

## **Impact of Artificial Intelligence on the Job Landscape in the Indian IT Sector**

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### **ABSTRACT**

*This research paper evaluates the impact of Artificial Intelligence (AI) on the job market within India's Information Technology (IT) sector using literature review, mathematical calculations, graphical representation, and qualitative assessment. Given the IT sector's significant contribution to India's GDP and AI's leading role in the global technology revolution, this study holds particular relevance.*

*Job roles are changing as automation follows a path from routine, data-intensive tasks to potentially displacing conventionally "smart" roles like software testing. On the other hand, roles that involve more complex cognitive tasks such as coding or data analysis, are being augmented by AI, which has positive effects on productivity and job satisfaction. In addition, new jobs roles like AI ethics officers and AI architects are also coming up, which calls for reskilling/upskilling.*

*Nevertheless, this paper suggests that AI has a dual-faceted impact on the IT job market in India — it threatens the obsolescence of some roles but also focuses on creating more skilled jobs. It also suggests that the workforce must be equipped with the required skills and knowledge to enable such initiatives and ensure viable future growth and innovation within the industry.*

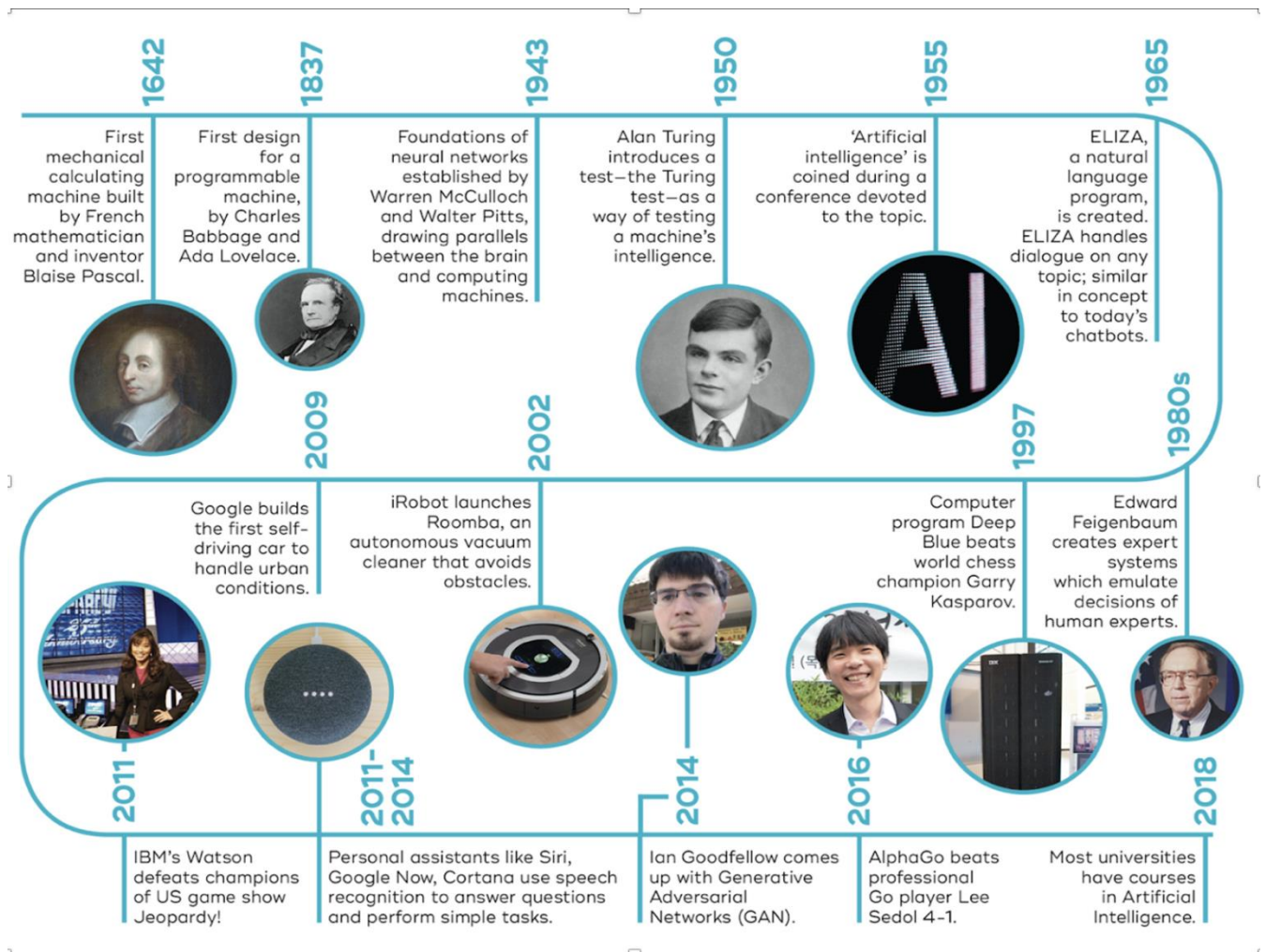
**Keywords:** Artificial Intelligence (AI), Indian IT Sector, Work Automation, Upskilling and Reskilling, Generative AI

### **1. INTRODUCTION**

#### **1.a. Artificial Intelligence and its history**

Artificial intelligence (AI) is the ability of machines to perform tasks that normally require human intelligence, such as reasoning, learning, decision-making, and perception. AI is not a single technology, but a collection of methods and tools that can be applied to various domains

and problems. Neither is AI a novel technology; the seeds for thinking machines were prevalent even in the late 1930s. Alan Turing was thinking about machine intelligence as early as 1941. In 1950, he published a landmark paper on “Computing Machinery and Intelligence”, introducing the concept which is now known as “Turing Test.” As per the Turing test, if a machine could carry on a conversation (over a teleprinter) that was indistinguishable from a conversation with a human being, then it was reasonable to say that the machine was "thinking". Since then there have been several advances in the field of AI. [1]



Source: History of Artificial Intelligence - Queensland Brain Institute - University of Queensland [2]

Generative AI (GenAI) is a subset of AI that can generate different types of content including text, video, image & audio. The release of ChatGPT in November 2022 prompted a massive uptake of GenAI across sectors including the IT sector. As per the 2023 report by the World Economic Forum, almost a quarter of jobs (23%) are expected to change in the next five years.

While GenAI is expected to affect bank tellers, clerks, secretaries, and accounting jobs, it is already transforming jobs, especially white-collar jobs in the IT sector. India, with a vast population employed in the IT sector, is unquestionably going to be impacted by this wave [3].

The IT sector in India comprises IT services, Business Process Automation(BPM), and engineering and R&D products. The share of the IT sector in the GDP of India has been around 7%. The IT sector in India contributes to ~50% of India exports and provides employment to 5.43 Mn. The Indian IT sector is a vital engine of economic growth of the nation, thus the impact of AI on the sector will have significant consequences on India's economy [4].

This research answers the question: how is Artificial Intelligence going to alter the job landscape of the Indian IT sector? To tackle this question I will explore the job landscape's shift within three categories- creation of new roles, transformation of existing roles, and obsolescence of some roles. The paper is divided into the following sections: 1) Methodology: This paper postulates that AI is expected to cause a significant labor market shift with overall net positive job creation in the Indian IT sector. This transformation catalyzes a movement of the workforce towards more efficient work, where the focus shifts to the development and management of advanced technological systems.

## **2. METHODS**

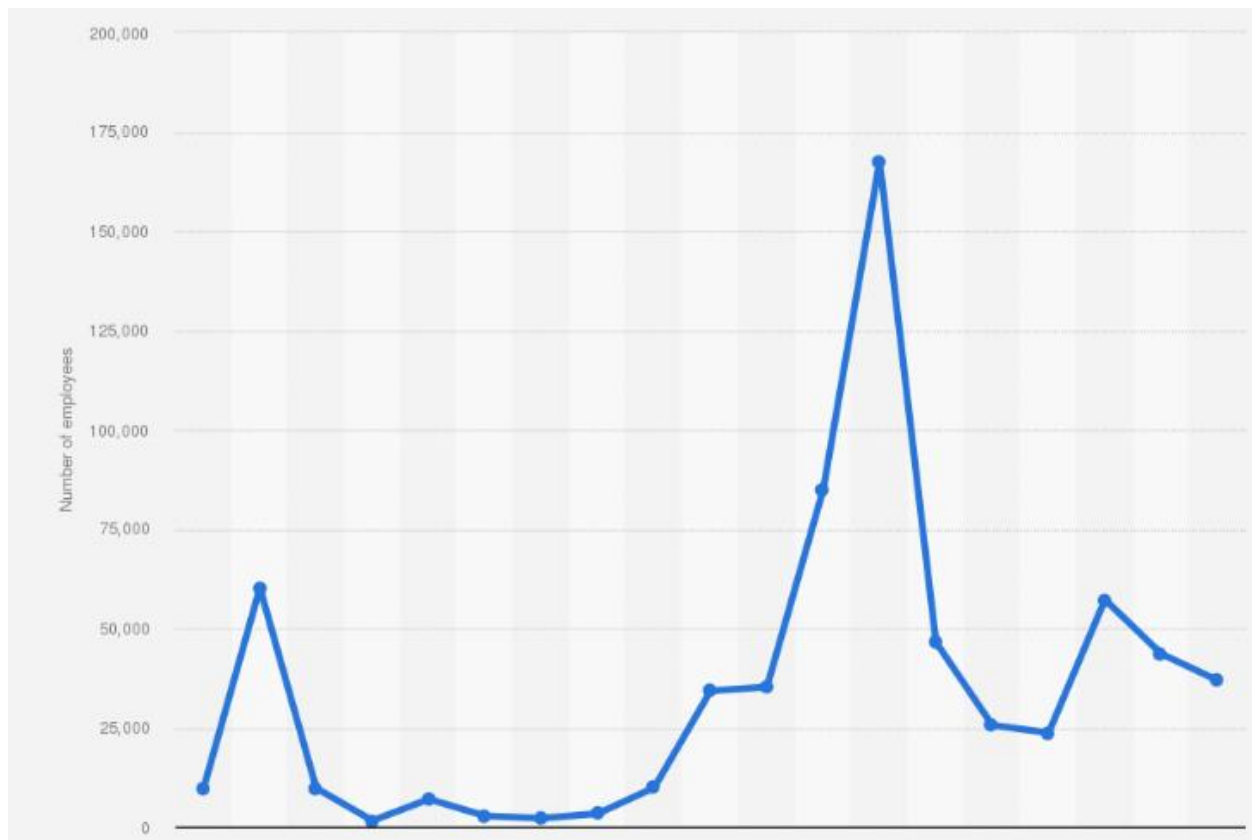
To establish the impact of AI on the Indian IT Job market, a mixed-method approach was employed, combining quantitative data analysis with qualitative insights. The quantitative aspect involved analyzing employment trends, skill requirements, and productivity metrics within the Indian IT sector, pre and post AI integration. For this purpose, secondary data sources were utilized. Specific companies or industry giants were analysed for a more detailed analysis. Companies like TCS were used as representatives of the sector, as I analysed the new job postings, and the skill requirements for the new jobs on its LinkedIn. Additionally, industry reports, company filings, and government databases were directly used as information for analysis, rather than sourced from various articles. The theoretical and predictive portion of the paper was backed with esteemed research papers and agency reports like Nasscom. The qualitative component involved understanding the opinions of the companies, and forming my own nuanced opinion.

## **3. DETAILS**

The IT sector is undergoing a shift in the workforce and there were layoffs that have been attributed to various factors. AI is one of the factors impacting the job landscape. This section covers the ongoing trend of layoffs globally and in the Indian IT sector, then it examines the impact of AI on different types of jobs, specifically in the Indian IT sector.

### 3.a. Layoffs in Technology Sector

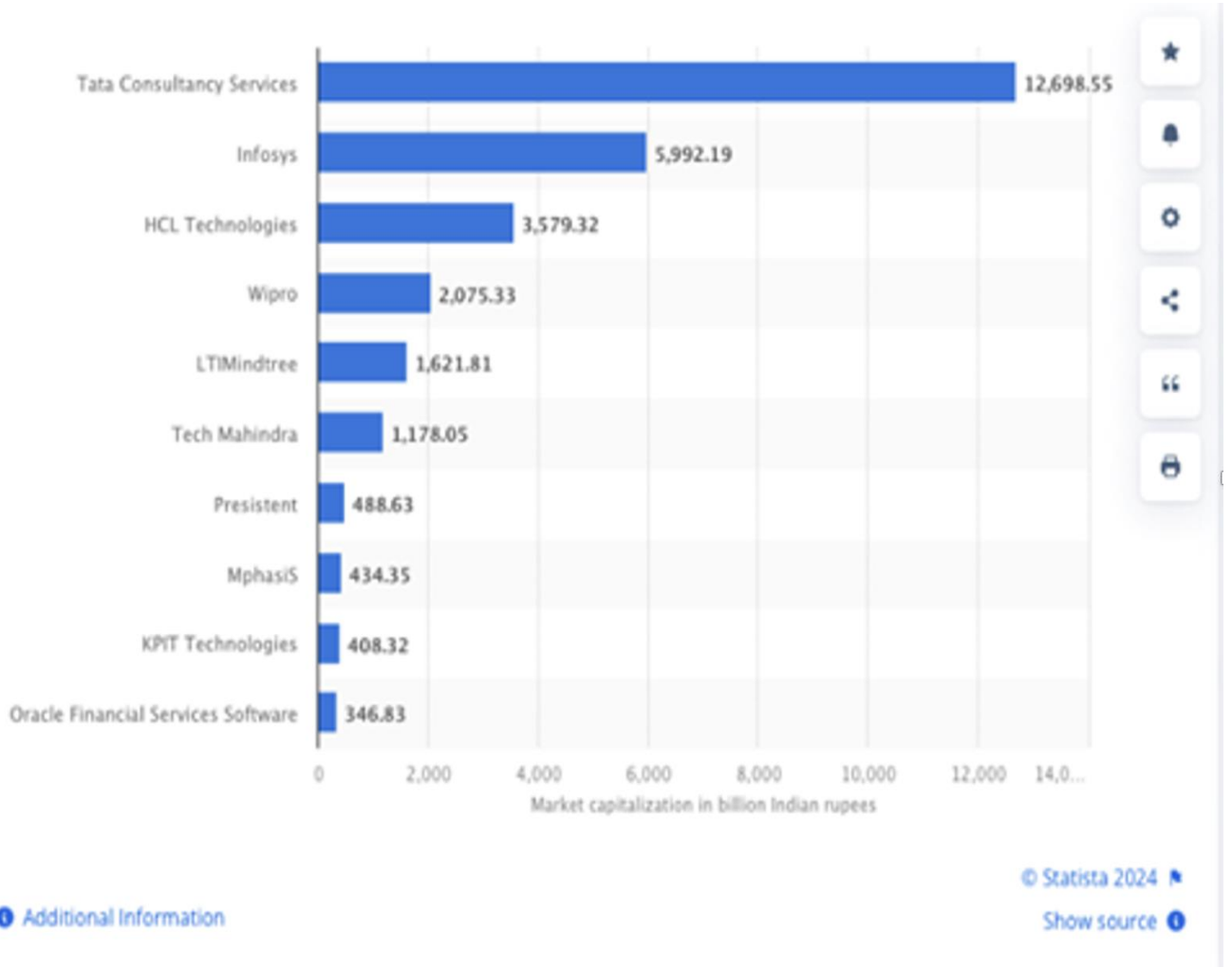
Since the 4th quarter of 2022, tech companies have seen a reduction in the workforce. During the first quarter of 2023, close to 167.4K employees were laid off. However, it may be misleading to assume that AI was the sole contributor behind these layoffs, as the spike in layoffs in 2023 was also because of over-hiring during the pandemic, high inflation, and weaker consumer demands [5].



Source: [Tech layoffs by quarter worldwide 2020-2024 | Statista](#)

### 3.b. Layoffs in the Indian IT sector

The impact of AI on the Indian IT sector is certainly profound, as it has led to a 136% surge in IT sector layoffs in 2024 in India. [6] For our analysis of the Indian IT sector, we will be using TCS (Tata Consultancy Services) as a representative of the Indian IT sector, as it has a market share of around 44% (calculation shown in appendix). An impact on TCS will greatly impact the Indian IT sector, and its workforce.



Source:-<https://www.statista.com/statistics/944948/india-leading-software-companies-based-on-market-capitalization>

#### 4. BODY

At the onset of the Covid-19 pandemic, the Indian IT sector faced significant disruptions. Reports indicate that Indian start-ups laid off over 15,700 employees in 2022 reflecting the global trend of job cuts in the tech sector, but then due to the remote components of the job, there was a swift recovery and ultimately robust hiring to satisfy pandemic demand. For instance, TCS and Infosys reported increases in their workforce. Infosys alone hired over 50,000 employees in the first quarter of the financial year 2022-23 to counter high attrition rates and meet the growing demand for IT services.

Now that the effects of the pandemic have stabilized, the IT service sector has been left with too many benched employees. The employment bubble that had nearly doubled workforce sizes during the peak of the pandemic has since burst. Firms are now focused on reducing operational costs and identifying redundant roles. AI has emerged as an opportunity for these companies, enabling firms to maintain efficiency while cutting down on labour costs.

In the first half of fiscal 2023, top Indian IT firms—Tata Consultancy Services, Infosys, HCLTech, and Wipro—cut their workforce by 37,299 despite prior job additions. These IT giants have recognized the importance of adapting to novel technology and optimizing costs, while newly offering jobs that aid in the integration of AI.

Three months into 2024, thousands have already lost their jobs. Layoffs have been especially bad in the global tech sector. As of February 2024, approximately 32,000 tech employees were laid off this year, according to Layoffs.fyi, a website monitoring tech industry job cuts. [7]

In a recent interview, Vikram Ahuja, CEO of Talent500, noted a significant transformation in IT services towards incorporating AI technologies. This includes the use of chatbots and other AI-driven tools that enhance productivity and improve customer conversation [7]. Additionally, the head of Indian IT company Tata Consultancy Services, K Krithivasan, said “artificial intelligence will result in minimal need for call centres in as soon as a year” [9].

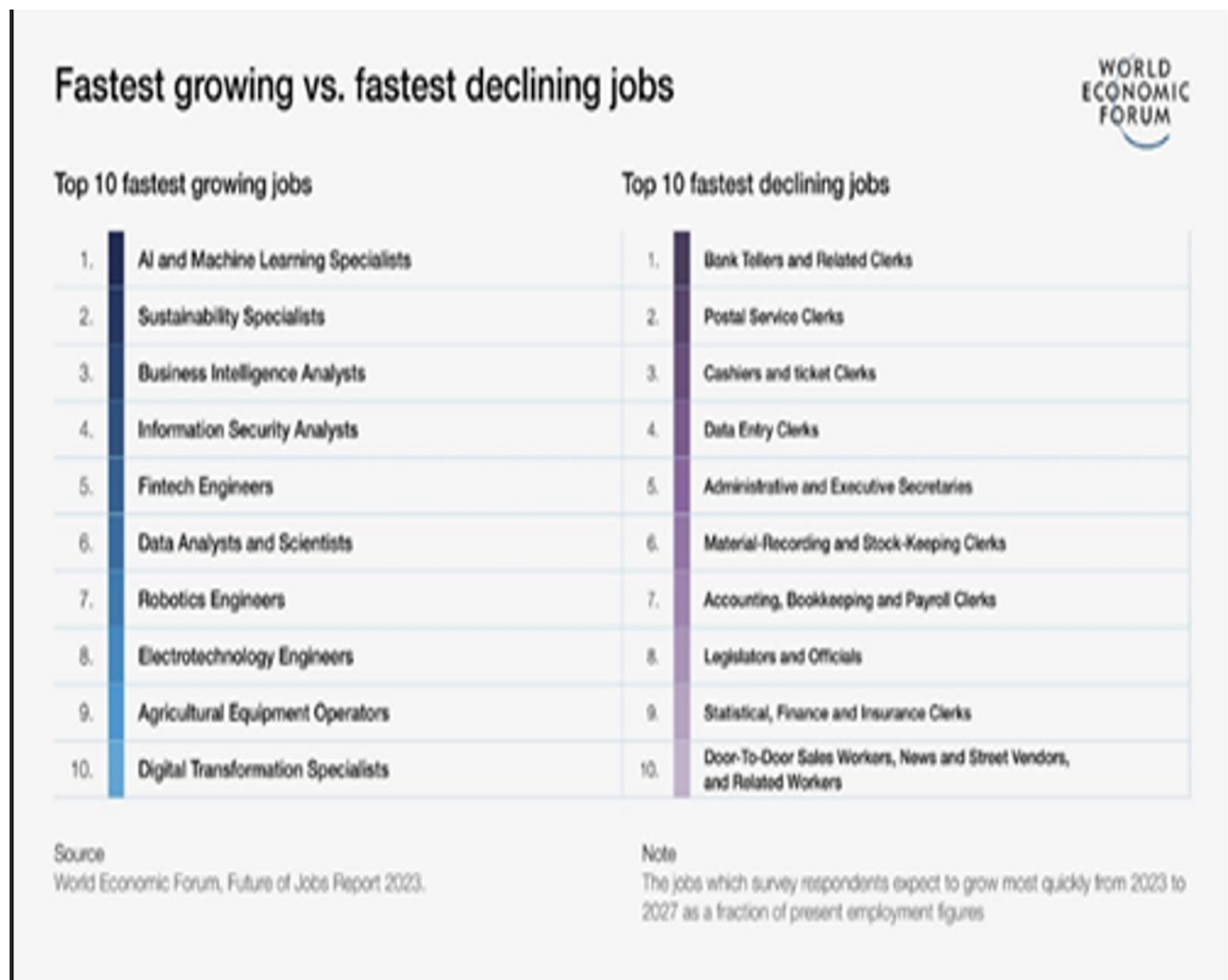
#### **4.a. Impact of AI in the Indian IT sector**

Artificial intelligence will undoubtedly reshape the job landscape in the Indian IT sector. I will explore the shift in the job landscape by classifying the jobs into these 3 categories:

1. The ones that can be fully automated and will therefore be rendered redundant;
2. The ones that will be fundamentally transformed;
3. The ones that firms will create to successfully integrate AI into the company.

#### **4.b. Jobs on the verge of extinction**

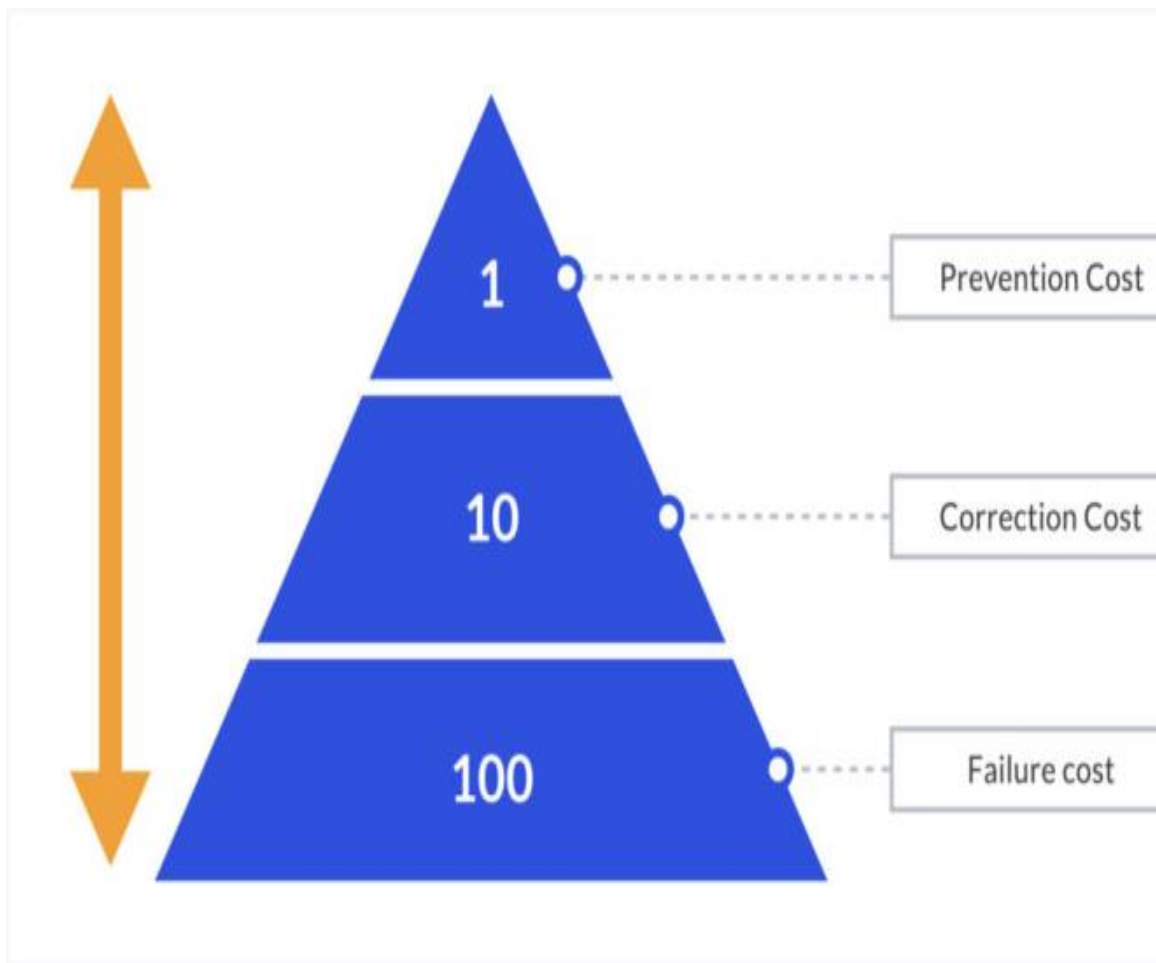
Jobs that involve routine, repetitive, and low-skill tasks can be easily performed by AI systems, without requiring human intervention or supervision. These jobs are typically found in the lower levels of the IT hierarchy, such as data entry, network management, and level one IT support. Such jobs can be replaced by AI tools that are faster, cheaper, and more accurate than humans. As per World Economic Forum report, jobs that are likely to decline quickly because of AI are mostly clerical or secretarial roles and include bank tellers and data entry clerks. While[3]



According to a report by an international labour organization, 640,000 low-skilled service jobs in the IT sector are at risk of automation. [10]. We will be analyzing Data Entry and Level one Tech support jobs.

Data entry involves entering any data that needs to be handled or analyzed into a spreadsheet or a database. This is one of the most routine and mundane tasks in the IT sector, requiring only basic skills such as Microsoft Excel. Moreover, this task is prone to human errors, which can compromise the quality and reliability of the data. Manual data entry error ranges from 1-5 %, and that might seem like a small number at first, but when we put it into context with around 20,000 data entries, the errors would amount to more than 200 .

According to the 1-10-100 rule, the cost of an error to a firm compounds in each step of the data entry process.



Source: [The 1-10-100 rule for early defect detection to enhance product's quality \(maximl.com\)](https://maximl.com) [11]

This rule illustrates that 1 is the prevention cost, 10 is the correction cost, and 100 is the failure cost. On the other hand, AI tools such as optical character recognition (OCR) and natural language processing (NLP) can automate data entry tasks by extracting data from various sources, such as images, documents, or voice, and converting them into structured formats. AI tools can also validate and verify the data, ensuring its accuracy and consistency. For instance, DocuClipper, a cloud-based AI tool, can automate data entry from bank statements, invoices, receipts, and other documents, with 99.6% accuracy.[12] AI is significantly more adept at preventing errors and less likely to encounter correction and failure phases compared to humans. In addition, using AI for massive data entry tasks can result in substantial cost savings (*refer to mathematical calculations in the [Appendix-Mathematical Representation of cost efficiency with AI](#)*).



Using the equation, we can quantify how substantial the cost savings will be. To show how big this value is, let us take the lower bound of human error(1%) and the error 0.04% for DocuClipper's AI model , we substitute these values into the equation derived. I have not used the three cost stages(prevention,correction,failure), although that would show an exponential difference.

Using the simplified equation for n=1,000,000 entries and assuming a unit cost per entry:

$$C\_AI\_total = n * PAI1 * C\_total$$

$$C\_H\_total = n * PHI * C\_total$$

- The total cost for AI is 400 units.
- The total cost for humans is 10,000 units.

As AI continues to improve, such tools will significantly reduce the time and cost of data entry. Thus, there is a high probability of the majority of such roles being eliminated soon.

Level one IT support In most companies that provide Business Process Operation (BPO) services, the support staff is divided into tiers or levels based on the hierarchy of skill sets. According to the BMC company, the hierarchy goes as follows: Level 1 (L1) support handles basic help desk functions, such as password resets and general troubleshooting. [13] Their task is usually routine, as they follow a script. Level 2 (L2) support deals with more complex issues that L1 cannot resolve. This generally requires a deeper technical knowledge and more thorough problem-solving. An example would be resolving software bugs. Level 3 (L3) support involves the highest level of expertise, addressing the most complex issues, often requiring collaboration with the developers or engineers of the product.

Level one support tasks are often repetitive and tedious, resulting in fatigue and lower job satisfaction. AI tools such as chatbots and automated call distribution systems can automate level one IT support tasks by providing instant and personalized responses to common queries and issues, using natural language understanding and machine learning. AI tools can also escalate complex issues to human agents, ensuring customer satisfaction and providing recommendations for improvement. These AI tools can enhance the efficiency and effectiveness of the IT support system, as well as reduce the workload and turnover of human agents.

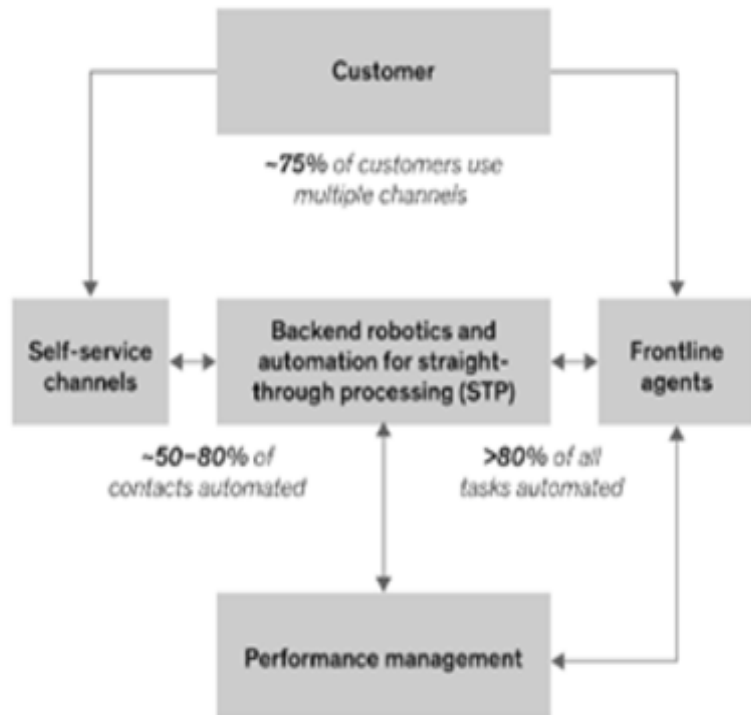
According to a model by McKinsey & Company, human interaction in customer-service will be minimized to primarily frontline agents, who will only be essential for managing complex issues.

[14]

**The future of customer service builds on AI to deliver engaging experiences and generate lasting value.**

**The stages of an AI-supported customer-service process**

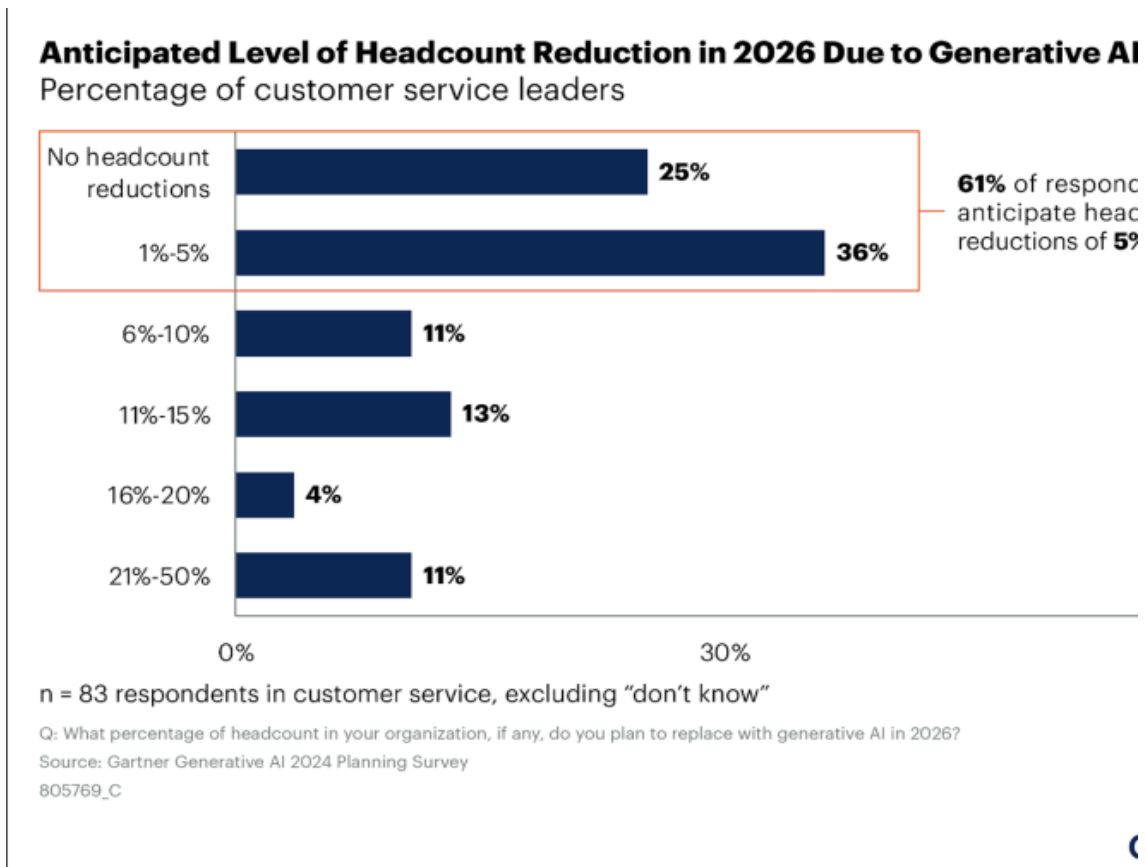
- A** Proactive communication linked to key demand drivers
- B** Intent recognition and nudges before customer reaches out
- C** Omnichannel enablement with self-service for service journeys
- D** Conversational AI at each entry point
- E** Frontline enablement with coaching for agents supported by a knowledge repository and AI
- F** Highly personalized, advisory interactions drive relationship and value, with STP or quick resolution of issues
- G** Performance measurement via a centrally managed nerve center that tracks resolution accuracy and efficiency



McKinsey & Company

Such a system allows for seamless self-service options where about 50-80% of contacts can be automated. Backend robotics further streamline straight-through processing (STP), automating more than 80% of tasks, thereby significantly reducing manual intervention. The impact of AI on job redundancy in the customer service sector is substantial, especially for Level 1 support roles. As AI and automation handle routine inquiries and basic troubleshooting, the demand for human agents in these positions diminishes.

There are around 1.2 million call centre support workers, and the Level 1 or junior level support will be impacted; however, the anticipated impact on the overall headcount will not be significant. In fact, Gartner data shows 61% of surveyed customer service and support leaders expect headcount reductions of 5% or less due to generative AI, in 2026 (see Figure below)



While the current state of self-service at most organisations is dismal — only 14% of customers experience total self-service success (starting, staying and resolving in self-service) — containment rates should continue to improve. However, even in a world where customers are willing and able to fully resolve issues in self-service, some level of assisted service will always be essential. [11]

#### 4.c. Jobs set for radical transformation

These are the jobs that involve complex and high-skill tasks that cannot be fully performed by AI systems, but can be augmented and enhanced by AI tools. These jobs are typically found in the higher levels of the IT hierarchy, such as software development, testing, and data analysis. However, these jobs are also the most likely to be transformed by AI, as they can benefit from the capabilities and advantages of AI tools, such as speed, accuracy, and scalability. Looking at the catalogue of jobs in the LinkedIn for TCS, we discover that there are a number of roles in TCS that have the potential to be augmented by AI, like software developers, data analysts, project managers, customer service representatives, quality assurance engineers, etc. [16]. We

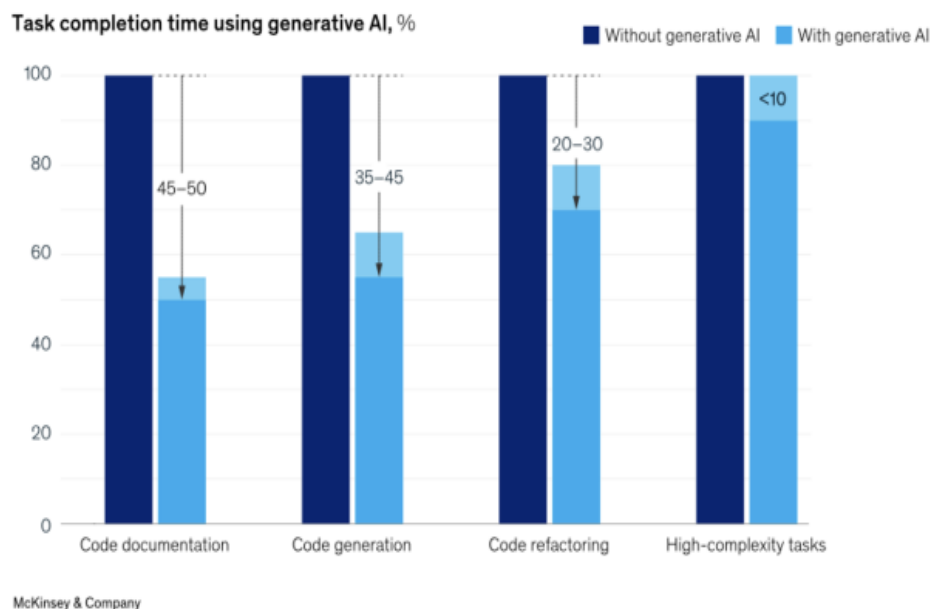
will be analysing software development and testing, which are the core jobs of the IT sectors, and are up for radical transformation.

**Software development:** The impact of AI on developers in the IT services industry will be dual-faceted, involving both potential job displacement and augmentation of jobs. We are observing the following trends:-

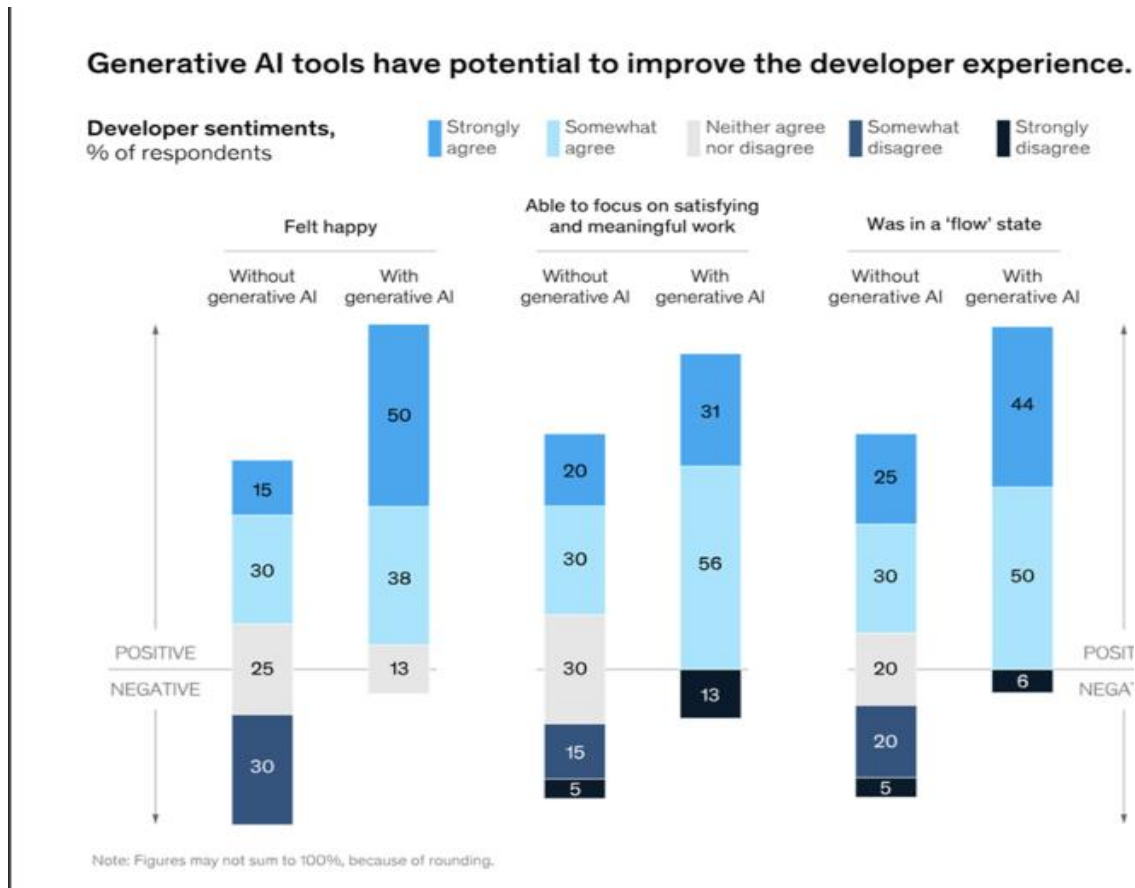
1. The way in which the developers code is going through evolution
2. There is a robust demand for software developers with AI skills
3. The way in which developer code is going through transformation

AI tools like GitHub Copilot significantly boost developer efficiency, allowing developers to complete tasks up to 55% faster compared to traditional methods. Developers found the tool particularly beneficial in reducing cognitive load by automating mundane tasks. It also has the additional benefit of making coding more enjoyable. [17], Copilot uses advanced machine learning algorithms to provide real-time code suggestions. Such tools aim at complementing human coders, rather than replacing them. Microsoft is not alone in implementing its own technology, as 342 other companies have successfully integrated GitHub copilot to streamline their coding operations. [18]. There are numerous such Generative AI coding tools [19].

**Generative AI can increase developer speed, but less so for complex tasks.**



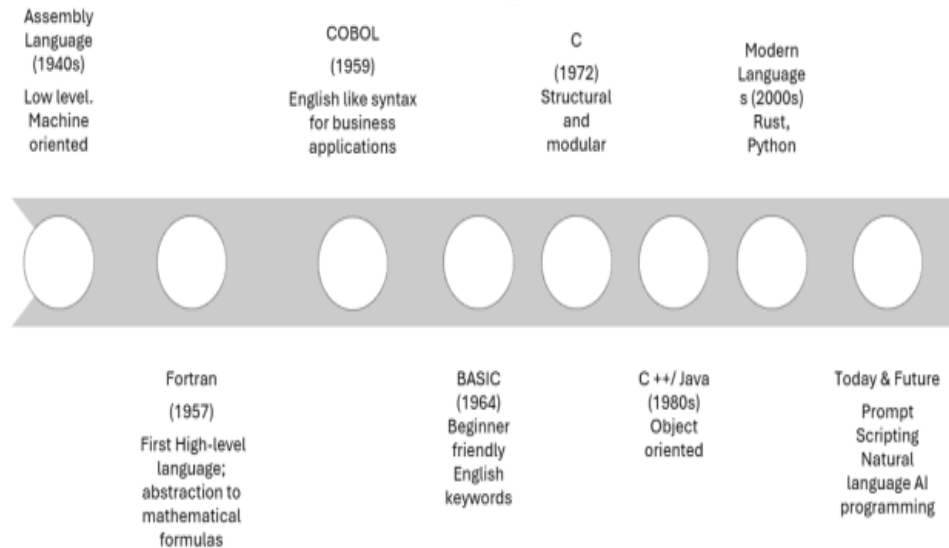
McKinsey’s developers tested generative AI–based tools, and found impressive speed gains for many common developer tasks. Completing documentation for code maintainability, which assesses how easily code can be improved, can be done in half the usual time. Writing new code takes nearly half the time, and bettering existing code (known as code refactoring) can be performed in about two-thirds of the original time. [20]



Not only did these tools improve productivity but they also significantly improved their development experience, which in turn could help companies retain their best talent. Developers using generative AI–based tools were more than twice as likely to report overall happiness and fulfillment. They attributed this to the tools’ ability to automate “grunt work” that kept them from more satisfying tasks and to put information at their fingertips faster than a search for solutions across different online platforms.[20]

AI tools like Copilot should become ubiquitous in the short to mid-term and the role of prompt engineers (discussed in the next section) would become paramount. Moreover, programming

languages would increasingly resemble natural English. Historically, each new programming language has moved closer to the human language. This trend is reflected in this timeline view.



If we consider the long term, the skills required to be a software developer will also have drastic changes. Firms will look to employ people who can provide high critical thinking skills, and valuable insights to the AI, without emphasising the need for specific programming language knowledge.

The second aspect of software development is the testing stage. Manual testing techniques, which require quality assessment(QA) teams to execute and verify test cases individually, are costly, time-consuming, and error-prone. They are also inadequate for meeting the demands of fast development and continuous delivery. Manual test methods pose a significant hindrance on the delivery of modern software applications, which are highly complex and require frequent testing cycles. Indian IT services are extensively leveraged for manual application testing due to their cost-effectiveness, and availability of labour. Key areas include functional testing, where the software is tested for its intended functionality; non-functional testing, which involves performance, load, and stress testing; and regression testing, ensuring that new code changes do not adversely affect existing functionalities.

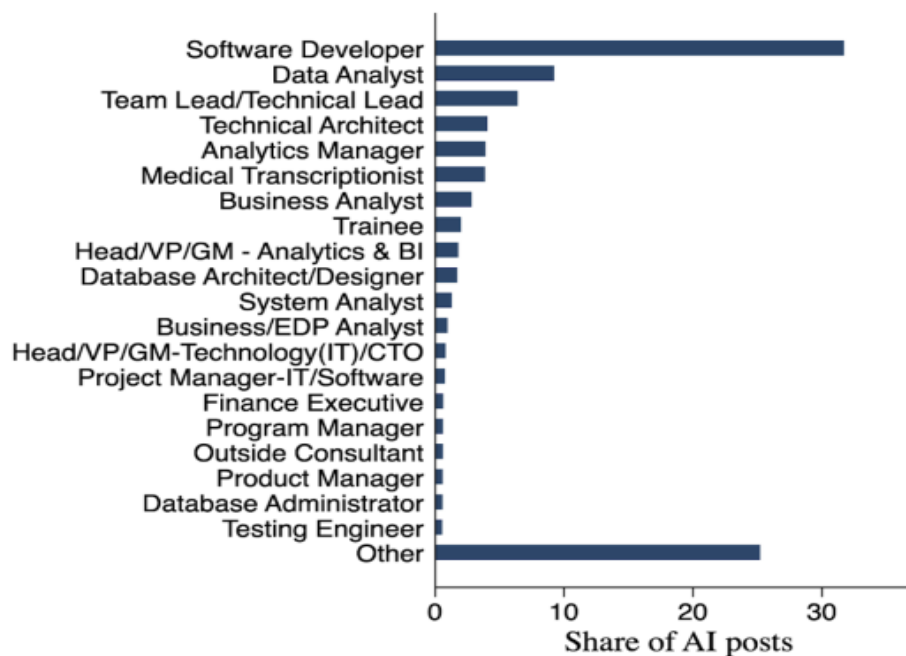
Artificial Intelligence is already transforming jobs of software testing, primarily by reducing time-to-market. AI is poised to be outstanding in certain types of these testings. In functional testing, AI performs well as it is able to automate test cases due to a programmed set of permutations that need to be tested. Microsoft's copilot implements this feature, as it allows users to generate test cases by automatically assessing the functionality and logic behind code[13]. On the other hand, in non-functional testing, such as performance testing, AI is

showing great potential with its ability to simulate data sets. With generative AI, it is possible to generate synthetic data based on historical trends that try to emulate any data the machine learning model could come across when launched as a product. MIT’s DataCebo is using this technology to provide enterprises a way to launch well-suited products. The SDV(Synthetic Data vault) is a software system within DataCebo that has been downloaded over a million times.[22]. In an announcement article by Meta in May, 2023, they heralded AI sandbox as a tool that acts as a testing playground for any new features they plan on releasing. The primary goal behind the launch was to find out what works for advertisers, and test multiple approaches with enhanced efficiency due to sandbox. The use of Artificial Intelligence also allows for quick incorporation of feedback from the advertising companies, helping Meta constantly improve their features and products[21]

**4.d. Robust demand for software developers with AI skills**

The image below highlights the robust demand for software developers with AI skills. [23]

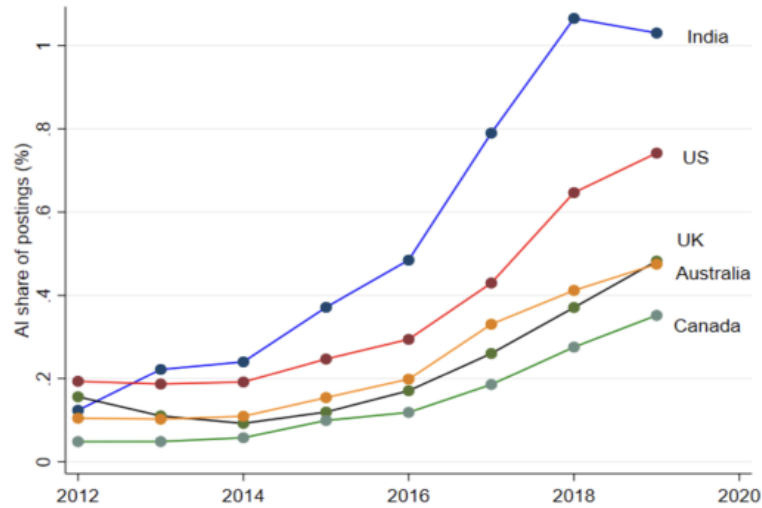
Figure B.6: Top 20 roles demanding AI skills, 2010-2019



*Notes:* We rank the top roles demanding AI skills by their share of AI posts. All other roles hiring AI skills are grouped in the ‘Other’ category.

While the demand trend is globally applicable it is more visible in the Indian IT sector.

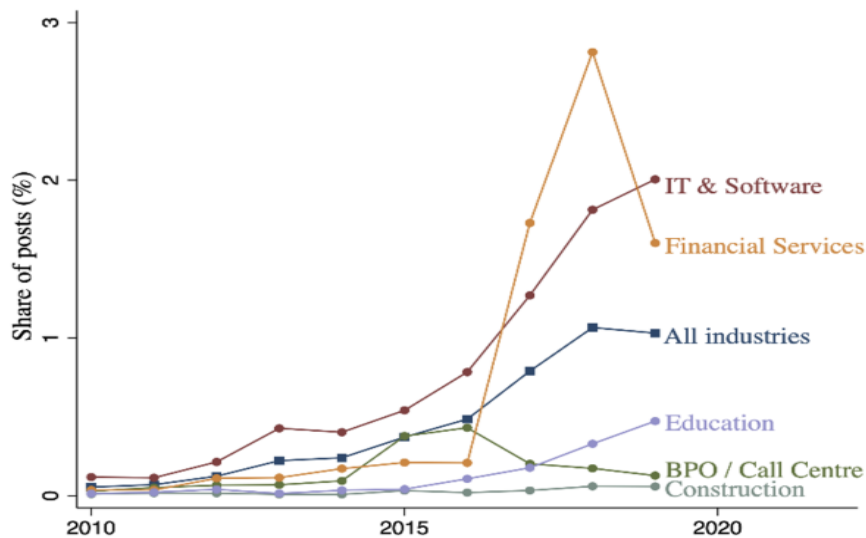
Figure 1.1: AI share of online job postings, by country



Notes: This graph shows the share of all online vacancies that specify particular AI skills, with these skills defined as described in Section 2.2. Data for India is that used in this paper; data for all other countries is from Lightcast, which does not cover 2020.

From the above graph, It is evident that India has excelled in creating jobs that involve AI technologies. More importantly, within India, the IT sector stands out as the leader in integrating AI into its job market. The graph below illustrates this. [23]

(b) AI share of posts, by industry





Although the all-time high in AI job postings was recorded in the financial services sector, the IT sector has consistently surpassed other industries and continues to grow. This trend underscores the critical role of the IT sector in the AI job market.[23]

As per a Boston Consulting Group report based on LinkedIn data collected over a year,

- Large tech companies are hiring heavily off-shore, and their focus seems to be India.
- There has been 15%+ growth in AI/ML jobs in India in the last 12 months with positions like AI Engineers growing at 67% YoY.
- Senior roles like AI Manager, AI Researcher, AI Specialist show a similar upward trend
- Leadership roles with titles of AI Vice President, AI Director, Head of AI shows a 11% increase for large tech, 8% increase in mid tech and 12% increase in BPO, in the last 12 months. [24]

In an interview on CNBC-TV18, Chief Executive Officer of Infosys, Salil Parekh, said the company was working on 200+ GenAI projects. He said the company was not looking at any job cuts due to AI implementation and that all technologies will co-exist in large organisations. The company is training six out of eight of its employees in artificial intelligence (AI) and Generative AI at different levels to capture the mega-tech opportunity.[25] Similarly Wipro is projecting growth in FY25 driven by AI and GenAI [26]. Additionally, the 1-10-100 rule applies to software development and testing as well (refer to the section on “Jobs on the verge of extinction”). 1 is the cost for catching the error while it is being developed, 10 for catching it in the testing or quality assurance stage, and 100 is the cost of correcting it once it has been released. As discussed earlier, AI will reduce the probability of reaching the latter stages, and thus result in huge cost benefits in Software development and testing as well.

#### **4.e. New Jobs to be AI ready**

These are the jobs that will emerge as a result of the adoption and integration of AI technologies into the IT sector. These jobs will involve new roles and skills that are necessary to leverage the potential of AI, as well as to address the challenges and risks of AI. According to the report by the World Economic Forum, by 2025, AI and related technologies will create 97 million new jobs, across 26 countries and 15 industries. The report also identifies the top 10 emerging jobs that will be in demand by 2025, such as AI and machine learning specialists, data analysts and scientists, and big data specialists. The report also suggests that by 2025, the IT sector will need to invest in reskilling and upskilling its workforce to bridge the skill gaps and prepare for the

future of work. [3] We will be analyzing Chief AI officer, AI Architects & AI Ethics and Compliance as two representative jobs.

AI Chief officer: This role is crucial in ensuring that the AI initiatives align with organisational goals, comply with ethical standards, and are integrated effectively in the business. Some of the responsibilities might include defining the strategic vision to integrate AI effectively, identifying, assessing, and mitigating privacy and security risks, ensuring robust data governance and driving innovation.[27]

As an example, Mustafa Suleyman, who was appointed as the CEO of AI at Microsoft, carries significant responsibility for the firm. In the official Microsoft Blog (March,2024), Satya Nadela said“we must ensure we have the capability and capacity to boldly innovate.”Suleyman and his team from Inflection, comprised of expert AI engineers, researchers, and architects, drive the launch and advancement of Microsoft’s consumer-side products. Their work involves developing cutting-edge AI technologies, ensuring ethical AI practices, and integrating these innovations seamlessly into Microsoft's ecosystem.[28]

AI Architects/Specialists: With the rising use of AI, AI specialists are in high demand. These professionals are responsible for ensuring the selection of AI models, platform requirements, and data management.[30] Here’s how they will contribute to the workplace:

**Model Selection and Optimization :** Choosing the right AI model for specific tasks is crucial for attaining optimal performance. AI specialists evaluate and benchmark different models, such as GPT-4, BERT, or specialised neural networks, to identify the ideal one for the job. They also perform hyperparameter tuning and model optimization to ensure the selected model operates efficiently.

**Data Management and Preparation:** High-quality data is essential for training accurate AI models. This involves data collection, cleaning, labelling, and preprocessing to create datasets that models can learn from effectively. This could possibly include utilising AI models such as DataCebo to generate synthetic data.[22]. Tools like Apache Kafka, Hadoop, and Spark are often used to manage large datasets efficiently.[31]

**Prompt Engineering:** In generative AI, prompt engineering involves crafting inputs such that it is interpretable by LLMs and so that they generate the desired output.[29] . This is particularly important for models like chatGPT, where the quality of the prompt directly influences the output. AI specialists fine-tune models by experimenting with different prompts and adjusting them based on the output quality. This evolves from basic concepts to advanced techniques like zero-shot, few-shot, and chain-of-thought prompting, which will not be discussed in depth.

For example, let's consider the following ChatGPT prompts and their responses:

Tell me about AI



Artificial Intelligence (AI) is a branch of computer science that focuses on creating systems capable of performing tasks that typically require human intelligence. These tasks include learning, reasoning, problem-solving, perception, language understanding, and interaction. AI is used in various applications such as natural language processing, computer vision, robotics, and autonomous systems. There are different types of AI, including narrow AI, which is designed for specific tasks, and general AI, which aims to perform any intellectual task that a human can do. The development of AI involves machine learning, where systems improve their performance by learning from data, and deep learning, which uses neural networks with many layers.

Provide a concise summary of artificial intelligence, its subfields, and current applications



Artificial Intelligence (AI) is the field of computer science dedicated to creating systems that can perform tasks typically requiring human intelligence. Subfields of AI include:

1. **Machine Learning:** Algorithms that allow computers to learn from and make decisions based on data.
2. **Deep Learning:** A subset of machine learning using neural networks with many layers to analyze complex patterns.
3. **Natural Language Processing (NLP):** Enabling machines to understand and respond to human language.
4. **Computer Vision:** Allowing machines to interpret and make decisions based on visual data.
5. **Robotics:** The design and operation of robots capable of performing tasks autonomously.

Current applications of AI span across various industries, such as:

- **Healthcare:** Diagnostic systems, personalized treatment plans, and drug discovery.
- **Finance:** Fraud detection, algorithmic trading, and customer service chatbots.
- **Transportation:** Autonomous vehicles and traffic management systems.
- **Retail:** Personalized recommendations, inventory management, and customer service.
- **Manufacturing:** Predictive maintenance, quality control, and supply chain optimization.

It is evident that the second response is more desirable, as it hands the user the information exactly how the user wants it. Similarly, a better prompt engineer would be able to create more effective output from the same Artificially intelligent machine, when compared to someone who lacks prompt engineering knowledge.

As of May 2024, there are over 400 job postings for Generative AI specialists in Indian IT companies. These roles are available across various leading firms such as Tata Consultancy Services (TCS), Infosys, Wipro, and HCL Technologies, reflecting the high demand for expertise in this emerging field.

AI Governance, Ethics and Compliance officer - The AI systems have several issues including bias, lack of transparency, and data privacy concerns which can lead to security vulnerabilities. To cite a few examples:

1. Biased tools - Amazon's AI recruitment tool, which was found to favour male candidates over female candidates. [32]
2. Lack of transparency -A Black-box AI system in finance can make decisions without clear reasoning, causing mistrust and regulatory issues. For example, machine learning models used in credit scoring and loan approvals can make decisions that are difficult to explain, which poses a risk for both consumers and financial institutions. [33]
3. Violation of privacy - . Ring, a home security company owned by Amazon, shared video footage from its doorbell cameras with police departments without user consent; [34] Google's Street View cars collected data from unsecured Wi-Fi networks, including emails, passwords, and other sensitive information, without users' knowledge or consent;[35] Cambridge Analytica harvested personal data from millions of Facebook profiles without user consent and used it for political advertising purposes.[36]
4. Adversarial attacks on AI systems: These can lead to incorrect outputs and potential harm. Adversarial attacks on self-driving car systems can involve placing small stickers on stop signs, causing the AI to misinterpret the sign as a yield sign or ignore it altogether.

There are numerous government bodies and organizations that provide guidance and establish standards to address such issues. [38][39][40][41][42][43][44]. Alongside these organizations, businesses need specialists who ensure that AI systems are ethical and comply with legal standards. These roles involve setting protocols, ensuring that the systems are not biased, and setting standards to support the responsible scaling of AI capabilities across businesses. Some of the potential responsibilities might include

- Implement bias detection algorithms and ensure diverse training datasets.
- Work on explainable AI (XAI) or transparent AI to make AI decision-making processes more transparent and understandable.
- Enforce stringent data protection measures and compliance with regulations like General Data Protection Regulation (GDPR).[37]
- Developing robust security frameworks and conducting regular security audits.

Currently, there are various job postings for roles like Data Ethicists and AI Compliance Specialists within Indian IT companies:

TCS has not explicitly listed positions titled "Data Ethicists" or "AI Compliance Specialists" in their public job postings, but they are developing a responsible AI framework, which includes positions that focus on AI ethics and compliance as part of their broader AI initiatives.

Virtusa, another IT services firm in Pune India, is hiring AI/ML developers with a focus on implementing best practices in AI ethics, data privacy, and security.

As of May 2024, there are 534 job postings related to AI ethics and compliance on platforms like Indeed. This number reflects the growing importance of ethical AI practices and compliance in the industry 500+ Ai Ethic Jobs, Employment 18 May 2024| Indeed.com

#### **4.f. AI will create, not diminish, workforce opportunity.**

A 2023 Gartner survey found that 22% of employees expected AI to replace their job in the next five years.[45] Despite this anxiety, in the short- to medium-term, GenAI isn't replacing many jobs in the IT sector, but the early indicators show that most jobs will be redesigned to include new responsibilities, such as interacting with GenAI tools. Gartner also predicts that 80% of enterprises will have used Generative AI API or deployed Generative AI enabled applications by 2025. GenAI will play a role in 70% of text- and data-heavy tasks by 2025, up from less than 10% in 2023. [45]. Thus there will be more and more demand for software developers with AI skills. Considering the topic from a broader perspective, Pal(2023) discusses that "India's experience presents a unique narrative". He suggests that while the rest of the world may face problems like job polarisation, and widening wage gaps, India will find it difficult to upskill when these new opportunities present themselves. [46] However, Indian IT companies are heavily invested in upskilling the workforce. As an example, TCS is expanding its generative AI capabilities in partnership with AWS and Google Cloud. They have launched initiatives to train their workforce extensively in generative AI, aiming to create one of the largest AI-ready workforces globally. TCS has trained over 150,000 employees in foundational AI skills and

aims to train 25,000 more TCS has established an AI Experience Zone. TCS utilizes its PacePort™ innovation hubs located in global cities like New York, Pittsburgh, Toronto, Amsterdam, and Tokyo. These hubs facilitate collaborative exercises, allowing employees and clients to co-innovate and develop AI-powered solutions using state-of-the-art technology and research. Tech Mahindra has launched a generative AI studio that works on text, code, image, video, audio, and data generation. [47]

## **5. CONCLUSION**

AI is causing a sea change in the composition of the workforce employed in the Indian IT sector. This study indicated the multifaceted influence of AI on job profiles within the industry, which, while rendering some newly redefined routine-intensive jobs obsolete, is simultaneously creating a huge shift toward the emergence of more complex and skill-intensive jobs.

Correspondingly, the study finds that routine tasks involve high risks of automation, such as data entry and Level 1 IT support jobs. However, AI is not a job-destroying force, but a catalyst for job change and creation. In all, AI is changing how software development, data analysis, and project management jobs are done while making the jobs more engaging, raising productivity levels, and reducing the rate of errors in those jobs. This certainly fuels the demand for new kinds of skills with high regard for continuous learning and adaptability.

New positions, such as AI Ethics Officers, AI Architects, and Chief AI Officers, underpin this job market evolution. Each of them plays a significant role in driving the ethical, technical, and strategic dimensions imposed by AI integration, ensuring deployment of AI technologies in a responsible and efficient way.

Such a contribution to the national economy, in addition to providing employment, has to be strategically addressed by the Indian IT Sector. It is very important that investment in initiatives related to reskilling and upskilling be undertaken to prepare the workforce for the future. The collaboration will be so vital between industry and government with educational institutions in creating such a sustainable ecosystem that nurtures innovation and growth.

While AI causes disruption in certain categories of jobs, it also opens up great avenues for employment creation and augmentation in the Indian IT sector. Embracing this change and preparing for the same will enable the sector to reap the maximum benefit of AI for continued economic growth and competitive positioning in global markets.

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## APPENDIX

### Calculation of TCS market share

Total Market

Cap=12,698.55+5,992.19+3,579.32+2,075.33+1,621.81+1,178.05+488.63+434.35+408.32+346.83

TCS Market Share=(12,698.55/Total Market Capitalization)×100. The total market capitalization of the listed Indian IT companies is approximately 28,823.38 billion INR. Tata Consultancy Services (TCS) has a market share of approximately 44.06%. We round down, since we haven't accounted for all the firms. Thus, it is around 44%

### Mathematical Representation of cost efficiency with AI

According to the 1-10-100 rule, the cost of an error to a firm compound in each step of the data entry process. As per this rule if 1 is the prevention cost, 10 is the correction cost, and 100 is the failure cost. We can illustrate the cost benefit with a mathematical equation using probability functions to compare the total cost of data entry by AI and humans due to the errors.

Define:

- $P_{AIp}, P_{AIc}, P_{AI f}$  : Probabilities of AI preventing an error, reaching the correction stage, and reaching the failure stage, respectively.
- $P_{Hp}, P_{Hc}, P_{Hf}$  : Probabilities of a human preventing an error, reaching the correction stage, and reaching the failure stage, respectively.
- $C_p, C_c, C_f$ : Costs associated with each stage (prevention, correction, failure).
- $n$ : Number of tasks or entries.

The total cost for AI and humans across  $n$  entries can be represented using the summation function( $\Sigma$ ):

| For AI:

$$C_{ai} = \sum_{i=1}^n (P_{AIp} \times C_p + P_{AIc} \times C_c + P_{AI f} \times C_f)$$

For Humans:

$$C_h = \sum_{i=1}^n (P_{Hp} \times C_p + P_{Hc} \times C_c + P_{Hf} \times C_f)$$

Given:

- $P_{AIp} > P_{Hp}$
- $P_{AIc} < P_{Hc}$
- $P_{AI f} < P_{Hf}$

We observe that:

Cai < Ch

As the number of tasks (n) increases, the cost savings with AI become exponentially significant. This model uses the summation function to account for the cumulative cost of handling data entries across different stages of error prevention, correction, and failure. By comparing the probabilities and associated costs at each stage, we see that AI's superior error prevention leads to significant cost savings, especially as the number of data entries increases.