 2024

Advancing India's AI Skills: Interventions and programmes needed

1. AI as an integral part of IT

Over the past two decades, India's IT sector has significantly contributed to the nation, constituting >7 percent of the GDP[48] in FY23. Fuelled by a skilled labour force, entrepreneurial spirit and supportive government policies, the Indian technology sector has achieved global excellence, becoming a driving force behind India's immense growth and development. The IT-BPM industry stands out as a vital catalyst in India's export expansion narrative, constituting more than ~50 percent of the nation's total services exports, amounting to ~US$200 billion[48, 51]. In addition, India's software product sector reached ~US$15.2 billion in FY24[36, 48] and its revenue (exports) could touch US$100 billion by 2030,[7, 8] driven by a higher penetration of deep tech in products such as AI/GenAI, Blockchain and AR/VR.[7]

Taking a global view, the AI market, comprising AI services and products, reached US$120 billion in 2023, with AI services accounting for 24% (~US$29 billion).[49] AI market spending is expected to grow to >$500 bn by 2027 as per IDC. If Indian technology players capture a similar market share for AI services as for traditional services (where India accounts for ~20 percent of the global services market), the estimated market potential for AI services would be US$24-25 billion by 2027, even with delayed growth of a few years compared with global peers.[40]

To understand the AI market, we need to review its components—AI services and AI products and how these are growing and diversifying from traditional services and products.

AI services are typically categorised into the following traditional buckets with aspects of AI interspersed in them:

1. **IT services**: AI enabled IT consulting, implementation, application development and management, outsourcing, deployment, support and education/training
2. **Business services**: AI-enabled business consulting and BPO services[42]

Major global companies today need AI services to increase revenues, improve operational efficiency, enhance innovation, achieve better customer experiences, build new-age capabilities, reduce cost and improve workforce efficiency and satisfaction.[42]

The AI software product market can be divided into the following archetypes:

1. **AI applications**: Collaborative content workflow and management, Enterprise Resource Planning (ERP), supply chain management, production and operations, engineering and Customer Relationship Management (CRM) applications
2. **AI platforms**: Facilitate the development of AI models and applications, such as intelligent assistants
3. **AI systems infrastructure software**: Analytics, business intelligence software, data management, integration, orchestration, application development, software quality, life-cycle software and application platforms
4. **AI application development and deployment**: Analytics and business intelligence software, data management, integration and orchestration, application development, software quality and life-cycle software and application platforms

As a major theme within the AI market, GenAI is growing aggressively and could reach 33 percent of the global AI market in 2027.[16] Due to this emergence and other shifts towards AI, the industry is witnessing an escalating demand for sophisticated AI software products and service solutions. This encompasses a range of advisory services and implementations of Large Language Models (LLMs) for generative applications, including summarisation, content creation, video analytics and knowledge assistance through advanced chatbot functionalities and complete value chain transformations using AI.

To use and capitalise on this growth opportunity, the government launched the "IndiaAI Mission" with a budget outlay of ~INR10,000 crore over the next five years.[17] As part of the mission, the government will support in nurturing ecosystems for AI development, including funding and providing resources for supercomputing capacity (around 10,000 GPUs), data availability, management, use cases, start-up funding and AI guardrails.

The IndiaAI mission has planned a comprehensive integrated framework focused on technology (algorithms, LLMs, etc.), infrastructure (GPUs, specialised accelerators, Cloud, HPC, etc.), applications (sectorial, domain, etc.), best practices (ethical/responsible AI), talent (technical and non-technical training to develop/ understand/use/contribute to datasets), enhancing general awareness (sectoral opportunities, threats, etc.) and development of a collaborative AI ecosystem among academia, schools and research.[15]

2. Identifying essential AI skills

"India has a huge opportunity to be a global leader in AI, and creating AI fluency at scale is a critical step in that journey"—India Head, Global Tech Major

"India's IT will be the "front-office' of the world's AI revolution"—*Jensen Huang (CEO, Nvidia)*

The Indian AI talent demand is expected to grow from 600,000–650,000 to >1,250,000 over 2022-27 at a 15 percent CAGR. However, the AI market is expected to grow at a rate of 25–35 percent CAGR, potentially signaling a demand-supply gap in the talent pool and a need for upskilling existing talent.[16, 49]

Most Indian IT companies have already started training their workforce on AI and related technologies. During 2023–24, TCS trained 350,000 employees, while Wipro trained 220,000 employees on AI. Microsoft has also agreed to provide AI skilling opportunities to 2 million people in India by 2025 to empower India's workforce with future-ready skills.[30] Infosys has initiated customised and comprehensive in-house AI training programmes to upskill its existing workforce. They have also collaborated with multiple institutions under their digital literacy initiative, "Infosys Springboard," to assist academia in curriculum design.[47]

Considering this, the Ministry of Electronics and Information Technology (MeitY) has envisioned multiple K12 and Graduate/Post Graduate level interventions to develop an AI-ready talent pool. These interventions will focus on model curriculum and technology, framework, ecosystem development, research for start-ups and MSMEs, faculty training, career path mapping and building an AI community.[15] The Ministry of Skill Development and Entrepreneurship has also collaborated with tech companies for the ADVANTA(I)GE INDIA initiative to empower India's workforce with future-ready skills and democratise access to AI skills nationwide.[30]

To ensure competitiveness in the global AI landscape, leading industry players[47] are reimagining a full stack of AI and tech skills across three different levels. Ranging from basic to advanced AI skills and domain-specific expertise, including reimagined AI-enabled value chains and processes within respective disciplines. Additionally, foundational skills such as problem-solving capabilities, critical thinking and social skills such as teaming and mentorship support are also emphasized across a three-dimensional lens of AI skills:

- **Level 1—Skills of the past**: These skills are relevant only for the next three-to-four years but will not significantly propel career growth (such as basic programming, data analysis and fundamentals of AI/ML).
- **Level 2—Skills relevant today**: These AI skills are pertinent in today's environment (such as advanced ML and deep learning, NLP, RPA and AI model deployment).
- **Level 3—Skills of tomorrow**: These futuristic AI skills will become prevalent in the next few years (such as AI ethics and compliance, autonomous systems, edge AI, training and fine-tuning AI models and quantum computing for AI).

Cross-functional responsibilities

- **Leadership**: Strategy and governance
- **Ethics**: Responsible AI development, fairness, transparency, privacy, bias mitigation in AI systems, legal and regulatory frameworks related to AI, policies and guidelines development
- **Project management**: Methodologies, resource allocation, risk assessment, stakeholder management, budgeting and agile development practices
- **Domain/functional experts**: Subject matter expert with deep knowledge of potential use cases and solution applicability to industry/function
- **Strategy and advisory services**: Strategy, ROI evaluation, change management, process evaluation and business benefits

Cross-functional capabilities

	Skills required	Potential roles
AI experts	• Highly specialised research and development on deep learning models (e.g., LLM, NLP, robotics from scratch) • Focus on neural networks, parallel and edge computing, GPU architecture, hardware and facilities planning (chip fabrication and design), ML/DL algorithms on hardware and embedded applications (e.g., NVIDIA Jetson/Jetson Nano) • Specialised domain skills (e.g., robotics, MedTech, IoT)	• AI researchers/scientists • Specialised domain researchers
AI developers/ builders/ architects	• Core AI programming using software languages (e.g., Python, Java), frameworks (e.g., TensorFlow or PyTorch) and models • Ability to use AI frameworks, develop AI models and finetune hardware • Data analysis, statistical modelling, visualisation, feature engineering, predictive modelling and ML techniques (Python/R/SQL/Jupyter Notebook, etc.) • AI segment-specific technical skills (e.g., speech recognition, AI, NLP) • Embedded applications (e.g., NVIDIA Jetson/Jetson Nano)	• Deep learning (e.g., GenAI/LLM) engineer • ML/NLP engineer • Computer vision/Speech engineer • Hardware engineer (e.g., GPU) • AI trainers/Prompt engineer • Robotics engineer
AI integrators	• Integration of AI services and products using major platforms • Understanding of AI tools and models, GenAI, NLP, etc. • Knowledge of basic coding tools (e.g., Amazon CodeWhisperer, GitHub's Copilot, etc.) • Data science skills in Mathematics and Statistics • Implementation methodology • Identification of use cases and solution • ROI evaluation	• Solution architect • Database architect • Product manager • Application specialist (e.g., SAP developers) • Data scientist • Database administrator • Cloud engineer • UI/UX manager • QA engineer • DevOps engineer • Data analyst
AI users	• Foundational understanding of AI, GenAI tools and frameworks • Advantages, limitations and potential impacts of AI • Domain-specific AI skills (such as AI-first marketing, AI-first finance and AI-first consultant) • Ethics and responsibility of using AI • Usage of low/no-code tools (e.g., cloud-based tools for AI/ML, visualisation and reporting)	• Finance • Strategy and generalists • Sales and marketing • Customer service • Procurement • Accounting • Other functions
AI informed	• Digital literacy for all	• All

In line with these levels, there are five core segments that need to be targeted with different learning paths, ranging from generic to specialised:

- **AI informed**: Focused on general AI literacy
- **AI users**: Focused on using AI to improve productivity and be AI first in the respective discipline
- **AI integrators**: IT workforce integrating AI tools and technologies into existing workflows
- **AI builders /developers /architects:** Workforce that will develop AI-related software and applications
- **AI experts:** Top-tier talent focused on new-age research and who have the skill and capability to develop AI models from scratch

This paper refers to these five core segments while discussing the skills required and initiatives from industry, academia, and government.

The skills required for training these cohorts will encompass a mix of technical and non-technical areas and depend on the specialisation, such as AI developers, AI experts and technical college students.

AI evolution will significantly transform technology-based job roles, with some positions being impacted and new ones emerging. There will be a shift from trend and experience-based comprehension to knowledge and understanding-based comprehension. Additionally, computation will transition from being skill and resource-dependent to access and collaboration-dependent. The focus of information will move from being descriptive to predictive.

Roles that rely on systems, data or human interactions, such as customer service representatives and insurance underwriters, are more likely to experience significant disruption due to AI's ability to enhance efficiency and accuracy. Conversely, roles requiring analysis of unstructured data (e.g., risk assessors, software developers, etc.) will be augmented through AI, leading to higher productivity and efficiency. Further, new roles will emerge as AI advances to ensure that AI systems comply with ethical and legal standards and to protect industry guardrails. This would include roles such as privacy and compliance officers, AI governance architects, AI consultants and AI developers/creators.

Per a recent study[21, 22], India, Singapore, Finland, Ireland, and Canada witnessed the fastest rate of AI skills adoption. Skills are growing at the fastest

rate in certain AI segments, such as question answering, classification, recommender systems, computer vision, and Natural Language Processing (NLP). These AI skills were adopted across industries such as technology, retail, education, and financial services.

Last year, about 43 percent of the overall Indian workforce across sectors encountered wide use of AI in their organisations. 60 percent of all workers and 71 percent of Gen Z professionals recognise that acquiring AI skills can enhance their career prospects. Additionally, two of three Indians plan to learn at least one digital skill in 2023, with AI and Machine Learning being the most desired skills. [21, 22]

A recent Deloitte survey reveals a significant gap between using GenAI and the business measures taken to support it. Globally, while 43 percent of employees use GenAI for work, 29 percent are unaware of their organisational initiatives in this space—showcasing a disconnect in communication.[50] Businesses need strategic and proactive responses to the rapidly changing environment and critical "no-regret" moves. This will help develop, implement and integrate a comprehensive GenAI strategy that empowers employees and integrates the necessary infrastructure and policies.

3. Operating models to develop the requisite AI skills in India

By 2030, it is expected that India will have a surplus of talent, with over one million highly skilled tech professionals. However, there are valid concerns about the quality of their skill sets and expertise in the industry.[9]

To meet this increasing demand for AI skills in India for steering the AI-led growth of India's IT sector, it is imperative to develop and cultivate AI talent through various operating models. These models should encompass reskilling the existing workforce and fostering new talent through academia and industry collaboration, ensuring a robust pipeline of skilled professionals ready to drive AI-led innovation.

To ensure a successful strategy and execution for AI skill development and talent availability in India, a collaborative approach involving industry, academia and the government is essential. The following are key themes and operating models for each stakeholder:

Industry

1. **Skill identification and pathway development**
    - Employers must identify current and future AI skills requirements and anticipate tech-based gaps
    - Develop comprehensive skilling pathways that include foundational courses, advanced training, and continuous learning opportunities
2. **National AI skilling Initiatives**
    - Industry should lead national AI skilling initiatives, collaborating with peers and academia
    - Implement mass-scale programmes and workshops to enhance AI awareness and user proficiency
3. **Collaborative skill pipeline development**
    - Work with academia to integrate foundational AI coursework into degree and diploma programmes
    - Provide advanced training through hackathons, internships, IP creation programmes and AI training academies
    - Establish academies to train educators who can then train others in AI

Academia

1. **AI awareness and general education**
    - Incorporate AI awareness modules into general education requirements to give students a foundational understanding
    - Organise events to enhance students' understanding of AI's potential
2. **Foundational and advanced AI training**
    - Collaborate with industry on accelerator programmes and AI MOOCs for practical training and continuous learning

- Develop model curricula and establish Data and AI labs to provide advanced and industry-aligned training

3. **Incentives and support**
    - Offer learning scholarships, research fellowships and innovation grants to incentivise AI skill development.
    - Provide funding, mentorship, and support to top STEM students to nurture top AI talent

Government

1. **Policy and framework development**
    - Develop, implement and scale a national AI policy that outlines goals, strategies and guidelines for AI skill development.
    - Establish regulatory frameworks to support AI education and training initiatives
2. **Funding and grants**
    - Provide grants for AI research and development to encourage innovation
    - Allocate funds for AI educational programmes and infrastructure development in academic institutions
3. **Public-private collaboration**
    - Facilitate collaborations between industry and academia to develop and implement AI training programmes
    - Establish a task force of industry leaders, academics, and government officials to oversee AI skill initiatives

Beyond these specific initiatives across three key pillars, India also needs a major initiative in the form of a broader shift and pivot from AI Services to AI Services + Products. While India is renowned for world-class technology services and engineering capabilities, it currently lacks globally recognized tech product companies which are distinguished by their AI expertise. By enabling this shift, it would not only enhance India's reputation in the global tech arena but also foster innovation, drive economic growth, and create high-value jobs. Focusing on developing market-leading and cutting-edge AI products will enable India to harness its vast pool of talent and resources and lead the way for a new wave of startups and tech companies.

To build and enable this pivot, targeted interventions and programmes would be needed from the key stakeholders discussed previously – in terms of incentivizing R&D, upskilling our talent and establishing innovation hubs for AI .

Using these, India can develop a skilled AI workforce capable of driving innovation and growth. Each model offers unique advantages and opportunities for collaboration between industry and academia, ensuring a holistic approach to talent development.

	Industry (Current tech talent employers, future employers)	Academia (Private and government universities, technical institutes and edtechs)	Government (Ministries and government bodies)
AI Informed	Nation-wide AI awareness initiatives driven by Industry AI concepts and awareness workshops Self-paced learning designed in collaboration with academia/edtechs	Integration of AI awareness modules into general education requirements Mandatory AI foundation coursework in technical diplomas and degrees (carrying specific credits) Practical AI Immersion events contextualised for the field or focus stream—AI competitions, AI awareness presentations and thought leadership events Train the Trainer programme for AI awareness training	National programmes on AI in collaboration with industry and academia AI literacy initiatives and democratisation of access to AI targeting different segments of the population
AI Users	Internships focused on the practical use of AI tools and applications Hands-on practical training on tools such as TensorFlow, PyTorch and Jupyter Run employee exchange programmes through learning platforms in collaboration with tech industry associations Peer learning circles for knowledge-sharing	Foundational and introductory AI courses Workshops and guest lectures with academic experts Impart practical problem-solving experience via internships and hackathons Promote AI MooCs for students and professionals Train the Trainer programme for non-tech professional courses (functional knowledge)	Training subsidies and tax breaks to industry and academia Public-private collaborations for practical training of government employees
AI Integrators	Specialised internships and training with a focus on AI-specific tools and technologies Mentorship programmes to guide new talent Specialised certifications for AI integration skills AI knowledge portal with resources, best practices and case studies AI training academy for upskilling of employees	Modifications in the existing curriculum Certification courses (for specified skillset) Joint industry-academia projects to provide practical and real-world experience Train the Trainer programme to train academic staff in technical AI courses	National AI research initiatives
AI Developers/ Creators/ Builders	Targeted AI training Specialised internships and training Collaborative AI development projects under the guidance of senior AI developers Mentorship programmes Sponsorship for strategic projects and research AI boot camps and hackathons	New and re-imagined curriculum design for graduate and postgraduate specialised courses Industry collaborations for research and development opportunities AI Centres of Excellence, AI competency centres, University data and AI labs Train the Trainer programme to train academic staff in specialised AI courses	Graduate/Postgraduate level interventions Tax breaks and tax holidays for the industry for recruiting and training AI talent across the board AI learning scholarships/stipends Research fellowships Innovation grants Mentorship support
AI Experts	Industry expert networks to share knowledge and collaborate on AI projects Specialist mentorships for junior developers Collaboration with AI experts to guide cutting-edge research in the next GenAI technologies	Advanced courses, certifications, degrees in AI specialisations (such as cloud AI security/Data science and deep learning or edge computing certifications, domain-specialised advanced AI courses, BS/ MS/ PhD in AI.) Rotation-based PhD programmes with top global universities Research grants in cutting-edge AI technologies Global partnerships for cutting-edge AI R&D of next-gen AI technologies Train the Trainer programme to train academic staff in advanced and super-specialised technical AI courses	AI-focused incubators and accelerators Public-Private Research Partnerships AI Skills Dossier for fresh talent coming out of universities Reimagined New Education Policy (NEP)

Interventions for reskilling/ upskilling of existing workforce

Interventions for nurturing new talent

Common Interventions

4. Global examples of AI skilling initiatives

Europe: Artificial Intelligence Skills Alliance (ARISA)[4]

The AI skills strategy for Europe aims to bridge the gap between the growing demand for AI skills and the current workforce capabilities. It recognises the transformative power of AI across industries and the need for ethical and responsible implementation. The strategy focuses on creating a skilled AI workforce by:

- Identifying potential mismatches in skills and recognising the necessity for ongoing evaluation of the AI talent pool
- Defining the most in-demand AI-related roles and skill requirements and adapting to the ever-changing market demands
- Developing educational profiles, certification frameworks and accreditation processes to align educational offerings with industry requirements
- Acknowledging the dynamic nature of the AI sector and prioritising the development of modular AI skills learning programmes for adaptable training
- Emphasizing the significance of an AI skills community to foster collaborative learning and knowledge exchange
- Advocating for AI awareness, promoting diversity in the AI workforce and engaging in discussions on ethical, inclusive, and human-centered AI with decision-makers and policymakers
- Accelerating AI upskilling and reskilling efforts, advocating for them within national governments and actively seeking and promoting funding opportunities

Google's AI opportunity initiative for Europe[27]

Google has announced the launch of a fund of US$26.9 million to help support skill training for Europeans in the field of AI, focusing on collaborations with EU governments, academics and businesses.

The initiative aims to equip people with the necessary skills to use AI opportunities, with around EUR 10 million dedicated to helping workers acquire skills to prevent them from being marginalised by AI advancements.

USA's AI Education Initiative[27, 23]

The US focuses on AI education through collaboration with educational institutions and private companies. The government has also established AI-focused research centres and institutes.

- The government established the National AI Research Resource Task Force to create a shared research infrastructure that provides AI researchers and students across the country with access to computational resources, high-quality data and educational tools.
- The AI Opportunity Agenda published by Google provides policy recommendations to help AI benefit as many people as possible, including initiatives to invest in AI infrastructure and build an AI-ready workforce.
- The AI Corps and AI Adjustment Assessment Programme give search results that mention the potential for creating a global "AI Corps" to build an AI-ready workforce by extending AI training programmes and helping workers impacted by AI transition to new jobs.
- AI Skilling Initiatives by the Department of Energy and National Science Foundation, a pilot programme to enhance existing successful training programmes for scientists, to train 500 new AI researchers by 2025.
- The DOE national laboratories also deliver hands-on research experiences, access to AI research expertise, and a science-driven approach to AI education and training.

Finland: Elements of AI programme under the National AI Programme AuroraAI[26]

To support its ambitious national AI strategy, the University of Helsinki collaborated with Reaktor Education to develop and launch “Elements of AI” under its National Artificial Intelligence Programme called AuroraAI, a free online course designed to introduce AI basics to non-specialists in the public.

The courses feature self-study resources, interactive content and task-based activities that cover AI technology concepts, usage methods and limitations. The Finnish government has

committed to educating at least 1 percent of its population. These courses are available in over 20 languages and have been completed by 1 million people worldwide.

South Korea's AI education initiative[24]

South Korea is investing heavily in preparing students for a future with AI. By 2025, the country aims to have AI coursework in its national curriculum across all grade levels, starting with high school. The Korean Ministry of Education's Keris unit is designing and piloting extensive teacher development around AI and other technologies.

Singapore—AI for everyone and skills future programme[24, 25, 27]

The programme's primary focus is to build skilled AI talent in Singapore. Such talent can be categorised into three groups—(i) creators who are top-tier talent engaged in novel and cutting-edge AI activities; (ii) practitioners that include data and machine learning scientists and engineers involved in the translation and development of AI solutions; and (iii) users of AI-powered products and services.

To cultivate a pool of top-tier AI experts, the government plans to introduce a new AI visiting professorship to attract world-class AI researchers to collaborate with Singapore. Additionally, the government is investing SGD 7 million into a new AI Accelerated Masters Programme in collaboration with local universities to develop a robust pipeline of Singaporean AI researchers. AI Singapore has also initiated a national AI programme, managed by the government, to teach individuals and organisations the skills needed to use AI and machine learning for social good. This initiative includes AI courses and workshops and funding and support for AI projects focused on social impact.

The aim is to triple the number of AI practitioners to 15,000 over the next five years to meet the growing demand for AI professionals. The government will invest over US$20 million to enhance AI practitioner training for students over the next three years. This includes increasing the AI-related SG Digital Scholarships for Singaporeans to pursue degree courses in AI and related fields at top universities and facilitating access to overseas internships in AI-related roles.

The SkillsFuture programme, a national re-education initiative, reimburses Singaporean citizens up to SGD 500 per year for taking approved retraining courses, including those in technology-related fields.

China's AI innovation action plan[32]

China is pursuing a multipronged approach to build a world-leading AI talent pipeline. One notable initiative is the establishment of the "AI Innovation Action Plan" by China's Ministry of Education, which aims to develop 100 interdisciplinary majors in AI, publish world-class AI textbooks, establish AI schools, research centres and launch national-level open online AI courses. The Ministry of Education also plans to train 5,000 students and 500 teachers in AI within the next five years.

This initiative underscores China's commitment to nurturing fresh AI talent and integrating AI education into academic institutions to meet the growing demand for skilled professionals.

Industry collaborations for AI skilling in the Middle East

Saudi Arabia signs MoUs with leading industry players like Microsoft and Huawei [33, 34]

This initiative focuses on training young Saudi engineers in AI skills and technologies, including Azure OpenAI, to drive innovation and economic growth in the region. The programme recruits top talent through collaboration with leading universities, emphasizing the importance of developing AI capabilities to support the community's development. The AI Centre of Excellence is a platform for knowledge exchange and collaborative learning.

Further, Saudi Arabia's National Center for Artificial Intelligence has signed an MoU with Huawei to support the National AI Capability Development Programme. This collaboration aims to train Saudi AI engineers and students, enhance Arabic language AI capabilities, and explore creating an AI capability platform to localise technology solutions.

UAE's Trusted Cloud Programme[35]

The "UAE Trusted Cloud" programme by Microsoft has empowered over a quarter million people in the UAE to acquire digital skills. Started during the pandemic, this initiative includes events such as

Microsoft Build: AI Day in Dubai, UAE, where developers and IT professionals can explore new opportunities with AI and enhance their knowledge and skills. Additionally, the programme highlights the high demand for individuals with deep technology skills in the UAE, particularly in AI.

5. Road ahead for India

Advancing India's AI exports presents a compelling narrative of growth and opportunity for India's digital economy. The nation's IT sector stands poised to spearhead this transformative journey, positioning India as a major player in the AI landscape.

As India sets its eyes on this ambitious goal, it is crucial to develop a skilled workforce and foster an enabling environment for innovation and growth. To advance India's AI exports, the following key steps need to be taken:

- **Invest in upskilling initiatives** to equip professionals with expertise in AI, including programming languages, AI frameworks and domain-specific technical skills
- **Foster collaborations between industry and academia** to bridge the skill gap and align educational offerings with industry requirements
- **Implement specialised training programmes, mentorship opportunities and on-the-job project experiences** to nurture fresh talent for the AI workforce
- **Establish data and AI labs** in collaboration with technical training institutes to provide vocational AI training
- **Explore models, such as online learning platforms and boot camps,** to cater to diverse learning needs and enhance accessibility to AI

By embracing these strategic measures, India can pave the way for exponential growth in AI exports, driving economic prosperity and solidifying its position as the digital global leader.

References

1. Business Standard
2. India to become third largest economy with GDP of $5 trillion in three years: Finance Ministry - The Hindu
3. https://www.indiastat.com/Socio-Economic-Voices/New-Foreign-Trade-Policy-2023-will-boost-India-exports-USD-trillion-by-2030
4. European Digital SME Alliance
5. Chart: Software & IT Services: The Backbone of India's Economy | Statista
6. https://www.investindia.gov.in/sector/it-bpm
7. Indian-Software-Product-Ecosystem-Accelerated-Growth.pdf (nasscom.in)
8. Yourstory – Nasscom's $100 Bn target
9. India's IT Industry: Growth, Trends, and Challenges in 2024 - Acara Solutions India
10. https://www.wto.org/english/res_e/booksp_e/trade_outlook24_e.pdf
11. ESC Statistical Yearbook 2023
12. Nasscom – Seizing the ER&D Advantage
13. Current trends in Indian IT Market | LinkedIn
14. What Governments Need Now — Data and AI Skills - Government Executive (govexec.com)
15. India's software ecosystem - Nasscom
16. India AI 2023
17. AI Powered Tech Services - Nasscom
18. Cabinet approves INR 10K Cr
19. NPAI skilling framework
20. https://nasscom.in/knowledge-center/publications/technology-sector-india-strategic-review-2024
21. India among top 5 countries with fastest-growing AI talent: LinkedIn report (indiaai.gov.in)
22. India Among Top Five Countries With Fastest Growing AI Talent: LinkedIn (inc42.com)
23. Supercharging America's AI Workforce | Department of Energy
24. AI initiatives launched to uplift Singapore's economic potential (Factsheet) (smartnation.gov.sg)
25. AuroraAI: Finland's National Artificial Intelligence Program (interestingengineering.com)
26. 4 ambitious government initiatives preparing the workforce for a future of AI - Ross Dawson
27. Shockwaves & Innovations: How Nations Worldwide Are Dealing with AI in Education – The 74 (the74million.org)
28. Google's 25M Euro AI skill boost for Europe unveiled (cointelegraph.com)
29. https://www.ugc.gov.in/pdfnews/5732498_Report-on-NPAI-Skilling-Framework.pdf
30. Microsoft launches new AI Skills Initiative and grant - Microsoft Stories India
31. NASSCOM Report on State of Data Science & AI Skills in India published in February 2023
32. DP 265 Amit Kumar.pdf (ssc-globalthinkers.org)
33. AI Skills: Microsoft launches AI Centre of Excellence dedicated to upskilling Saudi engineering talent, ETHRWorldME (indiatimes.com)
34. Saudi Arabia signs artificial intelligence agreements - Power Technology (power-technology.com)
35. Microsoft | UAE Trusted Cloud
36. Priming for a No normal Future – Nasscom
37. Gartner Market Definitions
38. IDC-IBM
39. Mphasis
40. IDC
41. IFC
42. IDC-Wipro
43. Nextplatform
44. LiveMint
45. Economic Times
46. Amazon and IIT Bombay announce AI-ML partnership: What it means for you - Times of India (indiatimes.com)
47. Discussion with Infosys
48. Nasscom Strategic Review 2024
49. A Roadmap for Future Ready Firms - Nasscom
50. Deloitte State of Gen AI Survey
51. MEITY IT BPM Exports

Contact us

nasscom

Sangeeta Gupta
nasscom
sangeeta@nasscom.in

Achyuta Ghosh
nasscom
achyuta@nasscom.in

Namita Jain
nasscom
namita@nasscom.in

Deloitte

Sathish Gopalaiah
President, Technology & Transformation
Deloitte India
satishtg@deloitte.com

Nitin Mittal
Global AI Leader
Deloitte
nmittal@deloitte.com

S Anjani Kumar
Partner, Technology & Transformation
Deloitte India
anjanikumar@deloitte.com

Contributors

Ayush Rungta
Pavan Kumar Reddy
Alisha Gupta
Manish Mehta

About Deloitte

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited ("DTTL"), its global network of member firms, and their related entities (collectively, the "Deloitte organization"). DTTL (also referred to as "Deloitte Global") and each of its member firms and related entities are legally separate and independent entities, which cannot obligate or bind each other in respect of third parties. DTTL and each DTTL member firm and related entity is liable only for its own acts and omissions, and not those of each other. DTTL does not provide services to clients. Please see www.deloitte.com/about to learn more.

Deloitte Asia Pacific Limited is a company limited by guarantee and a member firm of DTTL. Members of Deloitte Asia Pacific Limited and their related entities, each of which is a separate and independent legal entity, provide services from more than 100 cities across the region, including Auckland, Bangkok, Beijing, Bengaluru, Hanoi, Hong Kong, Jakarta, Kuala Lumpur, Manila, Melbourne, Mumbai, New Delhi, Osaka, Seoul, Shanghai, Singapore, Sydney, Taipei and Tokyo.

This communication contains general information only, and none of DTTL, its global network of member firms or their related entities is, by means of this communication, rendering professional advice or services. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser.

No representations, warranties or undertakings (express or implied) are given as to the accuracy or completeness of the information in this communication, and none of DTTL, its member firms, related entities, employees or agents shall be liable or responsible for any loss or damage whatsoever arising directly or indirectly in connection with any person relying on this communication.

About Nasscom

NASSCOM represents the voice of the $250 billion+ technology industry in India with the vision to establish the nation as the world's leading technology ecosystem. Boasting a diverse and influential community of over 3000 member companies our network spans the entire spectrum of the industry from DeepTech and AI start-ups to multinationals and from products to services, Global Capability Centres to Engineering firms. Guided by our vision, our strategic imperatives are to accelerate skilling at scale for future-ready talent, strengthen the innovation quotient across industry verticals, create new market opportunities - both international and domestic, drive policy advocacy to advance innovation and ease of doing business, and build the industry narrative with a focus on Trust, and Innovation. And, in everything we do, we will continue to champion the need for diversity and equal opportunity.

Nasscom Insights is the in-house research and analytics arm of Nasscom generating insights and driving thought leadership for today's business leaders and entrepreneurs to strengthen India's position as a hub for digital technologies and innovation.

Disclaimer

The information contained herein has been obtained from sources believed to be reliable. nasscom and its advisors & service providers disclaim all warranties as to the accuracy, completeness, or adequacy of such information. nasscom and its advisors & service providers shall have no liability for errors, omissions or inadequacies in the information contained herein, or for interpretations thereof. The material or information is not intended to be relied upon as the sole basis for any decision which may affect any business. Before making any decision or taking any action that might affect anybody's personal finances or business, they should consult a qualified professional adviser.

Use or reference of companies/third parties in the report is merely for the purpose of exemplifying the trends in the industry and that no bias is intended towards any company. This report does not purport to represent the views of the companies mentioned in the report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favouring by nasscom or any agency thereof or its contractors or subcontractors.

Usage of Information