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# ENGINEERING AND TECHNOLOGY SECTOR IN INDIA

A Landscape Overview for International Stakeholders

2025

# CONTENT

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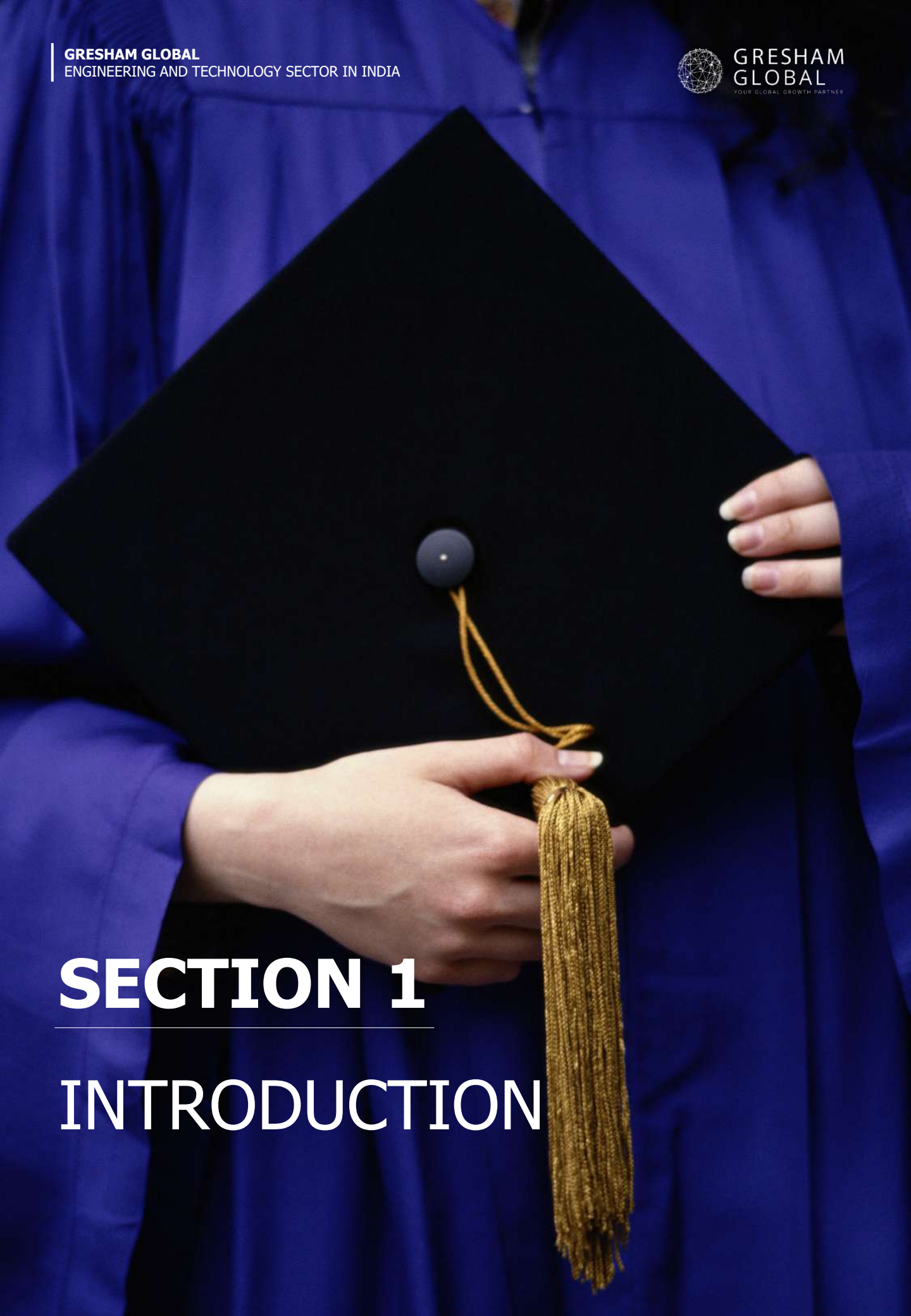


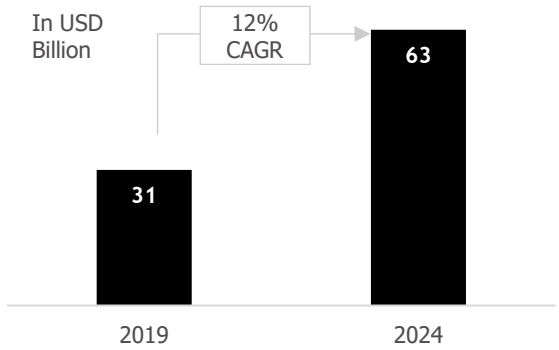
# SECTION 1

# INTRODUCTION

# OVERVIEW

India's engineering sector plays a pivotal role in driving its economic development, spanning diverse industries such as construction, manufacturing, infrastructure, aerospace, and technology. The country boasts numerous prestigious engineering institutions, including the IITs and NITs, which produce a highly skilled workforce capable of meeting both domestic and international demands. Government initiatives like Make in India and Skill India further support the sector by enhancing domestic manufacturing and boosting employability. As investments in infrastructure, renewable energy, and digital transformation grow, India's engineering sector continues to evolve, creating abundant opportunities for innovation, research, and career advancement. The engineering sector in India creates jobs across diverse industries such as infrastructure, manufacturing, technology, aerospace, renewable energy, and research, driven by government initiatives and private sector growth. In FY21, the science and technology sector became India's largest employment generator, adding 1,497,501 jobs.

**Fig 1.1: The engineering Research and Development R&D and product development sector in India is projected to grow at a compound annual growth rate (CAGR) of 12%, reaching US$ 63 billion by 2025, up from US$ 31 billion in 2019.**




According to the Economic Survey 2022, India's gross domestic expenditure on R&D (GERD) as a percentage of GDP stands at 0.66%. India's GERD as a percentage of GDP has remained relatively unchanged at around 0.7% for nearly a decade, which is lower than that of Brazil (1.16%) and South Africa (0.83%). IT spending in India is expected to rise by 10.7% year-on-year, reaching US$ 124.6 billion in 2024, according to Gartner's forecast.

For the fiscal year 2024-25, the government allocated Rs. 8,029 crore (US$ 966 million) to the Department of Science and Technology and Rs. 16,604 crore (US$ 2 billion) to the Ministry of Science and Technology under the Interim Budget.

India is a thriving hub for startups, with a rapidly growing entrepreneurial ecosystem. The country's dynamic market, diverse talent pool, and increasing access to funding have made it an attractive destination for new ventures. The government's initiatives, such as Startup India, along with a supportive infrastructure and a burgeoning tech industry, further fuel the growth of innovative startups across various sectors like technology, e-commerce, fintech, and healthcare. This vibrant startup culture has positioned India as one of the leading global startup ecosystems.

As of August 2024, India is home to 143,695 startups, a significant increase from just 350 startups in 2014. Additionally, India has seen an investment of over Rs. 1,000 crore (US$ 120.21 million) in space startups between April and December 2023.

# MARKET SIZE

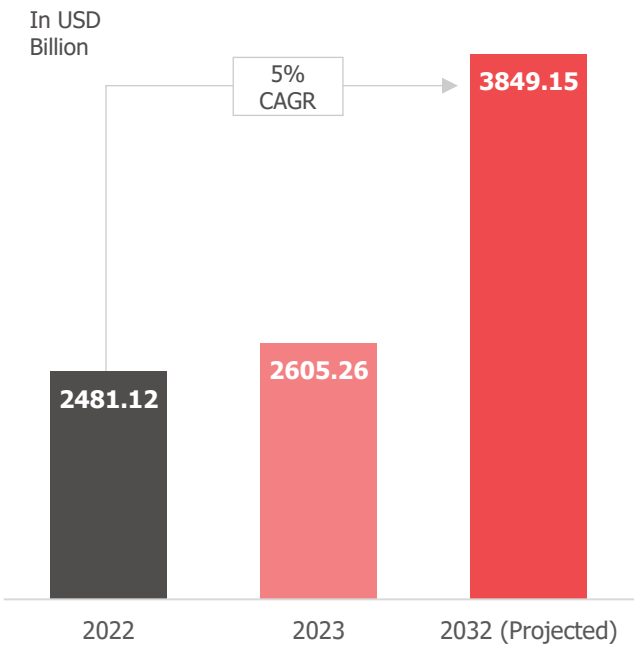
Engineering accounts for about 25% of India's total global exports in the goods sector and is one of the largest foreign exchange earners.[i]

The quick estimates of Index of Industrial Production (IIP) for FY24 came at 156.2, improving from 146.7 in FY23.

The Capital Goods sector contributes to 12% of India's manufacturing output and 1.8% of GDP. Market valuation of the capital goods industry was US$ 43.2 billion in FY22.

The electrical equipment market share in India is expected to increase from US$ 52.98 billion in 2022 to US$ 125 billion by 2027, implying a robust CAGR of 11.68%. Market size for the Indian Construction Equipment Market stood at US$ 7.2 billion in FY23 and is forecasted to grow at a CAGR of 15% for next 5 years, as per the estimates of CII.[ii]

**Fig 1.2 The Computer Engineering market was valued at USD 2,481.12 billion in 2022. It is projected to grow from USD 2,605.26 billion in 2023 to USD 3,849.15 billion by 2032, reflecting a compound annual growth rate (CAGR) of 5% during the forecast period (2023-2032).[iii]**




In FY24, exports of engineering goods stood at US$ 109.32 billion, reflecting a marginal growth of 2.1% of YoY growth.

India's automotive industry is worth more than US$ 222 billion, contributes 8% of the country's total export, accounts for 7.1% of India's GDP and is set to become the 3rd largest in the world by 2030.[iv]

In FY2024, the adoption rate of artificial intelligence (AI) in major industries across India was around 48%, and it is projected to grow by 5-7% in FY25.[v]

# SECTION 2

# SECTOR DEVELOPMENTS

# RECENT DEVELOPMENTS

In 2023, **India ranked 6th globally in patent applications**, with a total of 64,480 filings. This places India among leading nations like China, the United States, Japan, and South Korea in terms of intellectual property activity. India's rise in patent rankings is significant, reflecting its diverse economy that spans traditional sectors like agriculture as well as advanced industries such as pharmaceuticals, information technology, and renewable energy.[vi]

A recommendation to support Fund for Improvement of S&T Infrastructure (FIST) for the proposals from 115 departments across various academic institutions and Universities and 22 postgraduate colleges is given under the FIST-2024 Program, with a total **allocation of ₹273.89 crores to enhance research infrastructure**.

India has made some significant strides up the **Network Readiness Index (NRI) 2024 ranking**. The country has **moved to 49th place** from the 79th position in 2019. This is an impressive jump of 30 ranks over the past five years. It ranks countries across several dimensions - ICT infrastructure, digital technologies, network policies, and e-readiness. In this regard, the improvement reflects continuous efforts in terms of digital transformation, technological advancements, and investments in infrastructure.

India has made significant progress in global innovation rankings, securing **the 39th position in the Global Innovation Index (GII) 2024**, among the top innovative economies worldwide.

The Department of Science and Technology (DST) has been implementing the **National Initiative for Developing and Harnessing Innovations (NIDHI) program** to support start-ups and individual innovators. Recent initiatives include enhancing the program's infrastructure and outreach to Tier II and Tier III cities by establishing 8 new Inclusive Technology Business Incubators (iTBIs) and 10 new NIDHI Entrepreneur-In-Residence Centres. Additionally, the DST-GDC IITM I-NCUBATE Program was launched to build a strong pipeline of deep-tech startups in India.[vii]

In 2024, the Indian Institutes of Technology (IITs) made significant strides in **advancing Artificial Intelligence (AI)** initiatives across various sectors:

**IIT Bombay** partnered with Samsung R&D Institute to explore AI, digital health, and other areas, fostering joint research and industry collaborations for students and faculty.

**IIT Madras** launched the Centre for Human-Centric Artificial Intelligence (CHAI) to harness AI for amplifying human potential, focusing on technology development, entrepreneurship, and international collaborations. IIT Madras also introduced online AI courses for 11th and 12th-grade students, providing hands-on experience in data science, AI, and electronics.

**IIT Jodhpur** launched the Srijan Centre for Generative AI, in collaboration with Meta and IndiaAI, along with the YuvAI Initiative to enhance AI skill development and research in India.

**IIT Delhi** partnered with the Indian Air Force to advance aviation textiles through AI and digitization, promoting innovation in obsolescence management and self-reliance. IIT Delhi also collaborated with Honda to advance Cooperative Intelligence for future mobility, focusing on improving machine-human interaction through AI.

**IIT Kanpur** signed an MoU with the National Health Authority (NHA) to develop AI-driven digital public goods for healthcare under the Ayushman Bharat Digital Mission (ABDM).

These initiatives demonstrate IITs' pivotal role in reshaping AI applications across industries and driving innovation, skill development, and global collaborations in India.[viii]

# GOVERNMENT INITIATIVES

In Union Budget 2024-25, Government has committed an outlay of Rs. 11.11 lakh crore (US$ 133.5 billion) during the year towards infrastructure capital expenditure.

In September 2021, India published the amended Patents Rules (2021) and reduced fees by 80% for educational institutions.

DST has been a pioneer in establishing a network of Technology Business Incubators (TBI) and Science & Technology Entrepreneur's Parks (STEP) across the country under the National Initiative for Developing and Harnessing Innovations (NIDHI) program.

Union Minister Mr. Jitendra Singh announced that India will establish a National Research Foundation (Anusadhan NRF) to transform research and development. Once operational, it will bridge public and private sectors, fostering collaboration between industry and academia

Union budget FY25 announces venture capital fund of US$ 119.5 million (Rs. 1,000 crore) will be established to expand the space economy by 5 times over the next decade.

Initiatives such as Skill India and Make in India focus on improving employability and boosting domestic manufacturing, opening up opportunities for BTech graduates. Government projects in infrastructure development, smart cities, and digital transformation demand engineering expertise, providing employment prospects in both the public and private sectors.[ix]

India's decision to allow 100% Foreign Direct Investment (FDI) in the space sector is a strategic move to encourage global investment, foster innovation, and enhance the development of advanced space technologies. This policy aims to boost private sector participation, improve satellite communications, and strengthen India's position in the global space industry.[x]

# PARTNERSHIPS

| | |
|---|---|
| **Volvo Group in India** | Bolstering its commitment to build a stronger industry-academia engagement and enhance industry readiness, Volvo Group in India has signed a Memorandum of Understanding (MoU) with three prominent universities across India—Manipal University, KIIT University, and SRM University in 2024.[xi] |
| **IITs and its Relations** | The Indian Institute of Technology (IITs) have always been leading in academic industry partnerships. Collaborations with companies like Infosys, HCL, Tata Motors, Mahindra & Mahindra and Reliance Industries have been successful, with technological innovations making waves in fields of information technology, software development, automotive engineering and the chemical and energy sectors.[xii] |
| **India and Kazakhstan** | India and Kazakhstan are strengthening their trade and technological partnerships in electronics and manufacturing. The India-Kazakhstan Business Conference on Electronics Equipment and Engineering Goods held at the Astana International Financial Centre (AIFC) in November 2024 in Kazakhstan, brought together business leaders, officials, and executives from both countries to explore joint ventures, technological partnerships, and expanding business opportunities in these growing sectors. The conference, held in a hybrid format, focused on facilitating Indian companies' entry into the Kazakh market. According to the Indian Ambassador to Kazakhstan, Dr T.V. Nagendra Prasad, India and Kazakhstan's bilateral trade reached roughly US$ 1 billion in 2023, a figure still short of its potential. Ambassador Prasad emphasized India's electronics strengths, which are driven by the 'Make-in-India' initiative and the Productivity Linked Incentive (PLI) scheme, which continues to attract multinational manufacturers. The event, which saw participation from around 50 companies and featured sector-specific sessions, highlighted India's potential to support Kazakhstan's 'Digital Kazakhstan' initiative, which underpins Kazakhstan's infrastructure modernization.[xiii] |
| **India and The US** | India and the US launched the US-India Artificial Intelligence (USIAI) Initiative in March 2021 to enhance collaboration in AI across key sectors like manufacturing, healthcare, energy, education, and the environment. In April 2022, the Indian Electronics and Semiconductor Association (IESA) and the US Semiconductor Industry Association (SIA) signed an MoU to explore cooperation in the semiconductor industry, supporting the development of India's semiconductor ecosystem.<br><br>Additionally, the Initiative for Critical and Emerging Technologies (iCET) was established to strengthen technological and industrial cooperation between the two nations, particularly in defense and emerging technologies like AI and data science. This initiative aims to support joint research in areas such as AI, with a focus on 25 projects across India's Technology Innovation Hubs.<br><br>The US has also recognized India as a major defense partner, with several defense agreements concluded over the years, including key pacts like the Logistics Exchange Memorandum of Agreement (2016) and Communications Compatibility and Security Agreement (2018). The iCET initiative is expected to enhance defense cooperation, especially in AI and military technology.<br><br>In the telecom sector, India and the US are advancing R&D cooperation in 5G and 6G, promoting the adoption of Open RAN in India, and fostering public-private dialogue on telecommunications and regulations through iCET.[xiv] |

# PARTNERSHIPS

| | |
|---|---|
| **Bharti Airtel and Google Cloud** | Bharti Airtel and Google Cloud have formed a long-term partnership to provide cloud solutions to Indian businesses. This collaboration aims to accelerate cloud adoption and modernization by offering Google Cloud's advanced solutions to Airtel's customers. Airtel will also offer cloud-managed services to over 2,000 large enterprises and one million emerging businesses. The partnership targets the expanding Indian public cloud services market, which is projected to reach $17.8 billion by 2027.[xv] |
| **India and The UK** | As reported in July 2024, the Prime Ministers of India and the United Kingdom are launching a new 'Technology Security Initiative' (TSI) to enhance their strategic partnership. This initiative builds on the India-UK Roadmap 2030 and focuses on collaboration in critical and emerging technologies (CET) across key sectors. The TSI aims to strengthen existing cooperation, expand the scope of current frameworks, and create new mechanisms for collaboration. Coordinated by the National Security Advisors (NSAs) of both countries, the initiative will prioritize areas for cooperation, foster technology value chain partnerships, and be reviewed biannually. A bilateral mechanism will also be established to promote trade in CET and address regulatory issues.[xvi] |
| **Tata Motors and BMW Group** | Tata Motors and BMW Group formed a joint venture (JV) to collaborate in the Indian automotive market, particularly for the production of electric vehicles (EVs) and luxury cars. This partnership focuses on leveraging Tata Motors' extensive experience in the Indian market and BMW's expertise in premium and luxury vehicle technology. The collaboration aims to enhance product offerings and drive innovation in electric mobility, contributing to the growth of the luxury car segment in India while promoting sustainable automotive solutions.<br><br>This JV helps both companies expand their footprint in the competitive Indian automotive sector, with Tata Motors bringing its local manufacturing capabilities and BMW focusing on advanced vehicle technologies and premium features. The partnership also aligns with India's push towards electric mobility and cleaner, greener transportation options.[xvii] |
| **BHEL and GE** | In July 2023, Bharat Heavy Electricals Limited (BHEL) signed a Technical Assistance and License Agreement with General Electric Technology GmbH Switzerland for Gas Turbines. |
| **Automotive** | With 100% FDI allowed through the automatic route, major international players such as Cummins, GE, ABB, and Alfa Laval have entered the Indian engineering sector due to growth opportunities.[xviii] |

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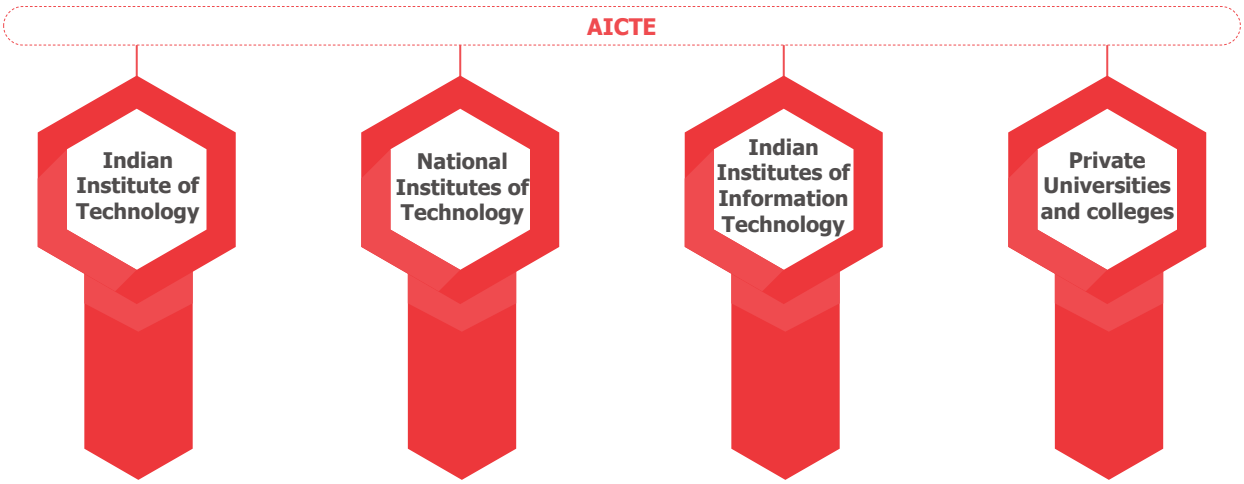
# SECTION 3

# ENGINEERING EDUCATION IN INDIA

# STRUCTURE OF ENGINEERING EDUCATION

**Fig 3.1: Structure of Engineering Educations in India**




## Role of AICTE:

AICTE stands for the All India Council for Technical Education, which is a statutory body and a national-level council in India. It is responsible for the planning, formulation, and regulation of the development of the technical education system in India. AICTE's role includes accrediting postgraduate and undergraduate programs in engineering, technology, management, architecture, and applied arts & crafts, as well as promoting quality education, innovation, and research in these fields. It also aims to enhance the employability of students and align technical education with industry demands.

It was set up in 1945 as an advisory body and later in 1987 given the statutory status by an Act of Parliament. The AICTE grants approval for starting new technical institutions, for introduction of new courses and for variation in intake capacity in technical institutions. It has delegated to the concerned state governments powers to process and grant approval of new institutions, new courses and variations in the intake capacity for diploma level technical institutions. It also lays down norms and standards for such institutions. It also ensures quality development of technical education through accreditation of technical institutions or programmes. In additional to its regulatory role, the AICTE also has a promotional role which it implements through schemes for promoting technical education for women, handicapped and weaker section of the society promoting innovations, faculty, research and development, giving grants to technical institutions.

The institutions under the AICTE include post-graduate, under-graduate and diploma in the whole spectrum of technical education covering engineering/technology, pharmacy, architecture, hotel management and catering technology, management studies computer applications and applied arts and crafts.

The AICTE has its headquarters in New Delhi and seven regional offices located at Kolkata, Chennai, Kanpur, Mumbai, Chandigarh, Bhopal and Bangalore. A new regional office at Hyderabad has been set up and is to be operational soon.

The Council discharges its functions through an Executive Committee.[xix]

# STRUCTURE OF ENGINEERING EDUCATION

## Indian Institute of Technology

To address the increasing demand for highly skilled technical professionals, India currently has twenty-three Indian Institutes of Technology (IITs) located in cities such as Bombay, Delhi, Kanpur, Kharagpur, Madras, Guwahati, Roorkee, Hyderabad, Patna, Bhubaneshwar, Ropar, Jodhpur, Gandhinagar, Indore, Mandi, Varanasi, Tirupati, Palakkad, Goa, Jammu, Dharwad, Dhanbad, and Bhilai. These institutions are governed by The Institutes of Technology Act, 1961, which designates them as "Institutions of national importance" and outlines their powers, responsibilities, and governance structure.

The IITs offer undergraduate programs in various engineering and technology disciplines, postgraduate programs with specializations, and Ph.D. programs across engineering, science, and interdisciplinary fields. They also engage in basic, applied, and sponsored research. Currently, the IITs offer degrees such as B. Tech., B. Arch, M.Sc., M. Design, M. Phil., M. Tech, MBA, and Ph.D. Admissions to these courses are based on merit, determined through entrance exams like the Joint Entrance Examination (Advanced) for B.Tech programs, the Graduate Aptitude Test in Engineering (GATE) for M.Tech, and the Joint Admission Test for M.Sc. (JAM).[xx]


## National Institutes of Technology

Following the recommendations of the Engineering Personnel Committee (EPC), established by the Planning Commission in 1955, eight Regional Engineering Colleges

(RECs) were founded in the early 1960s as collaborative ventures between the Central and State Governments. The goal was to meet the technical manpower requirements for the industrial projects outlined in the Second Five-Year Plan (1956-61). These colleges were registered as autonomous bodies under the Society Registration Act, 1860, and were affiliated with State Universities in their respective regions. Over time, the number of RECs grew to seventeen, each serving as a national institution admitting students and recruiting faculty from across the country. Half of the admissions in these institutions (each designed to accommodate 250 students annually) were reserved for students from states other than the one in which the REC was located. In addition to undergraduate courses, the RECs also offered postgraduate programs in various fields.

The primary objective of establishing these RECs was to generate the necessary technical workforce by providing undergraduate education and training in engineering and technology. Moreover, the RECs were intended to set academic standards and provide leadership to other technical institutions in their regions.

In 2003, the seventeen Regional Engineering Colleges were renamed National Institutes of Technology (NITs) and were fully funded by the Central Government, receiving deemed university status. Additionally, three other institutes—Bihar Engineering College in Patna, Government Engineering College in Raipur, and Tripura Engineering College in Agartala—were converted into NITs in 2004, 2005, and 2006, respectively. This brought the total number of NITs to 20. These institutes were expected to match the quality of other national-level technical institutions and meet the demand for high-quality undergraduate and postgraduate education in engineering and technology. The National Institute of Technology Act, 2007, was passed by Parliament to provide a uniform statutory framework for all NITs.

# STRUCTURE OF ENGINEERING EDUCATION

Admissions to the NITs are conducted through the All-India Engineering Entrance Examination (AIEEE), administered by the Central Board of Secondary Education (CBSE).[xxi]

## Indian Institutes of Information Technology

The Central Government has established five IIITs at Allahabad, Gwalior, Jabalpur, Kancheepuram and Kurnool. These institutions are meant to provide undergraduate, postgraduate as well as Ph.D education. The IIIT at Gwalior is for IT in Management. The IIITs at Jabalpur, Kancheepuram and Kurnool are for IT in Design as well as Manufacturing. Under the 11th Five Year Plan 20 more IIITs have been established in the country in the Public Private Partnership (PPP) mode.

Admissions into undergraduate programmes in IIITs are made through the JEE (Main) Examination.[xxii]

## Private Deemed Universities

Birla Institute of Technology and Science Pilani, Amrita Vishwa Vidyapeetham, Vellore Institute of Technology, and International Institute of Information Technology, Hyderabad are some of the top private deemed universities in the country. The curriculum here is more updated and flexible than public Universities.

Admission to engineering programs in India is highly competitive and typically involves entrance exams, including:

**JEE Main and JEE Advanced:** The Joint Entrance Examination (JEE) is the primary entrance test for admission to top engineering institutes like the Indian Institutes of Technology (IITs), National Institutes of Technology (NITs), and other premier institutions. JEE Main is the first stage, and successful candidates then qualify for JEE Advanced, which is required for IIT admissions.

**State-Level Exams:** Many states conduct their own entrance exams for engineering admissions, such as the Maharashtra Common Entrance Test (MHT-CET), Karnataka Common Entrance Test (KCET), Tamil Nadu Engineering Admissions (TNEA), and West Bengal Joint Entrance Examination (WBJEE).

**Private University Exams:** Some private universities, such as VIT University, BITS Pilani, and Manipal University, have their own entrance exams for admission to their engineering programs.

# MAJOR SPECIALIZATIONS

## Aerospace Engineering

This branch of engineering focuses on the research, design, development, construction, testing, and technology of aircraft. It also includes astronautical engineering, which specializes in spacecraft and the challenges of deep space environments.

## Chemical Engineering

This field of engineering involves applying chemical and biological processes to create valuable materials or substances. It is an interdisciplinary area, merging natural and experimental sciences like chemistry and physics, life sciences such as biology, microbiology, and biochemistry, as well as mathematics and economics.

## Civil Engineering

Civil engineering is the profession focused on designing and constructing infrastructure projects. These projects can range from large-scale endeavors like nationwide transportation systems or water supply networks to smaller projects, such as individual roads or buildings.

## Electrical/ Electronic Engineering

Electrical and electronics engineering both deal with the use of electrical power. The main distinction between the two is that electrical engineers primarily focus on the large-scale generation and distribution of electrical power, whereas electronics engineers specialize in smaller electronic circuits, like those found in computers.

## Mechanical Engineering

Mechanical engineering, one of the oldest and most diverse branches of engineering, focuses on the design, manufacturing, and maintenance of mechanical systems. It involves studying topics such as statics and dynamics, thermodynamics, fluid dynamics, stress analysis, mechanical design, and technical drawing.

## Computer Engineering

Computer engineering focuses on the design and development of computing hardware and software. It combines elements of electrical engineering and computer science

# KEY TRENDS

Over 1.29 million students were enrolled in the computer science engineering discipline in the academic year 2022. The second highly sought-after engineering discipline was electronics with about 605 thousand students for the same year.[xxiii]

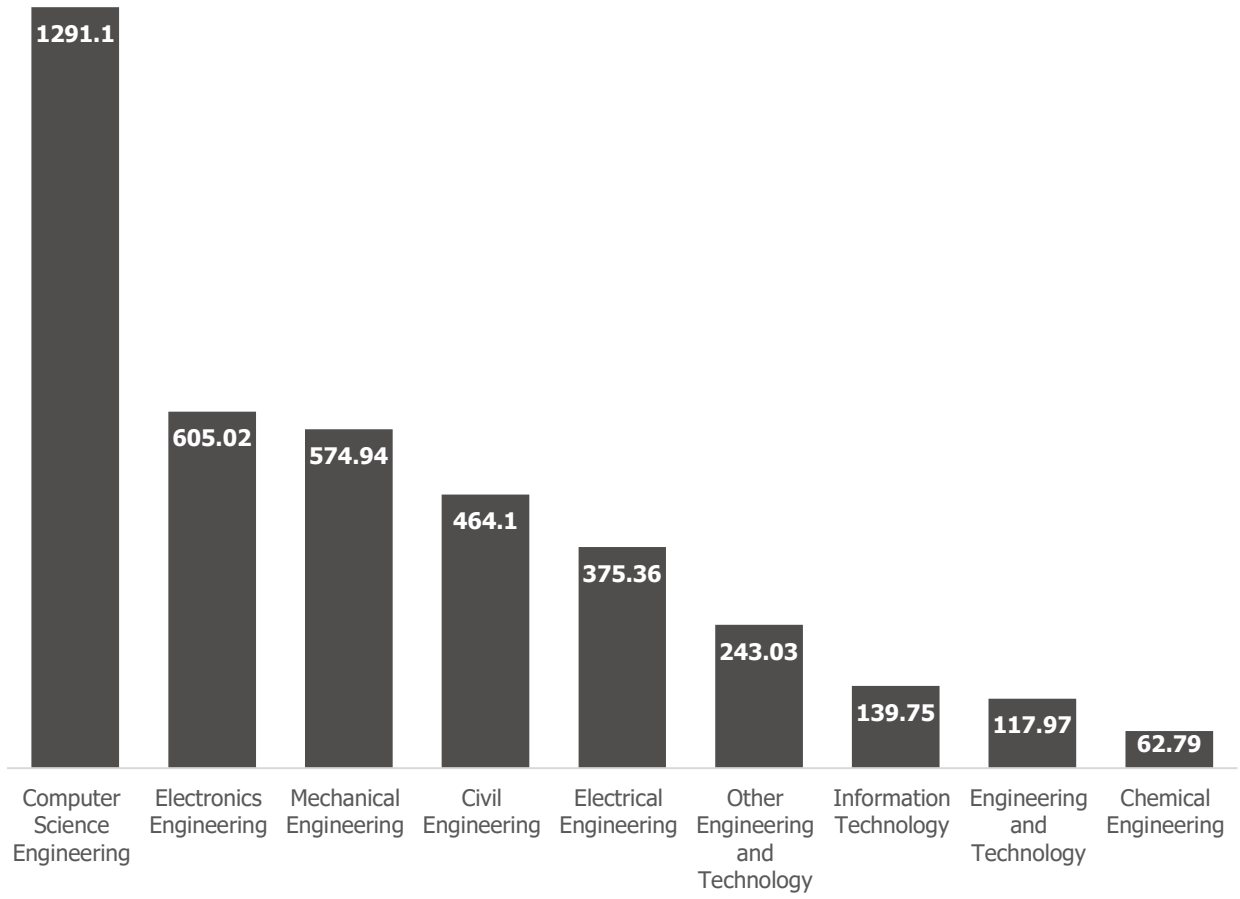
## Skills Gap

Nasscom estimates the demand supply gap for digital talent is expected to widen from the current 25 per cent to about 29 per cent in 2028. As per the report, Over the next 2-3 years, India's technology sector will require over 1 million engineers with advanced skills in artificial intelligence and other specialized areas.[xxiv]

## Enrolment in Engineering

According to 2023 All India Survey on Higher Education (AISHE), enrolment in regular engineering programmes dropped by 10 percent from 40.85 lakh in 2016-17 to 36.63 lakh in 2020-21.[xxv] This is due to increasing costs, diminishing job opportunities, competition and emergence of alternate career choices.

**Fig 3.2: Number of students enrolled in engineering at an undergraduate level across India in 2022, by discipline**



# CAREER OPPORTUNITIES

## 1. Higher Studies

**M.Tech / MS (Master's Degree):** Many engineers pursue higher studies to specialize in a particular field, whether it's in technology, management, or research. Top institutions such as IITs, NITs, and foreign universities offer advanced degrees in engineering.

**MBA (Master of Business Administration):** Engineering graduates often opt for an MBA to enter the business or management field, which can lead to roles such as project manager, consultant, or business analyst.

**Ph.D.:** Those interested in research or academia may pursue a Ph.D. to contribute to innovations in their field and potentially become professors or researchers in institutes.

## 2. Core Engineering Jobs

Engineers can work directly in their respective fields, such as:

**Software Engineer/Developer:** For those in Computer Science or IT engineering, roles include software development, system design, app development, and cybersecurity.

**Mechanical Engineer:** Opportunities in industries like automotive, manufacturing, aerospace, and robotics.

**Civil Engineer:** Opportunities in infrastructure development, construction, project management, and urban planning.

**Electrical/Electronics Engineer:** Roles in power generation, telecommunications, electronics, and consumer goods.

**Chemical Engineer:** Opportunities in industries such as oil & gas, pharmaceuticals, food processing, and environmental engineering.

## 3. Startup/Entrepreneurship

Many engineers choose to start their own ventures, especially with the rise of technology-driven startups. With a strong understanding of engineering principles, they can create solutions in fields such as software, hardware, renewable energy, or even consulting.

## 4. Public Sector Jobs

Engineers can find opportunities in government organizations such as:

**Public Sector Undertakings** (PSUs) like BHEL, ONGC, ISRO, DRDO, etc., through exams such as GATE (for technical roles).

**Indian Engineering Services** (IES): A prestigious career option for engineers in the Indian government, involving roles in public sector engineering departments.

**Defense Services:** Engineers can join the Indian Army, Navy, or Air Force through various entry schemes.

## 5. Freelancing and Consulting

Engineers with specialized skills in areas like software development, mechanical design, data analysis, or electrical systems can work as freelancers or consultants, offering their expertise to businesses on a project basis.

## 6. IT and Software Industry

The IT industry is one of the largest employers for engineers, especially for those with skills in programming, data analysis, and software development. Companies like Google, Microsoft, Amazon, and many others actively hire engineering graduates.

## 7. Research and Development (R&D)

Engineers can contribute to cutting-edge developments in fields like AI, robotics, biotechnology, nanotechnology, and more. These roles often require a high level of technical expertise and innovation.

## 8. Government Exams and Services

Engineers can prepare for various competitive exams such as:

**IAS/IPS** (Indian Administrative Service/Indian Police Service) for a career in civil services.

**State Government Services** in technical departments.

## 9. Interdisciplinary Roles

**Data Science and Analytics:** Engineers, especially those from computer science, electrical, or mechanical backgrounds, can transition into data science roles by learning programming languages and statistical analysis.

**AI & Machine Learning:** Those with expertise in computer engineering or related fields can enter the AI and ML domain, working on projects involving automation, data-driven decision-making, and robotics.

# EMERGING TRENDS

## Focus on Emerging Technologies

As industries evolve, there is a greater emphasis on emerging technologies like Artificial Intelligence (AI), Machine Learning (ML), Blockchain, Cybersecurity, Internet of Things (IoT), and Robotics in engineering curricula. Institutions are offering specialized courses in these fields to cater to the growing demand for skilled professionals.

## Interdisciplinary Learning

To keep pace with global trends, many engineering schools are integrating interdisciplinary learning, encouraging students to take courses outside their core discipline and work on projects that combine different fields, such as Bio-informatics or Environmental Technology.

## Entrepreneurship and Innovation

Many engineering colleges in India are promoting entrepreneurship and innovation through incubation centers, hackathons, and startup competitions. This helps students apply their technical skills to create new products and solutions, encouraging the growth of startups.

## Online Education and MOOCs

With the rise of online platforms, students can now access specialized courses and certifications in various engineering fields through Massive Open Online Courses (MOOCs) like Coursera, edX, and Udemy. This allows students to supplement their formal education and acquire new skills in cutting-edge areas of technology.

## Research and Development

India's emphasis on innovation and the development of indigenous technologies offers vast opportunities for BTech students interested in research. Government-supported institutions, research laboratories, and corporate R&D centers provide platforms for engaging in advanced research across a range of fields, including biotechnology, nanotechnology, and aerospace engineering.[xxvi]

# TOP RANKED INSTITUES

Following are the top 25 ranked engineering institutions across India as per National Institutional Ranking Framework, Ministry of Education, Government of India

| NIRF Rank | Institution | City | State |
|---|---|---|---|
| 1 | Indian Institute of Technology Madras | Chennai | Tamil Nadu |
| 2 | Indian Institute of Technology Delhi | New Delhi | Delhi |
| 3 | Indian Institute of Technology Bombay | Mumbai | Maharashtra |
| 4 | Indian Institute of Technology Kanpur | Kanpur | Uttar Pradesh |
| 5 | Indian Institute of Technology Kharagpur | Kharagpur | West Bengal |
| 6 | Indian Institute of Technology Roorkee | Roorkee | Uttarakhand |
| 7 | Indian Institute of Technology Guwahati | Guwahati | Assam |
| 8 | Indian Institute of Technology Hyderabad | Hyderabad | Telangana |
| 9 | National Institute of Technology Tiruchirappalli | Tiruchirappalli | Tamil Nadu |
| 10 | Indian Institute of Technology (Banaras Hindu University) Varanasi | Varanasi | Uttar Pradesh |
| 11 | Vellore Institute of Technology | Vellore | Tamil Nadu |
| 12 | Jadavpur University | Kolkata | West Bengal |
| 13 | S.R.M. Institute of Science and Technology | Chennai | Tamil Nadu |
| 14 | Anna University | Chennai | Tamil Nadu |
| 15 | Indian Institute of Technology (Indian School of Mines) Dhanbad | Dhanbad | Jharkhand |
| 16 | Indian Institute of Technology Indore | Indore | Madhya Pradesh |
| 17 | National Institute of Technology Karnataka, Surathkal | Surathkal | Karnataka |
| 18 | Indian Institute of Technology Gandhinagar | Gandhinagar | Gujarat |
| 19 | National Institute of Technology Rourkela | Rourkela | Odisha |
| 20 | Birla Institute of Technology and Science, Pilani | Pilani | Rajasthan |
| 21 | National Institute of Technology Warangal | Warangal | Telangana |
| 22 | Indian Institute of Technology Ropar | Rupnagar | Punjab |
| 23 | Amrita Vishwa Vidyapeetham | Coimbatore | Tamil Nadu |
| 24 | Jamia Millia Islamia | New Delhi | Delhi |
| 25 | National Institute of Technology Calicut | Kozhikode | Kerala |

# END NOTES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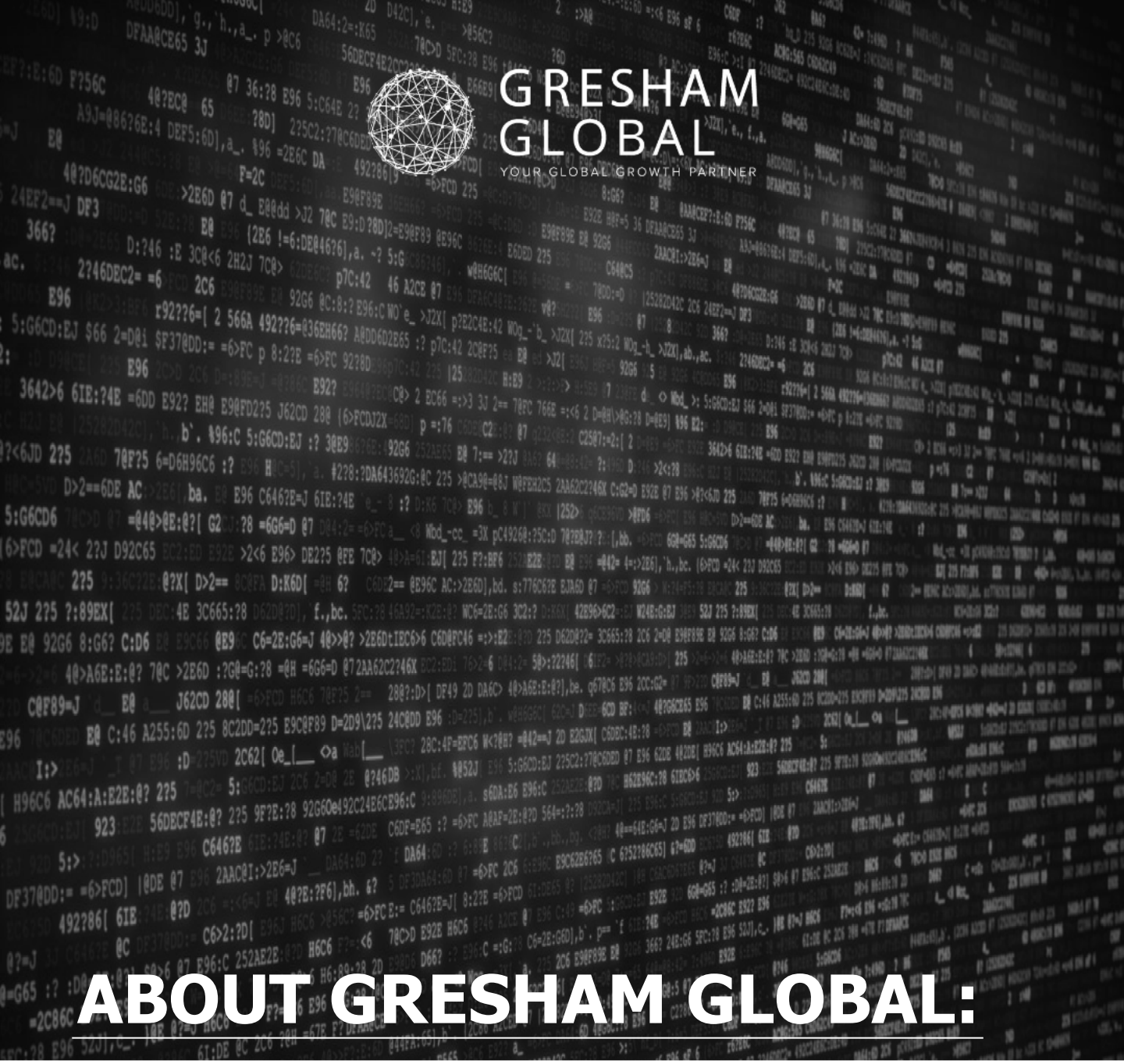


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