iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** V **Month of publication:** May 2025

DOI: https://doi.org/10.22214/ijraset.2025.71234

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue V May 2025- Available at www.ijraset.com

The Impact of Technological Disruption on Entry-Level Workforce Skills: An Indian Perspective

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Abstract: This study explores how emerging technologies, particularly Artificial Intelligence (AI) and automation, are reshaping skill demands for India's entry-level workforce. Given the country's large youth population and growing service economy, the impact is especially significant. Through secondary data analysis and stakeholder insights, the paper examines how technological change disrupts traditional employment models, redefines workforce skills, and necessitates policy reforms in education and skilling. It highlights both the challenges and opportunities facing early-career professionals in India's rapidly evolving labour market.

I. INTRODUCTION

Technological disruption is no longer a distant prospect—it is a present reality transforming labour markets worldwide at an unprecedented pace. Innovations such as Artificial Intelligence (AI), automation, and Industry 4.0 are not just changing how work is done, but also who does it and what skills are required to succeed. For India, home to the world's largest youth population and a rapidly digitizing economy, this disruption presents both enormous potential and significant challenges (World Economic Forum, 2025). In recent years, Indian industries—from IT and manufacturing to BFSI, healthcare, and education—have adopted digital technologies at a remarkable speed. Automation is streamlining backend operations, smart factories are redefining manufacturing, AI is transforming healthcare diagnostics, and EdTech is revolutionizing the classroom (Draup & NASSCOM, 2022; QS World Future Skills Index, 2024). These changes are reshaping the entry-level job market, demanding new skills from graduates entering the workforce. A growing disconnect exists between what India's education system teaches and what employers need. Unni (2016) found that most graduates—even from technical fields—lack job-ready skills. According to NASSCOM (2022), nearly 70% of engineering graduates are not employable in digitally intensive roles. This signals a critical breakdown in the education-to-employment pipeline.

AI, in particular, presents a double-edged sword: it automates routine tasks but also creates demand for roles requiring complex problem-solving, creativity, emotional intelligence, and adaptability—skills machines can't replicate (Autor, 2015; Wang et al., 2019). Yet access to these emerging opportunities is uneven. Graduates from Tier 1 cities, with better infrastructure and training, are far more likely to succeed than those from Tier 2 and 3 regions, who often face obsolescence before their careers begin (Bhattacharya & Rakshit, 2024).

Entry-level job roles are also evolving. Once defined by clerical and operational tasks, today's roles increasingly require proficiency in data analytics, cloud computing, coding, and AI-based tools (Chowdhury & Miah, 2016). Employers now seek dynamic, tech-savvy professionals who can collaborate across teams and learn continuously.

This shift extends beyond the white-collar sector. In manufacturing, Industry 4.0 has created demand for robotics technicians and IoT specialists. In BFSI, AI is replacing auditing tasks with cybersecurity and risk analytics. In healthcare, telemedicine and digital health services are creating hybrid tech-clinical roles (World Economic Forum, 2025; Draup & NASSCOM, 2022).

India's demographic dividend—a young and growing population—offers a unique opportunity to build a globally competitive workforce. But without urgent reforms, this advantage could turn into a crisis of unemployment and underemployment (QS World Future Skills Index, 2024).

Recognizing this, policymakers and industry leaders have initiated promising reforms, including the National Education Policy (2020) and Skill India Mission. However, skilling systems must evolve much faster to match the speed of disruption.

This paper critically examines how technological transformation is reshaping skill demands for India's entry-level workforce. Drawing from academic literature, policy documents, and industry reports, it maps emerging trends, highlights sectoral shifts, and identifies barriers such as regional disparities and outdated curricula. Ultimately, it aims to offer practical, forward-looking strategies for educators, employers, and policymakers seeking to prepare India's youth for a future that demands not just knowledge—but resilience, adaptability, and lifelong learning.

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II. REVIEW OF LITERATURE AND THEORETICAL FRAMEWORK

The relationship between technological disruption and evolving workforce skills has received growing attention from global and Indian scholars alike. Foundational studies by Autor (2015) and Wang et al. (2019) highlight a consistent trend: automation displaces routine, low-skill jobs but simultaneously creates new demand for roles that require complex problem-solving, digital literacy, and interpersonal skills.

In India, this transformation is especially urgent. Multiple reports show that cognitive flexibility, critical thinking, AI literacy, and collaboration are now core employability traits. For instance, Chowdhury and Miah (2016) found Indian employers increasingly value adaptability and teamwork among entry-level hires. Yet a gap persists between what academia delivers and what employers demand. The QS World Future Skills Index (2024) ranks India highly for workforce potential but flags a severe "skills fit" deficit—where graduates have degrees but not job-ready competencies. Similarly, NASSCOM forecasts a 20x mismatch between digital job openings and skilled talent by 2024 (Draup & NASSCOM, 2022).

This growing mismatch is explained by key labour economics frameworks. The Skill-Biased Technological Change (SBTC) theory (Goldin & Katz, 1998; as applied by Autor, 2015) suggests that innovation benefits highly skilled workers, leaving others behind. In contrast, Routine-Biased Technological Change (RBTC) helps explain the shrinking demand for mid-skill, repetitive roles—now visible in India's BFSI and clerical sectors (World Economic Forum, 2025).

However, India's story diverges in important ways. Despite expanding higher education, graduate unemployment remains high, especially in technical fields like engineering and business administration (Unni, 2016). The problem is not the number of graduates—but their readiness for today's digital economy. Rao and Mason (2023) note that leadership and communication skills among Indian graduates are particularly underdeveloped, limiting both short-term employability and long-term career growth.

Regional inequality deepens these challenges. Urban centres like Bengaluru and Pune benefit from digital infrastructure and forward-looking curricula. In contrast, Tier 2 and Tier 3 cities face faculty shortages, outdated syllabi, and weak industry linkages (Bhattacharya & Rakshit, 2024; Dubey, 2024). This has created a two-speed skilling ecosystem—one future-ready, the other increasingly obsolete.

The literature reveals a clear shift in the skill profiles demanded of entry-level talent: from routine and technical to hybrid combinations of digital expertise, cognitive agility, and human-centric capabilities. Yet India's skilling systems are not evolving fast enough. There is a pressing need for targeted reforms, more inclusive access to digital learning, and empirical research tracking these changes over time—especially in informal and rural economies.

III. METHODOLOGY – DATA COLLECTION AND THEMATIC ANALYSIS

A. Data Sources

This study is grounded in a comprehensive review of secondary sources. Data was collected from credible academic databases and repositories including Scopus, Web of Science, Google Scholar, SSRN, and ResearchGate. Only peer-reviewed journal articles, industry whitepapers, and policy reports published between 2018 and 2024 were considered to ensure relevance and recency, especially in the context of post-pandemic digital acceleration.

B. Keyword Selection and Screening

Key search terms included: "technological disruption," "entry-level workforce," "future skills India," "Industry 4.0 India," "digital skilling," "AI employment India," and "urban-rural skill gap." Studies were screened for relevance based on their thematic alignment with workforce transformation, skilling, and socio-economic impacts in the Indian context. Non-peer-reviewed blogs, editorials, and sources prior to 2018 were excluded to maintain methodological rigor.

C. Analytical Technique

A qualitative thematic synthesis was employed. After a detailed reading and coding of selected literature, recurring themes, contradictions, and knowledge gaps were mapped across four categories:

- Emerging skill demands (technical, cognitive, digital, soft)
- Sectoral shifts in entry-level roles
- Regional and institutional disparities
- Theoretical alignment (e.g., SBTC, RBTC)

Insights were interpreted to develop actionable implications for educators, employers, and policymakers. The synthesis also informed the development of conceptual frameworks like the Entry-Level Workforce Disruption Cycle.

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IV. RESULTS AND DISCUSSION

A. Sectoral Transformation and Role Evolution

Technological disruption has fundamentally reconfigured India's entry-level employment landscape. Across IT, manufacturing, BFSI, healthcare, and education, automation and AI have displaced routine tasks while simultaneously giving rise to hybrid, tech-intensive roles. The IT sector's pivot from manual coding to cloud and cybersecurity profiles (World Economic Forum, 2025) is mirrored by similar changes in BFSI and manufacturing. The Fourth Industrial Revolution is reshaping factory floors, demanding skills in IoT and predictive maintenance (Khanna & Sharma, 2021), while BFSI institutions replace clerical roles with risk analysts and digital compliance professionals (QS World Future Skills Index, 2024).

In healthcare, roles like health data analysts and telemedicine coordinators are emerging (Bhattacharya & Rakshit, 2024), while education is shifting toward instructional design and EdTech integration (Dubey, 2024). Traditional entry-level roles rooted in repetition and documentation are rapidly disappearing, replaced by dynamic, interdisciplinary, and tech-enhanced positions.

B. Emerging Skill Archetypes

The emerging skill archetype is hybrid: combining technical, digital, cognitive, and soft skills. Programming proficiency (e.g., Python), familiarity with AI tools and cloud platforms (AWS, Azure), and CRM or project management tools are now base-level expectations. (Table 3) However, employers also demand adaptability, collaboration, critical thinking, and creativity—skills that remain distinctively human and irreplaceable by automation (Chowdhury & Miah, 2016).

C. Future-Readiness: The Entry-Level Workforce Disruption Cycle

To contextualize this shift, this study introduces the "Entry-Level Workforce Disruption Cycle." (Table 3 .)The cycle begins with technological innovation, which changes job profiles and redefines required skills. These shifts expose and widen existing inequalities—especially between Tier 1 and Tier 2/3 regions—before necessitating a systemic response through education reform, infrastructure expansion, and skilling policy innovation.

If managed strategically, this cycle becomes a growth engine. If neglected, it deepens unemployment and exclusion. Future-readiness, therefore, is not a static benchmark but a lifelong adaptive process that blends technical know-how with socio-emotional agility (World Economic Forum, 2025).

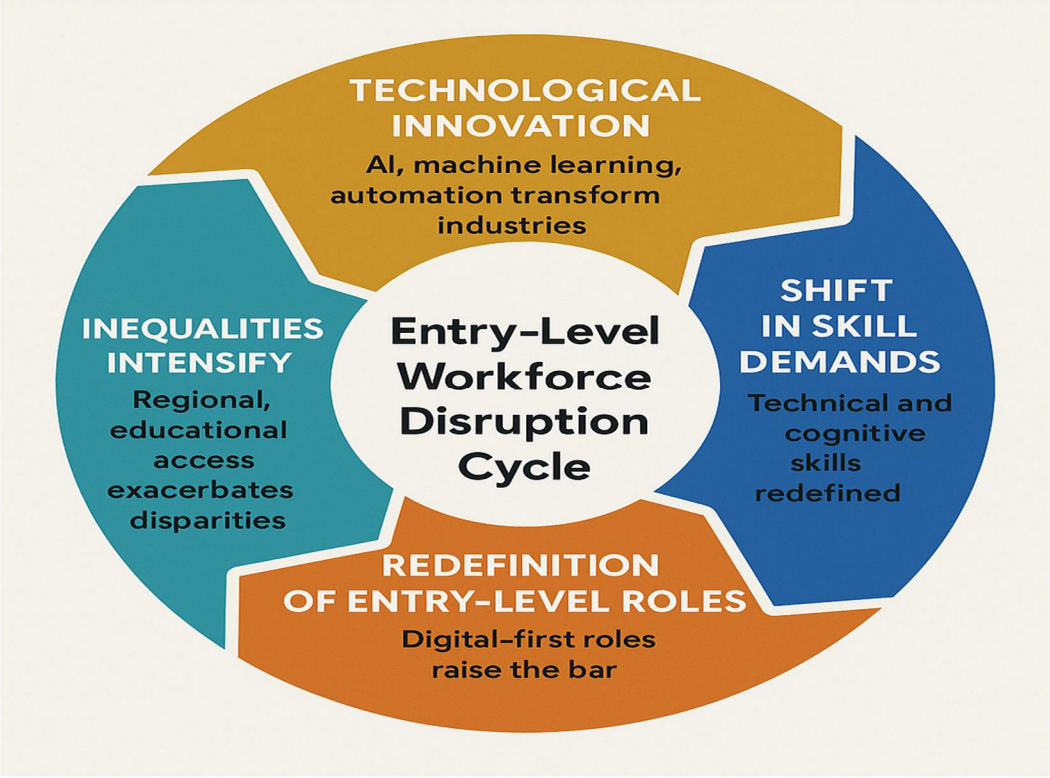


Table 2 : The Entry-Level Workforce Disruption Cycle

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue V May 2025- Available at www.ijraset.com

The Entry-Level Workforce Disruption Cycle (Table 2) illustrates how technology is reshaping India's job market. It starts with innovations like AI and automation, which shift industry skill demands and redefine entry-level roles. This transformation raises the bar for new graduates while exposing deeper divides—particularly between urban and rural regions. As traditional clerical roles vanish, the pressure mounts for a systemic response. Without intervention, these changes risk widening unemployment and inequality. But with strategic reforms in education, skilling, and infrastructure, India can turn this disruption into a growth opportunity—equipping its youth not just to adapt, but to thrive in a digital-first future.

Table 3 :Impact of Entry-Level Workforce Disruption Cycle on Each Sector

Sector	Technological Innovation	Disruption Type	Shifting Entry-Level Roles	New Entry-Level Roles	Critical Skills Demand
IT & ITES	Automation of coding, rise of AI-driven development tools	Automation of coding, testing, support	From basic coding to cloud, DevOps, AI engineering	Cloud Engineers, AI Support Executives; Cloud Engineers, AI Programmers, Cybersecurity Analysts	Python, Cloud Computing, Cybersecurity
Manufacturing	Industry 4.0, Robotics, Smart factories	Industry 4.0, Smart Factories	From manual assembly to robotics programming, IoT management	Robotics Maintenance Technicians, IoT Support Engineers	IoT Systems, Predictive Maintenance, Digital Literacy
BFSI	AI-powered risk profiling, Chatbots for customer service	AI for customer service, risk analysis	From teller operations to digital compliance and AI fraud detection	Digital Compliance Analysts, Risk Managers; Digital Compliance Analysts, Fraud Risk Managers	AI in Finance, Risk Analytics, Cybersecurity
Healthcare	Telemedicine, AI-based diagnostics	Telemedicine, AI diagnostics	From in-person care to digital health management and data interpretation	Telehealth Coordinators, Health Data Analysts; Telehealth Support Staff, Health Data Analysts	Health Data Management, AI Diagnostic Tools
Education	EdTech platforms, AI-enhanced learning analytics	EdTech-driven learning innovations	From classroom teaching to digital content development and online pedagogy	Instructional Designers, EdTech Content Developers; AI Curriculum Developers, Instructional Designers	EdTech Tools, AI Content Development

Table 3 illustrates how AI and automation are transforming India's entry-level job landscape across key sectors. As traditional roles give way to tech-driven ones, new positions—from AI programmers to digital health analysts—demand a powerful mix of digital, cognitive, and human-centric skills to stay employable in a rapidly evolving workforce.

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D. Quantified Gaps in Skills

The data signals alarming gaps across four domains:

- Technical: 70% of engineering graduates lack real-world digital proficiencies (Draup-NASSCOM, 2022).
- Digital: Less than 40% are fluent in basic collaboration tools (World Economic Forum, 2025).
- Cognitive: Employers report weak data-driven thinking and systems analysis.
- Soft Skills: Adaptability, communication, and teamwork are in short supply (Chowdhury & Miah, 2016).

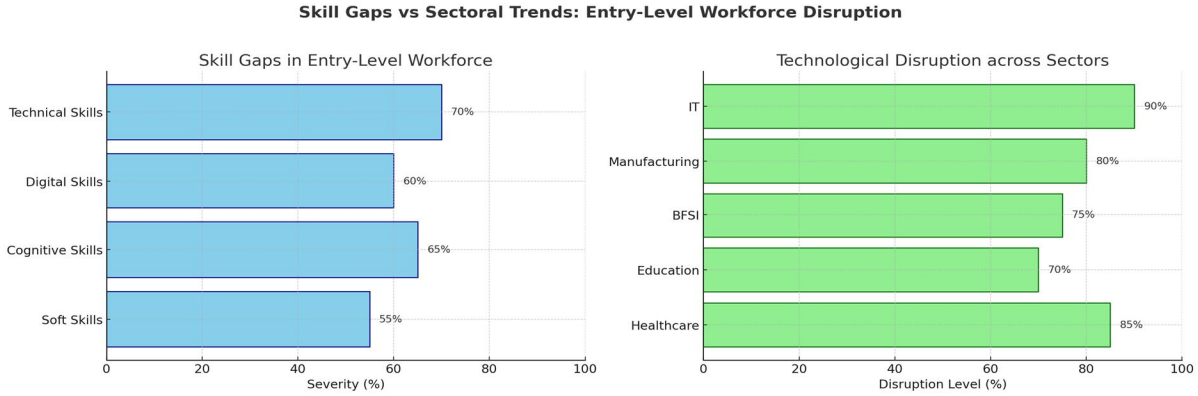


Table 4 illustrates India's entry-level workforce faces widening skill gaps amid rapid technological disruption. While sectors like IT, manufacturing, BFSI, healthcare, and education evolve with automation, AI, and Industry 4.0, graduates often lack the technical and cognitive skills needed to match changing job profiles. Traditional roles are disappearing, replaced by cloud engineers, cybersecurity analysts, IoT technicians, and digital educators—yet most young professionals are underprepared. This mismatch between education and industry needs, especially pronounced in non-urban regions, risks sidelining vast talent pools. Bridging these gaps through targeted skilling and adaptive learning is key to unlocking India's demographic potential in a tech-driven future. These findings underscore that academic credentials alone are no longer proxies for employability. Degrees without aligned skill sets offer diminishing returns.

E. Regional Realities and the Urban-Rural Skilling Divide

India's digital divide maps closely onto its urban-rural skill gap. Cities like Bengaluru and Pune have embedded skilling infrastructures and industry integration. In contrast, Tier 2 and 3 cities lack access to updated curricula, trained faculty, or experiential learning models (QS World Future Skills Index, 2024). Without urgent intervention, these divides threaten to fragment India's youth advantage into islands of opportunity and pockets of stagnation.

F. Reimagining the Skilling Ecosystem: Strategic Recommendations

Reimagining India's skilling ecosystem requires coordinated reforms. Educators must embed AI, data science, and cybersecurity into curricula and adopt project-based learning with mandatory internships (Bhattacharya & Rakshit, 2024; QS, 2024). Employers should co-create micro-credentials in high-demand skills and invest in in-house academies, modelled on firms like Infosys and TCS (Draup-NASSCOM, 2022). Policymakers must expand Skill India to include emerging tech like 5G and blockchain, offer incentives for upskilling investments, and strengthen digital infrastructure in underserved regions. Together, these efforts can bridge the skill gap, enhance employability, and ensure India's youth are future-ready in a rapidly evolving digital economy.

India stands at a crossroads. The country's youth, if equipped with adaptive, tech-enabled, and human-centric skills, can become the foundation of a resilient future workforce. But bridging the gap between aspiration and readiness requires systemic transformation. The evidence is clear: automation will continue to redefine roles, but it is human capability—agile, empathetic, and evolving—that will remain the ultimate differentiator.

V. CONCLUSION

The narrative of technological disruption in India is one of both extraordinary promise and formidable challenges. On the one hand, India stands uniquely positioned to capitalize on its demographic dividend, dynamic startup ecosystem, and rapidly expanding digital economy. On the other hand, if urgent steps are not taken to address critical skill gaps, regional inequalities, and systemic educational inertia, the same technological forces could exacerbate unemployment, underemployment, and socio-economic divides (World Economic Forum, 2025; Bhattacharya & Rakshit, 2024).

For India's entry-level workforce, technical prowess alone is no longer sufficient. Success in the emerging labour market demands a fusion of technical competencies with human-centric capabilities — creativity, critical thinking, adaptability, emotional intelligence, and a commitment to lifelong learning (QS World Future Skills Index, 2024). Individuals who can continuously reskill, work across interdisciplinary domains, and leverage technology creatively will be best positioned to thrive.

To unlock this potential, systemic transformation is imperative. Educational institutions must overhaul outdated curricula, employers must invest more deeply in upskilling and reskilling, and policymakers must create enabling ecosystems that democratize access to digital skills, particularly in India's hinterlands.

Finally, there is a pressing need for future research that moves beyond cross-sectional studies. Longitudinal tracking of skill development programs, dynamic mapping of emerging job roles, and impact assessments of public-private skilling collaborations will provide richer insights into what truly works in preparing India's workforce for the future.

If India rises to this challenge with vision and urgency, it can transform technological disruption into its greatest opportunity.

REFERENCES

[1] Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. Journal of Economic Perspectives, 29(3), 3–30. https://doi.org/10.1257/jep.29.3.3

[2] Bhattacharya, S., & Rakshit, P. (2024). Digital Skill Development to Enhance Employability for Indian Workforce. MET Management Review, 11(2), 87–94. https://doi.org/10.34047/mmr.2024.11209

[3] Chowdhury, T. A., & Miah, M. K. (2016). Employability skills for entry-level human resources management positions: Perceptions of students and employers. Australian Journal of Career Development, 25(2), 55–68. https://doi.org/10.1177/1038416216658774

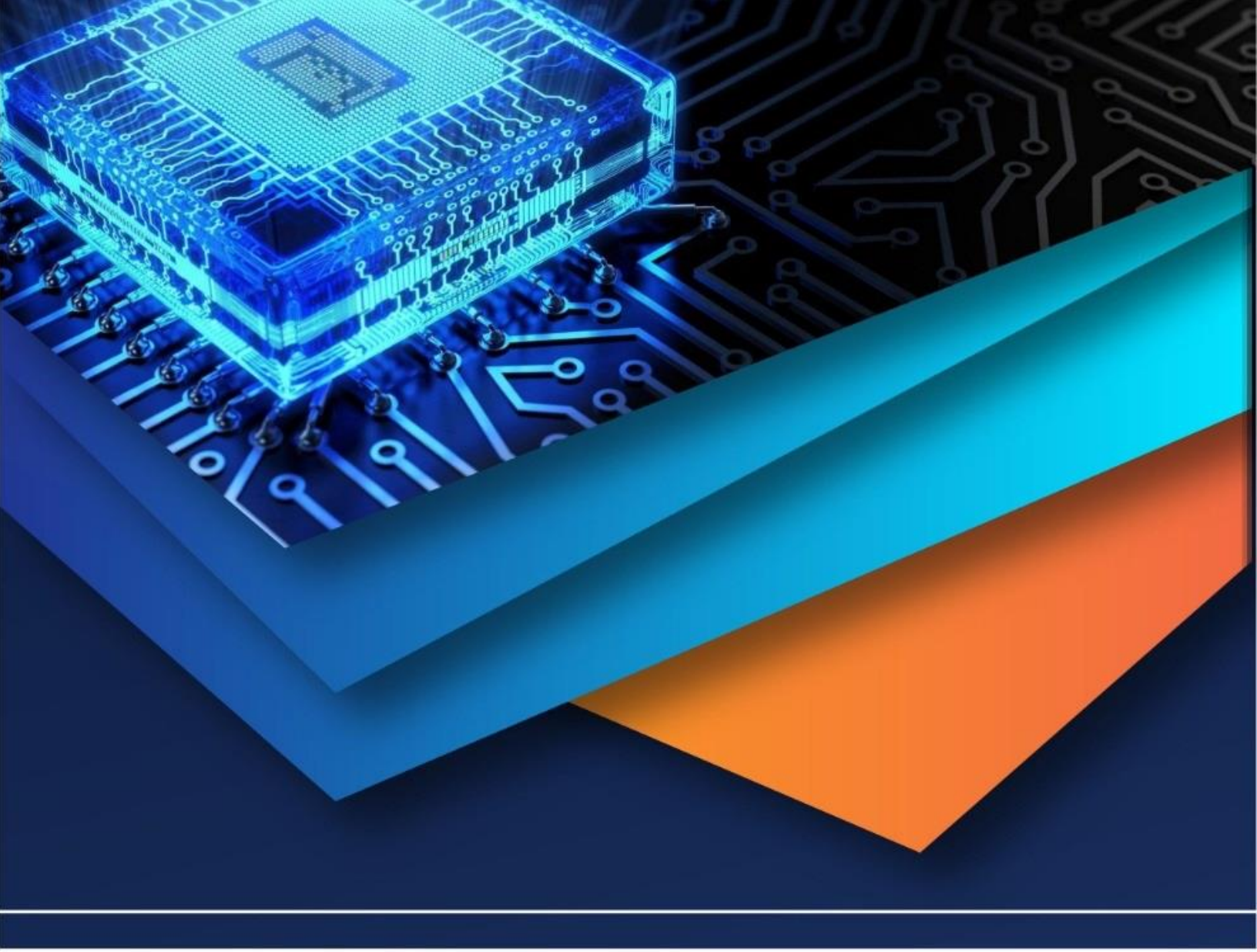
[4] Draup-NASSCOM. (2022). Digital Skills Trends and Demand-Supply Analysis. NASSCOM. Retrieved from https://nasscom.in/knowledge-center/publications/digital-skills-trends-and-demand-supply-analysis-2022

[5] Khanna, R., & Sharma, C. (2021). Do technological investments promote manufacturing productivity? A firm-level analysis for India. Economic Modelling, 105, 105672. https://doi.org/10.1016/j.econmod.2021.105672

[6] QS World Future Skills Index. (2024). QS World Future Skills Index Report 2024. QS Intelligence Unit. Retrieved from https://www.qs.com/qs-world-future-skills-index-2024/

[7] Unni, J. (2016). Skill gaps and employability: Higher education in India. Journal of Development Policy and Practice, 1(2), 151–169. https://doi.org/10.1177/2455133316650270

[8] World Economic Forum. (2025). The Future of Jobs Report 2025. World Economic Forum. Retrieved from https://www.weforum.org/reports/the-future-of-jobs-report-2025.



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