

F R O S T & S U L L I V A N



Integrated Telecom, Security and Safety (ITSS) Systems Market

26th September, 2025

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1. Global Macroeconomic Trends

1.1. Global GDP and GDP Growth

The International Monetary Fund (IMF) World Economic Outlook (WEO) July 2025 Update expects the world GDP growth to be 3.0% in 2025 and 3.1% in 2026. The forecast for 2025 is 0.2% point higher than that in the reference forecast of the April 2025 WEO Update and 0.1 percentage point higher for 2026. The upward revisions reflect stronger-than-expected early activity in response to anticipated tariff hikes, lower average US tariff rates than those announced in April, improved financial conditions stemming partly from a weaker US dollar, and expanded fiscal support in some key economies. Global headline inflation is forecast to decline to 4.2 percent in 2025 and 3.6 percent in 2026, closely mirroring earlier projections. However, this overall trend conceals significant differences across countries: in the United States, inflation is expected to stay above target, while larger economies will likely see more moderate price rises.

Risks to this outlook remain inclined to the downside, as highlighted in WEO April 2025 Update. If the tariff rates climb again, global growth may weaken. High uncertainty could hamper economic growth, especially if additional tariffs take effect without enduring, comprehensive agreements being reached. Rising geopolitical tensions could also disrupt supply chains and drive-up commodity prices. Parallely, larger fiscal deficits or heightened risk aversion may push long-term interest rates higher and tighten global financial conditions, fueling renewed volatility in financial markets amid ongoing fragmentation concerns. On the contrary, a positive resolution to trade negotiations could boost global growth. Policies must formulated and enacted for restoring confidence, promoting predictability and sustainability, lowering tensions, safeguarding price and financial stability, rebuilding fiscal buffers, and improving essential structural reforms.

Exhibit 1: Overview of the World Economic Outlook, actual and projections, 2020 - 2026
(Real GDP, annual percentage change)

	2020	2021	2022	2023	2024	2025*	2026*
World Output	-3.1	6.0	3.5	3.3	3.3	3.0	3.1
Advanced Economies	-4.5	5.2	2.6	1.7	1.8	1.5	1.6
United States	-3.4	5.7	2.1	2.9	2.8	1.9	2.0
Euro Area	-6.3	5.2	3.3	0.4	0.9	1.0	1.2
Germany	-4.6	2.6	1.8	-0.3	-0.2	0.1	0.9
France	-8.0	6.8	2.5	1.1	1.1	0.6	1.0
Italy	-8.9	6.7	3.7	0.7	0.7	0.5	0.8

Spain	-10.8	5.1	5.8	2.7	3.2	2.5	1.8
Japan	-4.6	1.7	1.0	1.7	0.2	0.7	0.5
United Kingdom	-9.8	7.4	4.1	0.3	1.1	1.2	1.4
Canada	-5.3	4.5	3.4	1.2	1.6	1.6	1.9
Other Advanced Economies^a	-1.9	5.3	2.6	1.8	2.2	1.6	2.1
Emerging Market and Developing Economies	-2.1	6.6	4.1	4.4	4.3	4.1	4.0
Emerging and Developing Asia	-0.8	7.2	4.5	5.7	5.3	5.1	4.7
China	2.3	8.1	3.0	5.2	5.0	4.8	4.2
India^b	-7.3	8.7	7.2	8.2	6.5	6.4	6.4
Emerging and Developing Europe	-2.0	6.8	0.8	3.3	3.5	1.8	2.2
Russia	-3.0	4.7	-2.1	3.6	4.3	0.9	1.0
Latin America and the Caribbean	-7.0	6.9	4.1	2.2	2.4	2.2	2.4
Brazil	-4.1	4.6	2.9	2.9	3.4	2.3	2.1
Mexico	-8.3	4.8	3.9	3.2	1.4	0.2	1.4
Middle East and Central Asia	-2.8	4.5	5.6	2.1	2.4	3.4	3.5
Saudi Arabia	-4.1	3.2	8.4	-0.8	2.0	3.6	3.9
Sub Saharan Africa	-1.7	4.7	4.0	3.6	4.0	4.0	4.3
Nigeria	-1.8	3.6	3.3	2.9	3.4	3.4	3.2
South Africa	-6.4	4.9	1.9	0.7	0.5	1.0	1.3
Memorandum							
Emerging Market and Middle-Income Economies	-2.3	6.8	4.0	4.4	4.3	4.0	3.9
Low-Income Developing Countries	0.1	4.1	5.2	4.1	4.0	4.4	5.0

* Projected

Source: World Economic Outlook Update, IMF, October 2021, October 2022, October 2023, October 2024, July 2025

Note: For India, data and forecasts are presented on a fiscal year basis, with FY 2024/25 (starting in April 2024) shown in the 2024 column, India's growth projections are 6.7 percent for 2025 and 6.4 percent for 2026 based on calendar year.

1.2. Regional Economic Trends

The IMF expects the global real GDP to grow at 3.0% in 2025 and 3.1% in 2026. Growth in the emerging and developing countries is likely to outperform the GDP growth in advanced economies thus continuing the trend of growth across most regions. Described below are the GDP growth trends across different regions.

Advanced Economies: Growth in the advanced economies is likely to be at 1.5% in 2025 and 1.6% in 2026 – around half of the global GDP growth. US is likely to grow by 1.9% in 2025, reflecting lower tariff rates compared to those announced on April 2 and more accommodative financial conditions. This projection is 0.1 percentage point above the April reference forecast, although faster-than-anticipated cooling in private demand and reduced immigration will partially offset this gain. In the Euro zone, the GDP growth is expected to be slightly faster than 2023 and 2024 at 1.0% in 2025 and 1.2% in 2026. The 2025 forecast has been revised upward by 0.2% points, largely due to a strong GDP performance in Ireland during the first quarter, even though Ireland accounts for less than 5% of the euro area's total GDP. There has been significant surge in Irish pharmaceutical exports to the US, driven by front-loaded shipments and the commissioning of new production facilities. Beyond Ireland, there is not much change (0.1% points upward movement from the WEO April 2025 update) in the Euro area's GDP growth forecast for 2025.

Japan, United Kingdom, and Canada are the other advanced countries in the world. While Japan is counted among the world's top 5 economies, its growth has remained flat with the trend likely to continue in 2025 and the year after. The country faces significant challenges including a shrinking and aging population, high public debt (around 260% of GDP), and uncertainties from global trade tensions, particularly increased U.S. tariffs and slower demand from key partners such as China. In the contrary, UK has experienced uneven growth from as high as 7.4% in 2021 to 0.3% in 2023. Based on IMF estimates, UK is likely to see GDP growth of 1.2% and 1.4% in 2025 and 2026 respectively. Monetary policy rates in the country is expected to decline in the second half of 2025, inflation to remain in the 3% mark before it falls down to reach Bank of England's target of 2% by 2027.

Emerging and Developing Economies: China, India, Russia, Brazil, Mexico, Saudi Arabia, and Nigeria are counted among the most prominent emerging and developing economies of the world. China remains one of the very few countries that have grown even during the COVID-19 pandemic. Its economic growth is driven by robust industrial output, export strength, and targeted investments, particularly in infrastructure and manufacturing. However, domestic consumption remains below pre-pandemic levels, and challenges persist in the real estate sector, especially in lower-tier cities.

India, considered as one of the fastest growing emerging economies, have experienced over 6% GDP growth since 2021, touching as high as 8.7% growth. It has surpassed Japan to become the fourth largest economy in the world. Growth in the country is primarily driven by rising domestic consumption, robust private and public investment, and a youthful population of over 1 billion. Within the next few years, India is likely to surpass Germany to become the third-largest economy. Nevertheless, Russia's growth has slowed down since the Ukraine war which is likely to go further downwards in 2025 and 2026. Russia faces structural limits on growth such as demographic decline, restricted access to technology and markets due

to sanctions, and a slowdown in government spending. Similarly, Brazil and Mexico has lost its shine to a certain extent as both the countries have experienced inconsistent GDP growth figures since 2021.

1.3. GDP of Select Economies

The world GDP is expected to be \$113.80 trillion (Tn.) by end of 2025, up from \$22.64 Tn. in 1990. The number is expected to grow even higher to reach \$144.58 Tn. by 2030. Currently, USA remains the biggest economy in the world followed by China, Germany, India, Japan and UK.

Exhibit 2: GDP of Select Countries at Current Prices, Advanced and Emerging Economies 1990 – 2030, in \$ Bn.

	1990	2000	2010	2020	2025*	2030*
USA	5,963.13	10,251.00	15,048.98	21,354.13	30,507.22	37,153.09
Canada	596.09	744.63	1,617.35	1,655.69	2,225.34	2,792.32
Germany	1,604.50	1,967.85	3,470.99	3,936.99	4,744.80	5,575.69
France	1,260.87	1,361.56	2,648.39	2,645.81	3,211.29	3,754.78
UK	1,197.02	1,668.69	2,487.92	2,698.71	3,839.18	4,955.99
Japan	3,185.90	4,968.36	5,759.07	5,054.07	4,186.43	4,994.89
China	397.36	1,220.34	6,138.99	15,103.36	19,231.71	25,827.52
India	320.98	468.40	1,675.62	2,674.85	4,187.02	6,769.82
Russia	NA	278.26	1,633.11	1,488.12	2,076.40	2,384.21
Brazil	455.34	655.45	2,208.70	1,476.09	2,125.96	2,679.57
Mexico	307.61	742.06	1,105.42	1,121.07	1,692.64	2,151.88
Saudi Arabia	117.47	189.52	528.21	734.27	1,083.75	1,374.16

*Projected

Source: As per latest GDP data from IMF published in April 2025 (accessed on 5th August, 2025)

1.4. Industry Verticals driving Economic Growth

Critical National Infrastructure or CNI ([definition of CNI has been detailed in the Appendix Section of the report](#)) forms the backbone of any economy that drives sustained economic growth and national development. CNI includes foundational assets like energy & utilities (oil & gas, and power), transportation, defense, healthcare, and communication systems that have a critical impact on economic security, public safety, and national well-being. CNI acts as an essential recipe for economic prosperity by enabling efficient movement of goods, services, and people, reducing operational costs, and enhancing market connectivity. The following mentioned below describes how the CNI verticals have contributed in boosting economic growth across countries and regions worldwide.

Energy & Utilities

- **North America:** North America's position in the energy sector influences global demand and supply dynamic. North America is a net exporter of energy with robust production of shale in USA and oil sands in Canada. Based on estimates, ~22% of the total oil production globally comes from USA and 6% from Canada¹. This market contribution is complemented by the large number of employment opportunities that are created because of the large scale of oil and energy production. As a matter of fact, the oil and gas industry in California (USA) alone generates around 5,36,770 jobs and \$53 Bn in labour income². Based on a report by Texas Independent Producers and Royalty Owners Association (TIPRO)³, the oil and gas industry in USA employed 2.04 million workers in 2023.
- **Europe:** In Europe, the "European Green Deal" aims at net-zero emissions by 2050 helping promote green industries. According to World Energy Investment 2024, the European Union (EU) invested 110 Bn euros in renewable energy in 2023 and spends 10 times more on clean energy as compared to fossil fuels. Beyond renewable energy, the European Union has also begun to focus on power networks, energy storage and carbon capture technologies, and has invested around \$360 Bn. in 2023. These investments in clean energy and traditional fuel ensures, constant and uninterrupted supply of power, which is critical for Europe's economic growth.
- **Middle East (ME):** The ME economies contribute ~15% of the global energy investments. The governments in the region focus on renewable options investing in large-scale solar parks, wind farms, and hydrogen projects, signaling a shift toward sustainability. Major investments in power generation, transmission, and distribution are underway, with the Middle East Energy 2025 event in Dubai highlighting new technologies in smart energy, storage, and electric mobility. Investments and advancements in power and energy sector implies the focus on sustained development boosting economic surge.
- **APAC:** The region being the most populated in the world, its energy consumption per capita has increased by 179%. Energy needs in the region have been driven by urbanization and industrialization. The countries in the region are making efforts to transition to sustainable energy sources by slowly moving away from fossil-based fuel. For instance, India invested \$68 Bn. in clean energy in 2023, a 40% increase over the 2016–2020 average. Nearly half of this went to low-emissions power generation, such as solar PV. Meanwhile, fossil fuel investment rose 6% to \$33 Bn. in response to higher energy demand. Under current policies, clean energy investment is on track to double by 2030, however needs to rise another 20% to meet India's full energy and climate targets. Energy investment accounts for 1.5% of GDP in Japan and Korea, with clean energy investment nearly 10 times higher than fossil fuel investment, over five times the global average. This trend reflects strong clean energy growth and the countries' heavy reliance on

¹ US Energy Information Administration, <https://www.eia.gov/tools/faqs/faq.php?id=709&t=6>

² 2025 Report Oil & Gas in California, LAEDC, https://laedc.org/wpcms/wp-content/uploads/2025/03/LAEDC_Oil-and-Gas-Economic-Impact-Report_FINAL_2025.03.07-2.pdf

³ USA Oil and Gas Job Figures Jump, Rigzone, March 2024, https://www.rigzone.com/news/usa_oil_and_gas_job_figures_jump-25-mar-2024-176192-article/

imported fossil fuels. Between 2021 and 2023, clean energy investment rose by approximately 40% in Japan and 10% in Korea compared to the 2016–2020 average. China has also rapidly expanded its renewable capacity. For instance, in 2023, it increased its wind capacity by 66% year-on-year. Over the past five years, it also added 11 GW of nuclear power. Strong domestic manufacturing and government support are the key factors driving investments in energy & utilities.

Transportation

- **North America:** Transportation has been a cornerstone for economic growth in North America. Over the years, various transportation infrastructure projects have been undertaken to boost the economic activity in the region. Based on secondary data, the transportation industry contributes to 6.5% of the country's GDP⁴. US Rail alone generates \$233.4 Bn. in economic output and supports nearly 7,49,000 jobs. The notable California High Speed Rail (CAHSR) project which aims to significantly reduce the travel time is said to have an economic impact of \$21.8 billion. Modernization plans and new infrastructure development projects in transportation would further enable economic growth in the region.
- **Europe:** Data suggests the transportation sector contributed 5.2% of EU's GDP. EU investments in infrastructure priorities climate-smart mobility, labour mobility, and integration of secondary cities - making infrastructure central to sustainable growth in the region. EU's general government's total expenditure on transport was around 2% from 2012 to 2019. It increased to 2.3% in 2020 and remained there in 2021, reflecting increased expenditure to support transport operators alongside a smaller increase in nominal GDP. In 2022, the ratio dropped back slightly, to 2.2%. Notable transportation projects such as Rail Baltica project, spanning five countries from Poland to Finland, expected to boost GDP growth in the Baltic region by 0.5-0.7% and add Eur16.2 - 22.5 billion in economic benefits, including travel time savings, trade facilitation, and regional cohesion.
- **Middle East:** The transportation sector contributes 8-10% of the total GDP in the ME. As per Airports Council International, Dubai remains one of the busiest airports in the world with around 66 million passengers in 2022, a 127% increase over 2021. Notable projects such as the Gulf Railway, a proposed 2,177 km pan-GCC network estimated at \$250 Bn., aims to connect all Gulf states via freight and passenger rail. It is projected to help the GCC railroad market exhibit a growth rate of 6.0%, facilitating trade, reducing transportation costs, and supporting regional tourism and labour movement.
- **APAC:** The region's economic growth is majorly driven by urbanization. It is to be noted that transportation often plays a key role in urbanization. Major large scale transportation projects are undertaken to improve connectivity and enhance business opportunities in the region. For example, In India, projects like Sagarmala and Bharatmala are undertaken to improve highway roads and ports respectively. Sagarmala Programme has significantly transformed coastal and

⁴ Bureau of Transportation Statistics, December 2024, <https://www.bts.gov/newsroom/transportation-services-contributed-65-us-gdp-2023-decrease-66-2022-still-above-pre>

inland waterway logistics. Coastal shipping volumes have increased by 118% over the last decade, while inland waterway cargo has grown by a staggering 700%. These improvements are expected to contribute approximately 2% to India's GDP and generate around 10 million jobs by 2025, largely through reduced logistics costs amounting to INR. 35,000-40,000 crore annually.

Defense

- **North America:** In mid-2025, President Donald Trump proposed the first-ever \$1 Trillion US Defense budget for Fiscal Year 2026. This proposal includes a base defense request of \$892.6 Bn. and an additional \$119.3 Bn. budget allocated through a congressional budget reconciliation bill, which is under negotiation in Congress. Currently, the US defense budget stands at \$849.8 Bn. for the year 2025. Not only is the defense sector among the largest employers in the US creating millions of jobs, but it also brings in large economic impact. Defense spending supports large contractors like Boeing and Lockheed Martin along with working closely with a large network of smaller suppliers and service providers, amplifying the economic impact through the supply chain. Likewise in Canada, the defense sector contributed to over 81,200 jobs (as of 2022) with GDP contribution to around \$9.6 Bn. While Western and Northern Canada excels in military aircraft maintenance, repair, overhaul, modernization or upgrade services, Ontario and Quebec focus on combat vehicles and aircrafts.

The defense sector is one of the biggest spenders on research and development (R&D). The much-needed innovation-based approach from governments for defense leads to technological breakthroughs that often spill over into the civilian economy. Notable examples include the internet, GPS, and advances in aerospace and materials science. Both US and Canadian defense sectors invest heavily in R&D, with Canada's industry being notably research-intensive and the US Department of Defense funding major innovation initiatives.

- **Europe:** Defense expenditure by EU members increased more than 30% between 2021 and 2024. Defense spending has surged to Cold war era level on the account of Ukraine -Russia war. In 2024, total military budgets in Europe (including Russia) rose to 17% to about \$693 billion. Major EU and NATO members sharply increased outlays for example, Germany's grew 28% to \$88.5 billion and Poland's 31% to \$38.0 billion. The UK and France also expanded spending to about \$81.8B and \$64.7B respectively. Nearly all NATO members in Europe now exceed the 2% GDP guideline.
- **Middle East:** Countries in the region such as Saudi Arabia, UAE, Qatar, Kuwait and Egypt were among the top weapon importing countries in world between 2019 and 2023. In the last couple of years, the countries are now seeking to diversify their defense suppliers and are turning to Asian countries such as China and South Korea. For instance, Saudi Arabia and UAE have adopted to South Korea's Air defense system. Likewise, UAE has adopted the China's Wing Loong II drones. Summarily, defense expenditure in the region increased by 15% and reached \$243 billion in 2024.
- **APAC:** In APAC, countries are increasingly investing their defense expenditure in a dynamic environment. Countries like China, India, South Korea are becoming self-reliant in their defense technologies. Governments are forging relationships with private sectors to be less dependent on foreign companies. For instance, in India, policies like Make in India and relaxed FDI norms have boosted local manufacturing, attracted foreign investment, and significantly increased defense

exports. India's exports in defense manufacturing increased from Rs. 686 crore in FY 2013-14 to Rs.23,622 crore. India's defense budget also increased from 2.53 lakh crore in FY 2013-14 to 6.81 lakh crore in FY 2025-26.

1.5. Need for Digital Communications

For critical industry verticals that constitute the backbone of any economy to sustain and flourish, digital communications are integral to their success. Digital communications remain foundational to the CNI sector, enabling resilient, secure, and seamless operations across essential services such as energy & utilities (oil & gas, and power), transportation, public safety, telecommunications, healthcare and defense. Networked Digital Systems play an indispensable role in the production and large-scale movement of highly critical products such as electricity, oil, mined ores and metals in a safe and secure environment. Similarly, they are crucial in the transportation sector for ensuring that passengers and freight are moved safely, securely and efficiently in high-density and high-speed operations. The points mentioned below describe how digital communications support the CNI sector and why it is essential.

- **Ensures reliable connectivity:** Communications infrastructure which comprises of fiber optics, 5G network connectivity, satellite links, IoT networks, wireless communications, etc. serves as an important pillar for CNI operations. Digital communications ensure uninterrupted delivery of essential services like energy distribution, emergency response, transport signals, and encrypted messages used in the defense sector. For example, optical fiber is commonly used for business-critical and static applications, while satellite connectivity covers remote or maritime locations. The reliability of these networks is crucial since any disruption can lead to serious economic, social, and even life-threatening consequences.
- **Improves security and resilience:** The CNI sector being the backbone of the economy often remain the primary target for cyber criminals which can disrupt essential services and threaten national security. Secure digital communication platforms are essential for protecting sensitive operational data, ensuring compliance with regulations, and enabling rapid incident response. Specific agencies like the National Protective Security Authority and National Cyber Security Centre in the UK, provide guidance and support to CNI operators to mitigate risks. The design and implementation of advanced, encrypted, and sovereign networks helps safeguard against cyber threats and physical attacks thus making the CNI sector more resilient to disruptions.
- **Enables innovation and automation:** The use of digital networks facilitates the integration of automation, AI, and IoT into critical operations. These technologies enable predictive maintenance, live monitoring and remote control of digital assets which improves efficiency and reduces operational costs. For example, LoRaWAN and NB-IoT networks are used to monitor and track assets, while 5G supports massive IoT deployments and advanced analytics. Effectively, digital transformation drives innovation, allowing industries to optimize processes and respond to changing market demands.
- **Supporting critical communications:** Referred to as mission critical communications (MCx), such as those used by public safety agencies, require ultra-reliable, secure, and high-quality voice, video, and data transmission. Advanced technologies like 5G and LTE have started to replace legacy systems thus enabling first responders and emergency services to coordinate effectively

during crises, ensuring public safety and rapid restoration of services. The ability of digital communications to support advanced multimedia services and guarantee quality of service is particularly valuable for sectors that are either considered fundamental (like energy or transportation) or critical (emergency services).

- **Facilitating collaboration and co-ordination:** Next-generation digital communication networks allow real-time collaboration between agencies, operators, and stakeholders. It is necessary for well-coordinated responses to incidents, efficient resource allocation, and information sharing during emergencies or routine operations. For instance, WiFi and advanced mobile networks help secure communication channels for public sector sites, emergency services, and local government, supporting both day-to-day operations and crisis management.

2. India Macroeconomic Trends

2.1. India Macroeconomic Trends and Growth

Exhibit 3: India Macroeconomic Indicators, 1990 – 2030

	1990	2000	2010	2020	2025*	2030*
GDP (\$ Bn.) (at current prices)	320.98	468.40	1,675.62	2,674.85	4,187.02	6,769.82
GDP Per Capita (\$) (at current prices)	368.75	442.04	1,350.63	1,915.55	2,878.45	4,468.54
Inflation (%) (avg. consumer prices)	11.2	3.8	9.4	6.2	4.2	4.0
Unemployment Rate (%)	NA	NA	NA	8.7	4.9	4.9
Population (Mn.)	870.45	1,059.63	1,240.61	1,396.39	1,454.61	1,514.99

Source: IMF WEO Update April 2025

GDP

As per the latest IMF WEO Update released in July 2025, India's real GDP is likely to grow at 6.4% in both 2025 and 2026. This is 0.1% point less than the 2024 GDP growth figures⁵. Earlier in April 2025, the IMF estimated India's GDP to be \$3,909.10 Bn. in 2024 and likely to become \$6,769.82 Bn. in 2030 to rank as the third largest economy in the world after USA and China. In-fact India's GDP growth is considered as one of the fastest growing among the large economies. India has a strong domestic consumption with rising private and public investment. There is continued growth in the services sector and rising manufacturing output. The growth is considered significant due to moderate global economic conditions and ongoing geopolitical uncertainties. India's domestic fundamentals remain resilient—helped by easing inflation, rapid infrastructure development, and increased rural and urban consumption. Nevertheless, much like any country, challenges persist in terms of income inequality, relatively low workforce productivity, and concerns about jobless growth, despite being a leading consumer market and the second-largest labor force worldwide. Overall, India's economic outlook for the coming years remains optimistic, anchored by sustained domestic demand and policy efforts to address structural challenges.

⁵ World Economic Outlook (WEO) Update, IMF, July 2025, <https://www.imf.org/en/Publications/WEO/Issues/2025/07/29/world-economic-outlook-update-july-2025>

GDP Per Capita

India's GDP per capita has increased considerably since 1990. Just before the country's economic transformation in 1991, India had a GDP per capita of \$368.75 which improved notably over the years. Based on estimates, by end of 2025, the number would become \$2,878.45 and further increase to \$4,468.54 in 2030. The value represents the average economic output per person when the country's total GDP is divided by its population, highlighting India's growing but still relatively low per capita income compared to developed nations. The low number represents the country's ongoing challenge of equitable income distribution and economic inclusion across the population. The advancement in per capita GDP marks improved living standards and economic prosperity, supported by sustained GDP growth rates above 6%, but also underscores the need for broad-based growth to lift incomes and reduce poverty further.

Inflation

India's inflation has shown steady decline since 1990. From 11.2% inflation rate recorded in 1990, the country is likely to see average inflation rate of 4.2% in 2025. In the next year, the number is expected to go down even further to touch 4.0%. The sustained decline is attributed to favorable base effects, stabilization in fuel and energy prices, and effective economic policies. While inflation in categories like housing, education, health, and transport saw minor upticks, overall price pressures have eased, providing relief to consumers and creating room for potential interest rate cuts by the Reserve Bank of India to foster economic growth.

Unemployment Rate

Much like inflation rate, the unemployment numbers have shown positive impact over the last few years. From 8.7% in 2020, the unemployment number hovers around 4.9% in 2025 and is likely to remain stable in the following year. However, India's unemployment scenario in 2025 reflects a complex interplay of structural, demographic, and economic factors. The labor market continues to face challenges related to the absorption of its large and growing workforce, particularly among youth and women, who often encounter barriers to entry such as skill mismatches, limited job opportunities, and social constraints. Especially in rural India, there are seasonal fluctuations tied to agriculture cycle that contribute to under-employment and disguised employment. Likewise in urban areas, sectors like manufacturing and services experience varying demand influenced by global economic trends and domestic policy shifts, impacting job creation dynamics. Nevertheless, the government is on the mission to boost job opportunities, especially in underdeveloped districts and smaller cities. Overall, India's unemployment currently highlights the need for sustained policy focus on job creation, skill development, and economic diversification, critical for providing employment to the country's youth – both urban and rural.

Population

India officially became the most populous country in the world in 2023 surpassing China. The IMF predicts India's population to become 1,454.61 Mn. by end of this year (2025). A significant characteristic of India's demographic profile is its relatively young population, with a large majority in the working-age group of 18 to 60 years. This demographic advantage offers a potential economic dividend, as a larger workforce can drive higher productivity, consumption, and savings, which are critical for sustained economic growth.

The demographic can boost the critical industry sectors like manufacturing, services, and infrastructure, provided the workforce is adequately skilled and gainfully employed. While India's fertility rate has declined below the replacement level in the last few years, the controlled and employable population growth would eventually help improve per capita income and living standards of the people. Summarily, if rightly channelized, India's population dynamics can serve as a powerful engine for economic expansion and global competitiveness in the decades ahead.

2.2. India Digital Growth Drivers Enabling Economic Impetus

Over the last few years, India has been well-recognized as one of the fastest-growing large economies. The country's digital growth drivers have become primary to its economic transformation, boosting rapid expansion across industry verticals. Key central government initiatives like Digital India, Make in India, and Startup India have laid the foundation for robust digital infrastructure, widespread internet connectivity, and a thriving innovation ecosystem. Smartphone adoption has been at an all-time high mostly due to its low-cost/affordability which has further accelerated digital adoption, bridging urban-rural divides and empowering millions with access to online services, education, and financial platforms, which was earlier thought to be meant for the privileged. The introduction of 5G/LTE networks along with rollout of projects like BharatNet, have further deepened digital reach, supporting the rise of e-commerce, fintech, and digital payments. India's digital public infrastructure initiatives like Aadhaar and UPI (unified payments interface) have revolutionized service delivery and financial inclusion by providing scalable, interoperable, and accessible digital solutions for over a billion people. The startups ecosystem in the country has been booming which several new-age startups focusing on emerging technologies like artificial intelligence, cloud computing, internet-of-things, and big data analytics. These growth drivers collectively underpin India's digital economy, which is expected to contribute nearly one-fifth of national income by 2029–30, outpacing traditional sectors and reshaping the nation's economic landscape.

Following mentioned below are the digital growth drivers for the Indian economy:

- **Rollout of 4G and 5G networks:** The next-generation telecom networks predominantly 4G and 5G has been a pivotal driver for India's digital growth. The rollout of 4G and 5G enabled high-speed internet access at affordable rates have accelerated e-commerce adoption, digital payments and IT services. Financial inclusion has seen deeper penetration mainly through mobile banking and digital payment platforms, supported by government initiatives like UPI and Jan Dhan Yojana. Education, healthcare, ecommerce and government sectors have benefited the most due to their faster and reliable internet connectivity. Media and entertainment content has reached the audience through their mobile devices with high digital content consumption. Today, the internet has not only become a medium for the urban public but also for remote villages in India.
- **Cheap voice communications:** India is rated among the countries with the cheapest voice calls. In-fact, the cost of making voice calls in India has dropped drastically in the last one decade due to intense competition, and entry of industry disruptors like Reliance Jio. In June 2022, the cost of outgoing call was INR. 0.16 as compared to INR. 0.49 in March 2016⁶. The availability of cheap

⁶ Making a phone call in India is now nearly free, Quartz, July 2022, <https://qz.com/india/1331946/reliance-jio-effect-phone-calls-in-india-are-now-nearly-free>

calls have bridged the communication gap that existed between urban and rural India. Now, millions of citizens can stay connected whether they are digitally literate or not. Enterprises and startups have benefited from this by relying on voice channels for customer support, authentication, payment reminders, and service delivery.

- **Digital Public Infrastructure:** DPI or Digital Public Infrastructure refers to foundational digital systems and platforms that enable the delivery of essential services, facilitate secure data exchange, and support digital governance across sectors. The core components of DPI include Digital Identity Systems (like Aadhaar), Digital Payments Infrastructure (like UPI) and Data Exchange Frameworks (like DigiLocker) that are designed to be scalable, interoperable, and accessible to both government and private sector participants.
- **Digital India, Make in India, and Startup India:** The three key government initiatives like Digital India, Make in India, and Startup India has been promoting digital adoption, innovation, and entrepreneurship, fostering a vibrant digital ecosystem. Digital India has revolutionized the way government and private services are being delivered thus making it accessible, transparent, and efficient for all citizens in the country. Initiatives like Aadhaar, UPI and JAM Trinity (Jan Dhan-Aadhaar-Mobile) have enabled direct benefit transfers, reduced leakages, and raised financial inclusion. The initiative has also fostered job creation and boosted the startup culture. The Startup India program has created a supportive environment for entrepreneurs through funding, mentorship, and regulatory reforms, resulting in a surge of tech startups in fintech, edtech, healthtech, and e-commerce. These startups create thousands of job opportunities for young and experienced professionals who like to nurture their skills in a fast-paced environment. In order to make India a self-reliant economy, the government launched the Make in India program that encourages domestic and foreign investment in manufacturing, particularly in electronics, IT hardware, and mobile devices, supporting the growth of digital infrastructure and reducing import dependency.
- **Adoption of Emerging Technologies:** As per a report by NASSCOM, artificial intelligence (AI) in India can add \$500 Bn. to India's GDP by 2025⁷. This would impact industry verticals like BFSI, retail, healthcare, and manufacturing. AI helps to improve decision-making, personalizes services, and improves operational efficiency. Companies in India – large, medium or startup – has been investing on AI to improve its service offerings and enhance efficiency. Meanwhile, cloud computing has been in use for quite some time now. The widespread adoption of hybrid and multi-cloud has enabled businesses to scale rapidly, optimize costs, and process data in real time. While cloud was earlier believed to be insecure, the belief has changed and proven to be a myth due to increased awareness among users and decision makers. Today, businesses look towards advanced computing techniques like edge computing that reduces latency and boosts efficiency. Another fast-emerging technology tool big data analytics, has provided benefit to enterprises and the government and are not restricted to traditional industry sectors like BFSI, retail/e-commerce

⁷ AI adoption to add \$500 billion to India's GDP by 2025: Nasscom report, June 2022, https://www.business-standard.com/article/economy-policy/ai-adoption-to-add-500-billion-to-india-s-gdp-by-2025-nasscom-report-122062300493_1.html

or logistics but also to sensitive industries like defense and law enforcement. Summarily, the adoption of advanced technologies such as AI, cloud computing, digital platforms, IoT, and analytics is reshaping India's economy—boosting GDP, creating jobs, transforming sectors, and enabling inclusive, sustainable growth at an unprecedented scale.

3. Infrastructural Developments in India

Infrastructure acts like a catalyst for India's growth. The \$1.3 trillion national master plan for infrastructure, Gati Shakti, has been a precursor to bring reforms in the sector and has some good initial signs. Infrastructure support to the nation's top manufacturers is also important, as it braces the movement of goods, which is critical to economic growth. The government has initiated various policies that are needed for proper growth and efficiency. This ranges from power, bridges, dams, roads, and urban infrastructure development. The government launched the National Infrastructure Pipeline in 2019 to augment the growth of the infrastructure sector. Frost and Sullivan have analysed some components of infrastructure that would be instrumental to India's growth.

3.1. Energy

India currently has a power capacity of 462 GW⁸, of which 45% is from renewable sources. With the South-Asian country being the most populous country in the world, it has set ambitious targets that have to be achieved. As India aims to achieve net-zero emissions by 2070, several policy changes shall be needed in the area to drive the reforms. The increase in demand will be marked by an increase in energy storage solutions. There remains a lot of scope for improving the infrastructure in India to reach the set targets. As a step, the Integrated Power Development Scheme (IPDS) has been launched to strengthen electricity distribution networks in India. Projects worth INR. 30,904 crore have been sanctioned under the scheme. Deendayal Upadhyay Gram Jyoti Yojana was launched for the electrification of rural areas across the country. These are some select examples among many other schemes that have been launched, keeping an eye on the requirement of electricity in the country.

3.1.1 Power: Transmission Grid Network

India's transmission grid network is crucial to the rapidly growing demand of the Indian consumers as well as the economy. A wide transmission grid network ensures there is minimum power disruption and consumers have uninterrupted power supply. As of January 2025, the transmission lines stood at 491,872⁹ Circuit Kilometers, which includes those with a capacity of 220 KV or higher. In the previous year, around 7,000 Circuit Kilometers of line were added to the network. Based on secondary data, the total inter-regional transmission capacity currently stands at 118,740 MW (as of January 2025). The use of advanced technologies have further helped in maintaining these networks. Modern technology makes it easier to track equipment health. In fact, use of thermal imaging helps better maintenance of the grid network.

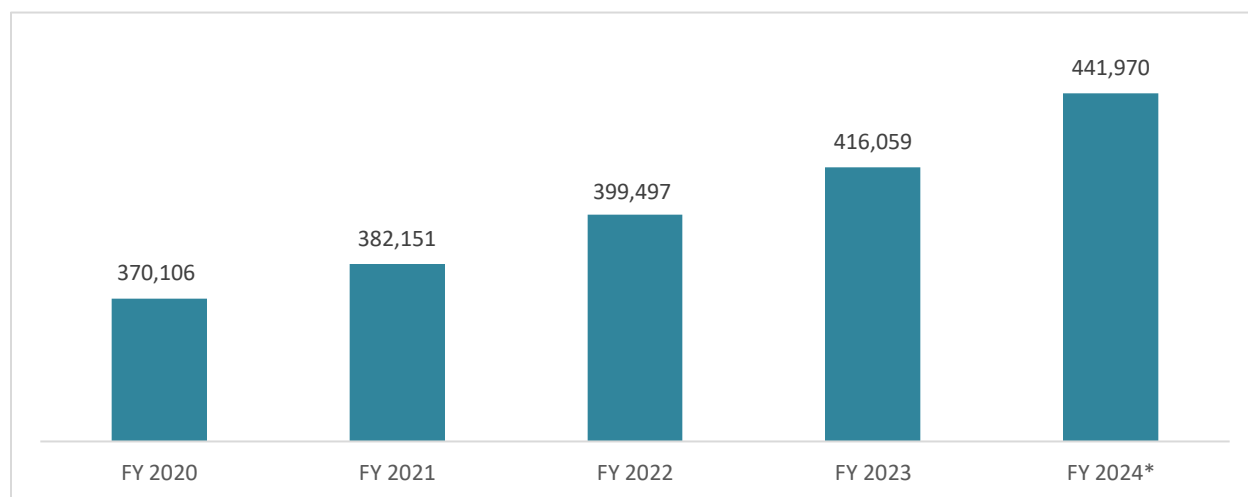
The government has planned to invest around INR 9.12 trillion by 2032 to further develop the power transmission infrastructure. However, the growth is adversely impacted by the time taken to acquire the land, which has been a challenge. The larger plan is to reach the target of 168 GW production by 2032,

⁸ Ministry of Statistics and Programme Implementation, Govt. of India, <https://www.mospi.gov.in/publication/energy-statistics-india-2025-0>

⁹ Strengthening Transmission: Key trends, challenges and network expansion plans, Powerline, March 2025, <https://powerline.net.in/2025/03/06/strengthening-transmission-key-trends-challenges-and-network-expansion-plans/>

from the current 119 GW inter-regional transmission capacity and 143 GW by 2027. The National Electricity Plan can be considered as a flagship scheme of the government to grow the power grid network in India. Ultimately, India needs to strengthen the power transmission network to ensure that there are no power disruptions or power shortages in critical avenues like manufacturing, transportation and critical infrastructure.

Exhibit 4: Installed Capacity of Electricity Generation in Utilities and Non-utilities, FY 2020 – FY 2024, in MW¹⁰



FY: Financial Year (April to March)

*Provisional

Source: Ministry of Statistics and Programme Implementation (MOSPI)

3.1.2 Power: Substations & Generating Stations

India has about 3,000¹¹ power plants spread across the country. The largest of them is the Vindhyachal Thermal Power Station with a capacity of 4,760 MW. The total generation capacity stands at 476 GW, which has nearly doubled over the past decade. The substation capacity in India has increased with a CAGR close to 6%. The overall transmission capacity is 1,269 GVA. There are massive investments underway to establish power stations of higher capacities. There is also an increasing role of the private sector, with Adani Energy Solutions making an entry in the field. The Deen Dayal Upadhyaya Yojana and the SAUBHAGYA scheme have also worked on expanding these stations to ensure that rural electrification can be achieved. There has also been the adoption of modern schemes like Gas Insulated Substations and Voltage Sourced Converters, to make it more efficient. Nevertheless, much like any infrastructure project, there remain bottlenecks with land acquisition, which has been a problem for some time now.

3.1.3 Oil & Gas: Upstream – Onshore & offshore

India's oil production plans through 2030 focuses on expanding exploration, boosting oil refining capacity, and accelerating energy transition. However, the sector faces roadblocks with declining domestic crude output. Based on data from Petroleum Planning & Analysis Cell (Ministry of Petroleum & Natural Gas),

¹⁰ Installed Capacity and Capacity Utilization, MOSPI, Govt. of India, [Chapter2_27032025.pdf](#)

¹¹ Open Infra Map, <https://openinframap.org/stats/area/India/plants>

India's indigenous crude oil and condensate production during April 2025 was 2.3 MMT (million metric tonnes)¹², marking a 3.1% year-on-year decrease compared to April 2024. ONGC accounted for 1.5 MMT of the capacity whereas PSC/RSC registered production of 0.5 MMT during April 2025. Despite the current decline in oil production, the country aims to increase its exploration acreage to 1 million square kilometers by 2030, with a 16% increase targeted in 2025¹³. This move is expected to bring in more investment and potentially discover new reserves, though recent years have seen few major finds. As an impact, dependency on import would decrease (which is currently ~85%), thus helping maintain foreign exchange.

3.1.4 Oil & Gas: Midstream - Pipeline, LNG Facilities

India's authorized natural gas pipeline network is 34,233 km.¹⁴, with around 25.429 km. of it operational. As of February 2025, the crude oil pipeline network spans approximately 10,445 km¹⁵. Its growth is driven by rising infrastructure and increasing energy demand. As the country grows through a crucial stage of development, the large pipeline network can serve as a key pillar for supporting oil & gas needs. Projects like the National Gas Grid, which aims to connect different parts of the country through these pipelines, are effectively being promoted by the government. This will ensure efficient transportation of fuel across the country, empowering economic growth.

LNG, which serves as a source of a new, cleaner fuel, is also critical to the country's growth and pursuit of greener energy. Importantly, there has also been significant foreign investment in the area. However, infrastructural issues exist that need to be addressed for proper implementation. Regulatory and compliance issues are also seen with a lot of emphasis on ensuring a safe environment. Some key players in the area include Indian Oil Corporation Limited (IOCL), Bharat Petroleum Corporation Limited (BPCL), Hindustan Petroleum Corporation Limited (HPCL), etc. The western coast of India would serve as an important location for its development, with the stretch being an important strategic position.

3.1.5 Oil & Gas: Downstream – Refinery, Storage Terminal

As of April 2024, 256.81 MMTPA (million metric tonnes per annum)¹⁶ is the oil refinery capacity of India. It is expected to further increase to 309.5 MMTPA by 2030. By 2025, a 20%¹⁷ increase is expected in the oil refining capacity in terms of metric tonnes. HPCL Rajasthan Refinery Limited is a key project to increase

¹² Monthly Report on Indigenous Crude Oil Production, Crude Oil Import and Processing & Production, Import and Export of Petroleum Products, Petroleum Planning & Analysis Cell, Ministry of Petroleum & Natural Gas, April 2025, https://ppac.gov.in/download.php?file=rep_studies%2F1747829499_Final_202405_Monthly_Report_WebVersion.pdf

¹³ India's Petroleum Industry, Ministry of Petroleum & Natural Gas, January 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2096817>

¹⁴ Natural Gas Pipeline Networks in India, Petroleum and Natural Gas Regulatory Board (PNGRB), March 2025, https://pngrb.gov.in/data-bank/20250331_NGPL.pdf

¹⁵ Indian Oil and Gas Industry Analysis, IBEF, <https://www.ibef.org/industry/indian-oil-and-gas-industry-analysis-presentation>

¹⁶ India's Petroleum Industry, Ministry of Petroleum & Natural Gas, January 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2096817>

¹⁷ US\$27 billion to be invested in boosting India's refining capacity by 2025, Ministry of External Affairs, August 2021, <https://indbiz.gov.in/us27-billion-to-be-invested-in-boosting-indias-refining-capacity-by-2025/>

the growth of India's refining capacity with a capacity of 9 MMTA, which is expected to start operations this year. HPCL has also expanded its Vishakhapatnam refinery, which would further increase the processing capacity. India currently has 3 strategic petroleum reserves (SPR) with a cumulative capacity of 5.33 MMT. The government plans to expand the number of SPRs to 6. In addition to that, the refineries also maintain some buffers. Since 85%¹⁸ of the crude oil is imported by India, these reserves are crucial to safeguard India against supply chain disruptions and delays. BPCL is investing around INR 1.5 lakh crore (\$18 billion) under its Project Aspire, including a new refinery in Andhra Pradesh (9 MMTA) and expansions at the Bina refinery. At the same time, India is also diversifying its importers, so that the country is not dependent on a specific country for its oil and gas requirements.

3.1.6 Petrochemical Facilities

The Indian chemical and petrochemical sector is currently (2024) sized at around \$220 billion and is expected to reach \$1 trillion by 2040¹⁹. The annual consumption in India is currently around 29.6 million tonnes, which is expected to go to 46 million tonnes by 2030. India's petrochemical capacity is linked to the refining sector. Public sector undertakings (PSUs) such as ONGC, IOC, BPCL, and private sector companies like Reliance Industries Limited (RIL) and Haldia Petrochemicals are the key players investing heavily in capacity expansion and modernization. Based on reports, nearly \$45 billion in petrochemical projects are underway in the country. The government has rolled out initiatives like development of Petroleum, Chemicals, and Petrochemical Investment Regions (PCPIRs), which is focused on industrial growth and attracting investments. Under the new PCPIR initiative, the government envisions to attract \$142 billion of combined investment by 2025, strengthening its long-term vision. As per the government of India, chemicals currently accounts for 15% of the country's total exports making it one of the important industry verticals.

3.1.7 Sustainable Energy: Solar, Wind, Nuclear, Hydrogen

Much like any advanced and emerging country, India has been focusing on renewal energy. As of 30th June 2025, India's total installed renewal energy (RE) capacity stands at 234 GW²⁰. Solar power contributes to 116.25 GW solar capacity (the largest source of renewal energy) followed by wind power (51.67 GW), and large hydro power (49.38 GW). Solar remains the fastest-growing renewal energy source in India as the country aims for 500 GW²¹ of non-fossil fuel capacity by 2030. Solar tariffs have declined significantly making India among the lowest-cost solar markets globally. The government has been keen on supporting solar through the development of large-scale solar parks, rooftop mandates, and domestic manufacturing incentives. Parallely states like Gujarat, Tamil Nadu, Karnataka, Maharashtra, Rajasthan and Andhra

¹⁸ Press Information Bureau, Ministry of Petroleum & Natural Gas, January 2023, <https://www.pib.gov.in/PressReleaseDetail.aspx?PRID=1894332>

¹⁹ Press Information Bureau, Ministry of Petroleum & Natural Gas, October 2024, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2066135>

²⁰ Physical Achievements, Ministry of New and Renewable Energy, Accessed on 14th July 2025, <https://mnre.gov.in/en/physical-progress/>

²¹ Press Information Bureau, Ministry of New and Renewable Energy, November 2024, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=207303>

Pradesh have been on the forefront of producing large capacities of wind power in the country due to their favorable wind conditions and supportive policies.

Exhibit 5: Programme/Scheme wise Cumulative Physical Progress of Installed Renewable Energy Capacity, in MW

Installed RE Capacity (Capacities in MW)	FY 2025-26 Achievements (1st April 2025-30th June 2025)	Cumulative Achievements (as on 30.06.2025)
Wind Power	1,637.03	51,674.85
Solar Power	10,601.35	11,6247.83
Small Hydro Power	1.50	5,102.05
Biomass (Bagasse) Cogeneration	0.00	9,821.32
Biomass(non-bagasse) Cogeneration	0.00	921.79
Waste to Power	0.00	309.34
Waste to Energy (off-grid)	12.99	543.86
Large Hydro Power		49,378.17
Total	12,252.87	2,33,999.21

FY: Financial Year (April to March)

Source: Ministry of New and Renewable Energy (accessed on 14th July, 2025)²²

Another mode of clean energy, nuclear power sector in India undergoes significant expansion as part of the country's broader strategy to achieve energy security and meet climate commitments. The country currently has 25 nuclear reactors across eight power plants with an installed capacity of 8.88 GW²³. The government has set a target of 100 GW of nuclear power capacity by 2047, as a part of its long-term energy strategy and its “Viksit Bharat 2047” vision. Hydrogen energy is fast evolving space with the nation aiming to position itself as a global leader in green hydrogen production and export. The Green Hydrogen Mission launched in 2023 remains central to this ambition targeting to produce at least 5 million metric tons (MMT) of green hydrogen annually by 2030²⁴.

²² Physical Achievements, Ministry of New and Renewable Energy, Accessed on 14th July 2025, <https://mnre.gov.in/en/physical-progress/>

²³ Lok Sabha Un-starred Question, Department of Atomic Energy, Government of India, April 2025, <https://cdnbbsr.s3waas.gov.in/s35b8e4fd39d9786228649a8a8bec4e008/uploads/2025/04/202504161497518776.pdf>

²⁴ India's Green Hydrogen Strategy in Action Policy Actions, Market Insights, and Global Opportunities, Institut français des relations internationales (IFRI), April 2025, https://www.ifri.org/sites/default/files/2025-04/ifri_raizada-india-green-hydrogen_2025.pdf

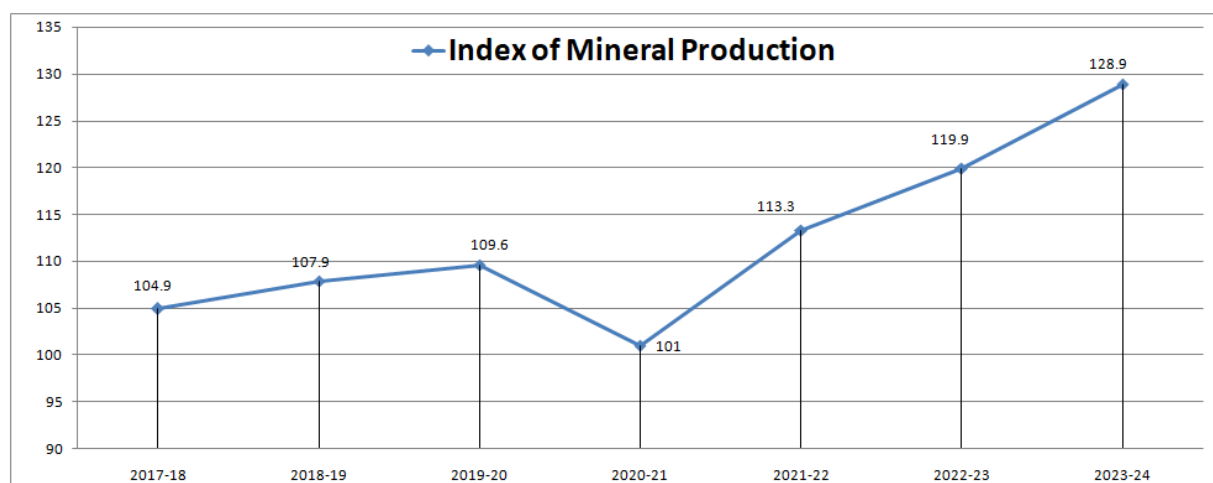
3.2. Mining

India is one of the leading countries in APAC with strong focus towards mining. In fact, it is one of the major producers of coal and iron ore in the world. It is also among the top producers of bauxite, manganese ore, aluminum, and zinc. In 2023, lithium reserves (5.9 million metric tons) were discovered in Jammu & Kashmir, taking a strategic leap towards India's energy transition. Then Minister of Mines Sh. Pralhad Joshi announced in March 2023 that India's mining sector aims to contribute to at least 2.5% of the GDP by the year 2026-27²⁵. Mentioned below are some of the recent statistics for the period of April to May FY 2026, as reported in July 2025 for India's mining industry²⁶.

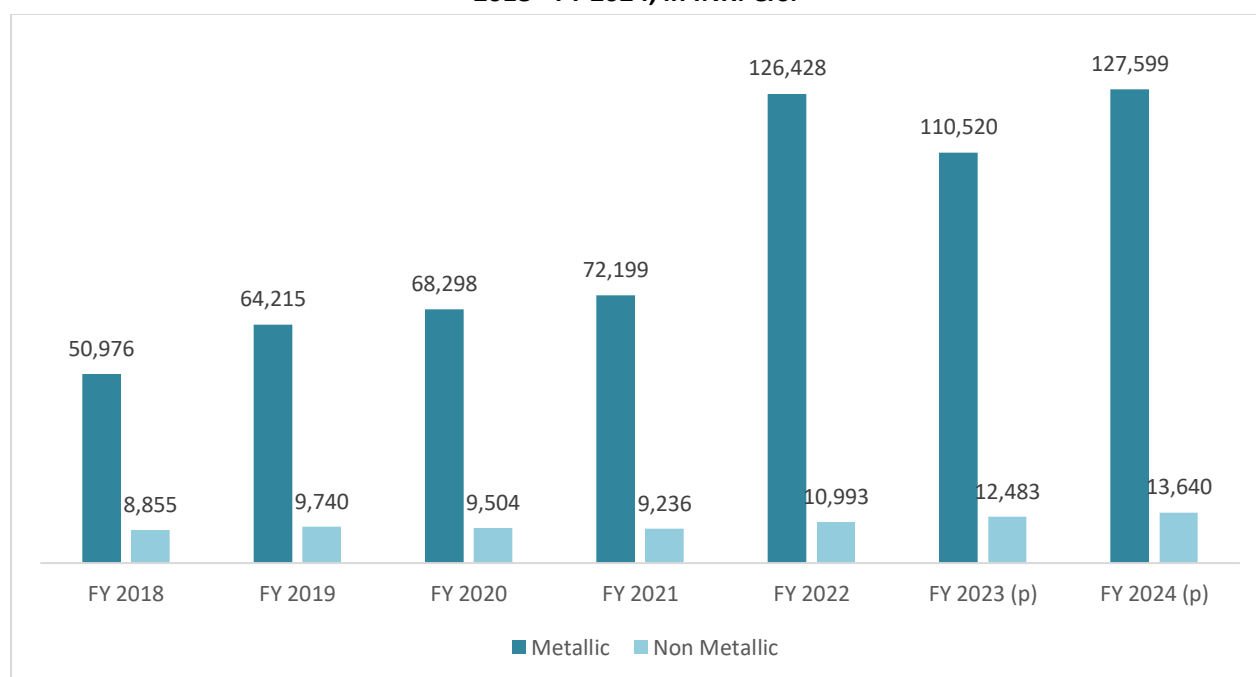
- Iron ore accounts for 70% of the total MCDR (Mineral Conservation and Development Rules) mineral production by value
- Iron ore production was 289 MMT in FY 2025. During the period of April to May in FY 2026, production increased to 53 MMT, from 52.7 MMT during the same period in FY 2025, showing a growth of 0.6%
- Production of manganese ore has risen by 1.4% to 0.70 MMT in FY 2025-26 (April- May) from 0.69 MMT during the corresponding period of previous year
- Bauxite production increased by 0.9% to 4.73 MMT during April-May FY 2026 from 4.69 MMT in FY 2024-25
- Production of Zinc Concentrate has risen by 3.7% to 0.28 MMT in FY 2025-26 (April-May) from 0.27 MMT in FY 2024-25 (April-May)
- Production of Limestone has risen by 1.6% to 81.40 MMT in FY 2025-26 (April- May) from 80.10 MMT in FY 2024-25 (April-May)

²⁵ Press Information Bureau, Ministry of Mines, March 2023, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1903480>

²⁶ Press Information Bureau, Ministry of Mines, July 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2141133>

Exhibit 6: Index of Mineral Production, India, FY 2018 - FY 2024

FY: Financial Year (April to March)

Source: Ministry of Mines²⁷**Exhibit 7: Value of Minerals Production (by groups) excl. atomic, fuel & minor minerals in India, FY 2018 - FY 2024, in INR. Crs.**

(p) projected

FY: Financial Year (April to March)

Source: Ministry of Mines²⁸

²⁷ Ministry of Mines, Government of India, accessed on 19th August 2025, <https://mines.gov.in/webportal/nationalmineralsscenario>

²⁸ Ministry of Mines, Government of India, accessed on 19th August 2025, <https://mines.gov.in/webportal/nationalmineralsscenario>

3.3. Transportation

India's transportation network has been going through a phenomenal change since a decade, with many key policies driving the change. PM Gati Shakti National Master Plan, Bharatmala Pariyojana, Sagarmala Project, UDAN scheme, and the Diamond Quadrilateral Bullet Train Network are some of the important transportation projects which have been driving changes in the sector. These initiatives have been combined with massive investment and improved technology, which has led to significant improvements. The intent of these projects are to enhance connectivity, thus supporting economic growth – not limited to only urban locations but also to rural parts of the country. With digital integration taking place on an unprecedented level, the Indian transportation sector is expected reap the benefit. In the following section, Frost and Sullivan analysed the key modes of transportation in the country that is expected to be instrumental in India's growth story.

3.3.1 Railways

The Indian Railways is the world's fourth largest railway network after USA, China and Russia. The expected revenue expenditure on Indian Railways for the year 2025-26 is expected to be INR. 2,99,059 crore, which is an increase of 7.7% from the revised estimate of 2024-25²⁹. Currently, Indian Railways has been focusing on high-speed rail, digital innovations, and station upgrades. In one of the latest developments, the Indian Railways unveiled its first 9,000 HP electric locomotive, built at the Dahod workshop in Gujarat. This powerful railway engine is expected to transform freight movement by increasing hauling capacity and reducing transit times. As of 2024, the Indian Railways had a route length of 69,000 kms and total track length of over 1,35,000 Kms. In the next 6-8 years, the Ministry of Railways has targets to add over 5,000 km of tracks annually, with a cumulative target of approximately 40,000 km of new tracks in that period. 98.83% of the total broad-gauge network is electrified (as of 1st April 2025), with a target to achieve 100% electrification by the end of the current financial year (FY 2026).

Exhibit 8: Year-by Year Breakup of Railway Electrification in India, in rkm (route kilometer)

Year	Newly Electrified (rkm)	Cumulative Electrified (rkm)
2014–2015	1,176	22,997
2015–2016	1,502	24,479
2016–2017	1,646	26,125
2017–2018	4,087	30,212
2018–2019	5,276	35,488
2019–2020	4,378	39,866
2020–2021	6,015	45,881

²⁹ Demand for Grants 2025-26 Analysis – Railways, PRS Legislative Research, February 2025, https://prsindia.org/files/budget/budget_parliament/2025/DFG_Analysis_2025-26_Railways.pdf

2021–2022	6,366	52,247
2022–2023	6,565	58,812
2023–2024	7,188	66,000
2024–2025	2,701	68,701

Source: Multiple Secondary Sources

Dedicated Freight Corridor (DFC) is another transformational project undertaken by the Indian government. DFC is a railway infrastructure project designed exclusively for freight transportation, aimed at boosting the capacity, speed, and efficiency of goods movement across the country. The project consists of two major corridors, namely:

- The Eastern Dedicated Freight Corridor (EDFC): From Ludhiana in Punjab to Dankuni in West Bengal (approx. 1,337 Kms)
- The Western Dedicated Freight Corridor (WDFC): From Jawaharlal Nehru Port in Mumbai to Dadri in Uttar Pradesh (about 1,506 km)

DFCs are planned to enable the seamless movement of freight by physically segregating freight trains from passenger trains, thereby decongesting the existing railway network and increasing the punctuality and frequency of both freight and passenger services. Based on latest available data (as of March 2025)³⁰, out of the total 2843 kms, 2741 kms (96.4%) of the route has already been commissioned and operational and work for the balance section has already been taken up.

India's national railway has often been questioned for its lack of upgradation. However, it is currently going through a modernization drive. The government has earmarked a record INR. 2.65 lakh crore for FY 2025–26³¹, which is a substantial increase compared to INR. 0.46 lakh crore allocated in FY 2009–14 period. This funding supports track expansion, station redevelopment, modern rolling stock, and essential equipment procurement. In the next few years, the government plans to introduce 200 new Vande Bharat trains (including the upcoming Vande Bharat Sleeper variants), 100 Amrit Bharat trains (non-AC, affordable options), and 50 Namo Bharat rapid rail services for intercity connections. These trains are designed to provide high speed, reduce travel time, provide comfort, and accessibility. In the long term, bullet trains are expected to be common in India as plans for a 7,000 km high-speed rail network by 2047 is already on the mind of the government. Railways understand upgrading station to equip them with modern facilities is essential and hence the Indian Railway Stations Development Corporation (IRSDC) has been leading efforts.

3.3.2 Metro Train

³⁰ Rajya Sabha Question, Ministry of Railways, March 2025, [https://sansad.in/getFile/annex/267/AU3306_6AQXyC.pdf?source=pqars#:~:text=Eastern%20Dedicated%20Freight%20Corridor%20\(EDFC\)%20from%20Ludhiana,kms%20\(96.4%25\)%20has%20been%20commissioned%20and%20operational.](https://sansad.in/getFile/annex/267/AU3306_6AQXyC.pdf?source=pqars#:~:text=Eastern%20Dedicated%20Freight%20Corridor%20(EDFC)%20from%20Ludhiana,kms%20(96.4%25)%20has%20been%20commissioned%20and%20operational.)

³¹ Press Information Bureau, Ministry of Railways, February 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2099337>

Currently, India has 18 operational metro systems with a cumulative length of over 1000+ Kms across 11 states and 23 cities in India, making it as the 3rd longest metro network in the world³². Based on government media reports, the pace of metro line commissioning has increased nine times, and the annual budget for metro projects has expanded from INR. 5,798 crore in 2013-14 to INR. 34,807 crore in 2025-26³³. Further to this, the government also introduced the Regional Rapid Transit System (RRTS), with Namo Bharat trains already operational on the Delhi-Meerut corridor. The government's larger plan is to expand the metro rail operations to 31 cities by 2030.

3.3.3 Airports and Airways

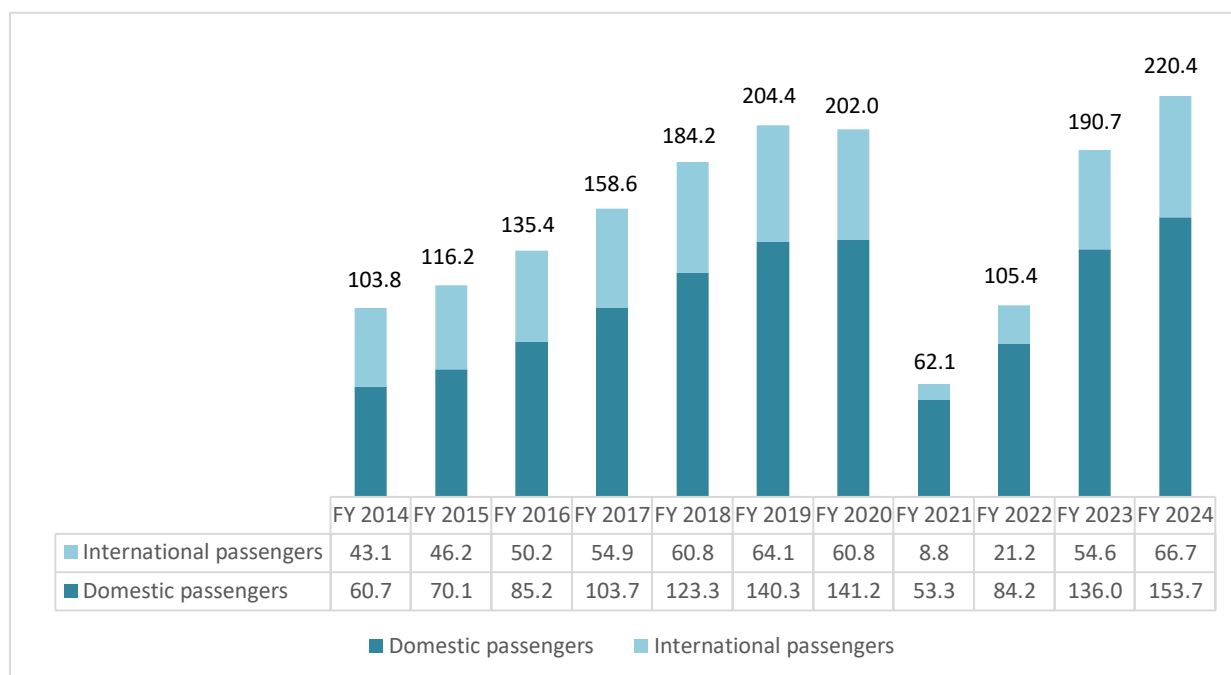
India currently has 159 airports³⁴, up from 74 in 2014 making it one of the fastest-growing aviation markets in the world. Today, the vast network of civilian air transport network is not only limited to the metro and Tier-1 cities but also have spread across the remote places in India. The Directorate General of Civil Aviation (DGCA) reports India's air passenger traffic stood at 220.4 Mn. in FY 2024, as from 77.4 Mn. in FY 2010. This spike in air passenger traffic is due to the UDAN (Ude Desh ka Aam Naagrik) scheme launched by the central government in 2016. The scheme is a flagship regional connectivity initiative undertaken by the National Civil Aviation Policy (NCAP) to make air travel affordable and accessible, particularly for people in Tier-2 and Tier-3 cities.

India aims to have 400 airports by 2047 from its current number of 159. While the country has ~800 airplanes, by 2030 the sector is expected to add another 600 aircrafts. Massive investments over \$24 Bn. are planned for airport infrastructure, including new terminals and greenfield airports.

³² Press Information Bureau, Ministry of Housing & Urban Affairs, January 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2090364>

³³ 11 years of Modi govt: India's metro and railway network sees historic expansion , DD News, June 2025, <https://ddnews.gov.in/en/11-years-of-modi-govt-indias-metro-and-railway-network-sees-historic-expansion/>

³⁴ Press Information Bureau, Ministry of Civil Aviation, February 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2098780>

Exhibit 9: Air Passenger Traffic in India, FY 2014 – FY 2024, in Mn.

FY: Financial Year (April to March)

Source: DGCA³⁵

3.3.4 Roadways and Highways

India's road network is the second largest in the world at 63.45 lakh km³⁶. The road network consists of National Highways (NHs), State Highways (SHs), and other roads like district, urban, and rural roads. Historical numbers suggest, India's highway network was 91,287 kms in 2014 which increased to 1,46,195 kms in 2024. This reflects an increase of more than 50,000 Km in the last decade itself. The rate of daily construction of highways has also gone up, with an increase to 33.83 kms³⁷ in 2023-2024 as compared to the 12.1 Km per day rate of 2014-15. The NH network has grown by 60% rising from 91,287 kms in 2014 to 1,46,195 kms in 2024. The government allocated INR. 1,70,266 crore to National Highway Authority of India (NHAI) in FY 2025-26.

³⁵ Handbook on Civil Aviation Statistics, Directorate General of Civil Aviation, 2023-24, <https://www.dgca.gov.in/digigov-portal/?page=jsp/dgca/InventoryList/dataReports/aviationDataStatistics/handbookCivilAviation/HANDBOOK%2023-24%20Final%20Draft.pdf&mainnull>

³⁶ Demand for Grants 2025-26 Analysis - Road Transport and Highways, PRS Legislative Research, February 2025, https://prsindia.org/files/budget/budget_parliament/2025/DFG_Analysis_2025-26_Road_Transport_and_Highways.pdf

³⁷ Press Information Bureau, Ministry of Road Transport & Highways, January 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2091508>

Exhibit 10: National Highway Construction in India, FY 2015 – FY 2025

Year	Construction (in kms)	Construction (in km/day)
2014–2015	4,410	12.1
2015–2016	6,061	16.6
2016–2017	8,231	22.6
2017–2018	9,829	26.9
2018–2019	10,855	29.7
2019–2020	10,237	28.1
2020–2021	13,327	36.5
2021–2022	10,457	28.6
2022–2023	10,331	28.3
2023–2024	12,349	33.83
2024–2025*	5,853	21.28

FY: Financial Year (April to March)

*Till December 2024

Source: Ministry of Road Transport & Highways

The central government has launched several road and highway development programs and initiatives to enhance national connectivity, economic growth, and regional development. Some of the major initiatives include Bharatmala Pariyojana, NHAI Projects, High-Speed Corridors and Expressway Projects, PM Gati Shakti Master Plan, and more. The Bharatmala Pariyojana is a flagship program of the Government of India to develop 83,677 kms of highways focusing on economic corridors, border roads, and expressways to improve freight and passenger movement efficiency. According to the program, Bharatmala Pariyojana would interconnect 550 district headquarters (up from 300 previously) via high quality highways. With this, 80% of the freight traffic would be moved onto national highways by improving logistics efficiency and connecting 24 logistics parks, 66 inter-corridors, and 116 feeder routes. Tunnels, bridges, elevated corridors, bypasses, and ring roads would be constructed to allow seamless and traffic congestion free connectivity.

While not exclusively related to road transport, the PM Gati Shakti National Master Plan is another important initiative of the government that aims to revolutionize India's infrastructure through integrated, multi-modal connectivity. The plan aims to connect roads, railways, ports, airports, waterways, and logistics infrastructure to create seamless movement of goods and people. It brings together 44 Central Ministries, 36 States/UTs, and various government departments on a single digital platform, enabling holistic and synchronized infrastructure planning and execution. This would result in development of economic zones notably industrial clusters, defense corridors, and agricultural hubs - which is critical for India's overall economic success.

3.3.5 Waterways

India is one of the countries surrounded by water in three sides. It is also the land of rivers. This makes India's ports and waterways form a critical backbone for the nation's trade and logistics. According to the Ministry of Ports, Shipping and Waterways, India has 12 major ports in the country wholly owned by the Government of India and governed by the provisions of the Major Port Authorities Act, 2021. However, there are 213 non-major ports managed by and under the control of the respective State Maritime Board / State Governments³⁸. Indian ports handle ~90% of EXIM Cargo by volume and 70% by value playing a critical role in managing the countries needs. The capacity utilization last reported was 57% as on FY 2023-24.

**Exhibit 11: Cargo Handling Capacity and Actual Cargo Handled by Major Indian Ports,
FY 2022 – FY 2024, in Million Tonnes Per Annum**

Port	2021-22		2022-23		2023-24	
	Capacity	Handled	Capacity	Handled	Capacity	Handled
Syama Prasad Mookerjee Port	92.77	58.18	92.77	65.66	93.02	66.39
Paradip Port	289.75	116.13	289.75	135.36	289.75	145.38
Visakhapatnam Port	134.18	69.03	143.68	73.75	148.18	81.09
Kamarajar Port	91.00	38.74	91.00	43.51	94.00	45.28
Chennai Port	135.00	48.56	136.00	48.95	136.00	51.60
V.O. Chidambaranar Port	111.46	34.12	111.46	38.04	111.46	41.40
Cochin Port	78.60	34.55	79.90	35.26	79.90	36.32
New Mangalore Port	108.96	39.30	114.96	41.42	114.96	45.71
Mormugao Port	63.40	18.46	63.40	17.33	63.40	20.62
Mumbai Port	84.00	59.89	84.00	63.61	84.00	67.26
Jawaharlal Nehru Port	141.37	76.00	141.37	83.86	145.87	85.82
Deendayal Port	267.10	127.10	269.10	137.56	269.32	132.37

³⁸ Press Information Bureau, Ministry of Ports, Shipping and Waterways, March 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2110322>

Total	1597.59	720.05	1617.39	784.31	1629.86	819.23
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FY: Financial Year (April to March)

Source: Ministry of Ports, Shipping and Waterways

According to reports, by 2030, India is likely to have 2 more new ports in the country – the Vadhavan port and a port in the Kamarajar region in Tamil Nadu. While the Vadhavan port is approved, the Kamarajar region is still in the planning phase. This addition of these two new ports would help realize the government's Maritime India Vision 2030, as the country aims to set a cargo handling capacity of 3,500 million tonnes per annum across all ports by 2030.

One of the important government initiatives with respect to the maritime industry is the Sagarmala Project launched in 2015. The initiative is meant to transform the country's maritime sector through port-led development. The primary goal of the project is to reduce logistics costs for both export-import (EXIM) and domestic trade by leveraging India's extensive 7,500+ kms coastline and navigable waterways, with minimal infrastructure investment. The project would include port modernization and new port development, port connectivity enhancement, port-linked industrialization, coastal community development, and coastal shipping & inland waterways transport.

3.4. Defense

Among the world's top 10 economies, India ranks 4th in terms of GDP. Its defense budget is also significant, reflecting its strategic priorities and regional security concerns. While countries like the United States and China allocate large portions of their budgets to defense, India's spending is highly notable for its focus on modernization and self-reliance in defense production.

Exhibit 12: Total Defense Spending, India, FY 2022 – FY 2026, in INR. Crs.

India's Defense Budget	Actuals 2021- 22	Actuals 2022- 23	Actuals 2023-24	Revised 2024-25	Budget Estimate 2025-26
Total	500,681	573,098	609,504	641,060	681,210
Year on Year Change		14%	6%	5.2%	6.3%

FY: Financial Year (April to March)

Source: PRS Legislative Research³⁹

Over the past five years, India has demonstrated a sustained upward trajectory in military expenditure across all major services under the Ministry of Defense (MoD). An analysis of budget data from FY 2021-22 through the projected figures for FY 2025-26 reveals an average annual growth rate of 8.7% in defense spending. While year-on-year increases have varied, the overall trend highlights India's commitment to strengthening its defense capabilities. This consistent investment has positioned India among the world's top five defense spenders, alongside the United States, China, Russia, Germany, and the United Kingdom.

³⁹ Demand for Grants 2025-26 Analysis, PRS Legislative Research, https://prsindia.org/files/budget/budget_parliament/2025/DFG_Analysis_2025-26_Defence.pdf

India's defense budget now stands out not only for its scale but also for its strategic significance in the global security landscape.

The implementation of the five Positive Indigenisation Lists (PILs) marks a pivotal shift in India's defense procurement policy, directly supporting the country's rising defense expenditure. These lists, most recently expanded to include 346 additional items, are designed to systematically restrict the import of key defense equipment after specified deadlines, compelling procurement exclusively from domestic sources. The initiative aims to drive self-reliance by boosting indigenous manufacturing, involving major defense public sector undertakings (DPSUs), micro, small and medium enterprises (MSMEs), and start-ups in the production of strategically important systems, sub-systems, and components. The 2025 defense budget highlights a growing focus on integrating advanced technologies such as AI, cybersecurity, and surveillance systems into the armed forces and identifies artificial intelligence, cyber, and space as priority areas for focused intervention in 2025.

India's Ministry of Defense has significantly advanced its air defense capabilities with Project Akashteer, investing INR 2,400 crore in an automated control and reporting system that leverages AI, data fusion, and real-time intelligence. Akashteer integrates a wide array of radar and sensor feeds, using artificial intelligence and machine learning algorithms to automate the detection, tracking, and autonomous engagement of aerial threats such as enemy aircraft, drones, and missiles. The system consolidates live data from multiple sources, creating a unified airspace picture accessible down to frontline units, and empowers decentralized decision-making for rapid response. By eliminating manual data entry and harnessing advanced analytics, Akashteer enables faster, more accurate threat assessment and engagement, marking a transformative leap in India's ability to defend its airspace with data-driven, technology-enabled solutions. Some of the similar projects undertaken by the Indian Government that push towards the indigenization of defense technology is listed below.

Exhibit 13: Notable Case Studies and Projects that Combine Indigenous R&D, Advanced Technology Integration, and Digital Capabilities

Program / Project	Timeline	Lead Agency	Objective	Tech Focus
Project Akashteer	Sanctioned in 2021, induction ongoing (2023–25)	BEL + Indian Army	Automated Air Defense Control & Reporting	Real-time tracking, integration of radar & weapons
Tactical Communication System (TCS)	Cleared in 2017, development ongoing with BEL & L&T	DRDO, BEL, L&T	Secure, mobile IP-based battlefield communication	Encrypted real-time data/voice, mobility
SAMAR Air Defense System	2022–2023 (converted by IAF engineers)	IAF + DRDO	Ground-based missile system using repurposed AAMs	Low-cost automation, radar integration

AFNET (Air Force Network)	Launched 2010, upgraded with 5G & cyber nodes post-2020	Indian Air Force	Digitized communication backbone	Satellite comms, secure IP core, cyber hardened
iDEX (Innovation for Defense Excellence)	Launched in 2018, ongoing	MoD, Startups	Promote indigenous tech in defense	AI, drones, surveillance, cyber tools

Source: Frost & Sullivan

3.5. Public Safety

Public safety encompasses emergency management, law enforcement, emergency medical services, fire safety, rescue department, etc. In continuation to the need for better safety arrangements, the Indian government has been launching and strengthening a broad range of public safety measures. This includes modernization of law enforcement and security coordination by establishing technology-driven multi-agency centers for intelligence and communication. This would streamline security coordination and real-time crime response, including the Multi Agency Centre (MAC). The MAC would help in synergizing the efforts of all agencies and provide a seamless and integrated platform to deal with the complex and interconnected current National security challenges⁴⁰. In connection with cybercrime, the Indian Cybercrime Coordination Centre (I4C) is increasing the cybercrime detection capability, including the launch of the e-Zero FIR initiative to allow filing of digital First Information Reports, enhancing swift response to cyber incidents. The government is parallelly working on improving earthquake preparedness through early warning systems, stricter building safety codes, and expanded seismic monitoring networks to improve real-time response and communication. Advanced technology (like AI) is being employed for predictive policing, facial recognition, crime pattern analysis, and “RoboCop” pilot programs to aid police with routine patrols and emergency response. To empower citizens with information and services, digital public safety apps and e-governance platforms are being launched to improve administrative transparency.

3.6. Smart Cities

The Smart Cities Mission was launched by the Indian government in June, 2015. The aim is to transform 100 cities with models of efficient, sustainable, and citizen-friendly urban development. The project seeks to improve quality of life through robust infrastructure, enhanced public services, and the integration of advanced technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and data analytics. One of the key components of the Smart Cities Mission is to establish Integrated Command and Control Centres (ICCC) in all the 100 cities for real-time urban management, deploying thousands of CCTV cameras for public safety, upgrading water supply monitoring, and technology-enabled solid waste management. The project is considered as one of India’s landmark projects with over INR. 171,000 crore tendered and a central allocation of INR. 48,000 crore, of which more than 90% was utilized by late 2024. As of March

⁴⁰ Press Information Bureau, Ministry of Home Affairs, May 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2129141>

31, 2025, more than 7,400 projects had been completed, contributing to goals of sustainability, economic growth, inclusiveness, and adaptability to future urban needs.

4. Integrated Telecom, Security and Safety (ITSS) Market

4.1. Market Definition

For the purpose of this industry report, the integrated telecom, security and safety (ITSS) systems market is defined as a domain where digital communications (as referred to as telecom & communications), security & surveillance, and safety are unified and offered through turnkey projects via single-point responsibility projects encompassing every stage (from design engineering, procurement of subsystems, and hardware & software installation/integration to project management, testing, commissioning, and life cycle management) primarily for the critical national infrastructure (CNI) sector, transportation, mining, public safety, defense, industrial and manufacturing. This unified approach ensures robust, efficient, and secure communication networks by leveraging advanced technologies like artificial intelligence (AI) in telecom infrastructure and services, security systems and services, and safety protocols.

4.2. Need for ITSS

Integrated telecom, security and safety (ITSS) systems are considered important for industry sectors where uninterrupted operations and the protection of physical and cyber assets are fundamental to national security and economic stability. It helps safeguard critical assets and ensures operational excellence, by building a robust underlying infrastructure. Listed below are some of the key reasons for the need for ITSS:

- **Ensures reliability and operational continuity:** Reliable, fail-safe communication and control systems are essential for the Critical National Infrastructure (CNI) sector. It is imperative that in every situation, these critical systems are up and running. ITSS helps provide reliable real-time data and voice communications, enabling swift responses to incidents and minimizing downtime.
- **Improves security and safety:** Critical infrastructure, defense and transportation often remain prime targets for cyber and physical threats. Security of assets around these industry verticals are crucial and needs to be fool proof. ITSS helps provide and integrate surveillance, access control, intrusion prevention, and emergency management to proactively guard against, detect, and respond to risks.
- **Enabling data-driven decision making:** Modern infrastructure generates volumes of data which is often complex. It is important that by using advanced analytics and AI, data collection is automated, cleaned, analyzed, structured, and rightly interpreted. The output data thus generated helps in achieving operational excellence, predictive maintenance, and efficient asset management.
- **Takes an integrated approach:** Traditionally, telecom, security and safety systems operated in siloes. This led to inefficiencies and communication gaps. Having these gaps in critical industry verticals could lead to undesirable outcomes and situations. ITSS unifies the critical pillars of telecom, security and safety into a single network reducing overhead, streamlining operations, and improving collaboration among machines and people.
- **Seamlessly Interworking Integrated Systems:** It is imperative that the systems implemented for CNI, are integrated in such a fashion that they communicate with each other and act as one

system of systems, enhancing each system's capability and presents it to the decision maker a complete situational awareness. For example the Access Control System communicating with the CCTV to point the nearest camera where the ACS alarm goes off, or say the nearest camera automated to track the intrusion alarm sensed by the (Perimeter Intrusion Alarm System) PIDS system.

- **Future-ready infrastructure:** The next wave of technology adaptation has already started with use of advanced technologies like AI, ML, analytics, internet of things (IoT), and emerging quantum communications. ITSS platforms are designed to imbibe these technology elements in the framework and ensure that systems remain secure and effective.
- **Industry-compliant:** With increasing security and safety concerns, most industry verticals are seeing a rise in industry mandates – failing which results in reputational damage, financial loss or even challenging the existence of the entity. ITSS helps ensure that businesses, government bodies, and the defense sector meet the industry regulations and mandates.

4.3. Technology Trends in ITSS

The ITSS industry is undergoing a transformation, driven by technological innovations and a move towards the Industry 5.0 ecosphere.

4.3.1 Trends in Telecom Infrastructure

Backbone & Access Networks

- **Fiber Optic Backbone:** The fiber optic rollout supports both core (backbone) and access (last-mile) network requirements. For CNIs, which have multiple systems connected on the network and these systems requiring multiple bandwidth allocations from very high data rates eg. CCTV, Business LAN etc., to low data rates such as telemetry and IIoT data, it is important that the organisation has its own backbone network within its premise as much as possible. Its high demand is driven by rising bandwidth requirements, digital transformation, government initiatives enabling digital growth, and technological advancement. Fundamentally, fiber optic rollout helps handle bandwidth demands better. Fiber is a preferred medium for 5G backhaul and future 6G deployments due to its low latency and large bandwidth. In-fact, the high growth of datacenters has fueled the demand for fiber optics.
- **Transmission Technologies:** In majority of the cases, where the CNI facility is limited to a defined single plant location, two or three tier architecture LAN implementation with secured WAN access suffices the end user requirements. For geographically spread-out facilities such as Oil and Gas pipelines, Oil fields, Upstream to downstream inter communications, power transmission, defense systems etc. require highly resilient and many a time high bandwidth communication setups. Also with rising complexity and granularity of data, the CNI industry is witnessing a multi-fold increase in demand for bandwidth. This has triggered the adoption of DWDM technologies where multiple wavelengths of light are used to carry large amounts of traffic on the same fiber. At present, DWDM technologies available in the market support very high data-rates running into hundreds of Terabytes per second. Another development in backbone fiber transmission for large area, multi-nodal communications is the adoption of the MPLS-TP technology standard, which is

an advanced version of MPLS specifically designed for predictive traffic behaviour that gives assured data connectivity similar to well-proven SDH technologies which have been deployed in CNI networks, while at the same time providing the flexibility of packet technology.

- **Wireless and Private 5G adoption:** Until now, mobile connectivity within CNI facilities was with WiFi. Moving forward, for last-mile mobile connectivity, adoption of 5G is going to be a more pressing need in the times to come. Wider adoption and deployment of 5G is being seen across countries worldwide. 5G emphasizes speed, reduced latency, and capacity for massive device connectivity. The CNI sector, primarily energy and Defense would prefer Private 5G to ensure high availability and robust security for communication during regular normal operations as well as emergencies. In India, there is a move towards allocating spectrum to private enterprises to build and operate their own secure private 5G network meeting their specific application. The term “CNPN” in the context of private 5G refers to Captive Non-Public Networks. The guidelines for CNPN covers aspects like licensing, spectrum allocation, network architecture, security and compliance. One of the other critical sectors like defense has been using 5G for real-time and reliable communication, enhanced ISR (intelligence, surveillance, and reconnaissance), controlling autonomous vehicles, and integration of military platforms for joint operation. In India, CNPN can be deployed independently or in partnership with telcos.

It helps enterprises to increase the speed of digital transformation, automate processes, and improve real-time decision-making. Industries have been leveraging 5G for advanced automation and industrial IoT by deploying connected sensors and machines for smarter manufacturing. Edge computing has been on the rise, benefiting from the use of 5G

Other Developments

- **All over IP:** A modern converged approach where all devices and systems within a building, organization, or network communicate exclusively using Ethernet and IP standards. This implies, instead of relying on multiple legacy systems or specialized communication protocols (eg. old field bus systems), data, voice, building automation, lighting, and security are integrated over a unified IP-based LAN. While All over IP is still evolving, in telephony and communication, the shift from traditional phone lines to IP-based solutions like VoIP (Voice over IP) is well underway. AV over IP market is experiencing strong growth, many building systems (like surveillance, access control, HVAC, Building Management Systems and lighting) are being increasingly managed through IP networks, especially in modern commercial setups.
- **Open RAN:** While still niche, a steady shift towards multi-vendor Open Radio Access Networks (RAN) is being observed to decouple hardware and software for greater flexibility. Open RAN is a next generation concept that disaggregates the traditional, proprietary radio access network (RAN), allowing network operators to use hardware and software from multiple vendors in a single network. This eliminates the dependency on a single supplier for the entire RAN system, allowing operators to use a diverse set of components—such as radios, hardware, and software.
- **Single Pair Ethernet (SPE):** This is Ethernet technology that allows both data and power transmission to flow over a single pair of copper wires, unlike traditional Ethernet which requires two or four pairs for similar functions. SPE is considered as an easy to use, compact, cost-effective

solution designed to simplify cabling and connectivity, especially for complex environments like industrial and building automation/systems or automotive networks. Backed up by IEEE standards (notably the IEEE 802.3cg and 802.3bp), SPE is considered an important technology for future-proof Ethernet infrastructure in both industrial and commercial environments.

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Internet and Wide Area Network (WAN)

- **Edge computing:** Referred to as an advanced computing technique, edge computing processes, analyzes, and stores data closer to its source—typically on devices or local servers at the "edge" of the network—rather than sending all data to distant centralized data centers. This helps in faster insights, improved reliability, enhanced scalability, and greater privacy and security since computing is processed locally without transmitting it to the cloud. Industry sub-sectors like autonomous vehicles, smart manufacturing, and critical infrastructure monitoring are some of the important use-cases of edge computing.
- **Software Defined Networking (SDN) & Network Function Virtualization (NFV):** SDN is a network architecture that decouples the control plane from the data plane, centralizing network intelligence in one or more controllers. This segregation helps network management programmable, dynamic, and highly flexible, allowing administrators to configure, control, and optimize network resources easily from a centralized console rather than configuring each device individually. Meanwhile, NFV moves traditional hardware-based network functions like firewalls, load balancers, and routers, into software-controlled processes that operate on standard, commercial off-the-shelf hardware or virtual machines. With virtualization, flexibility, scalability, and cost efficiency in network management improves. SDN finds strong relevance in telecom, IT, financial services, and manufacturing, that demands agility, automation, and scalability amid rising data traffic, IoT, and multi-cloud deployments. NFV adoption is tightly linked to the SDN trend, mainly popular among telecom operators, cloud providers, and enterprises who has high data transmission demands.

4.3.2 Trends in Security and Surveillance

Physical Security

- **Perimeter Intrusion Detection System (PIDS):** Perimeter security is critical for any organization and intrusion detection systems are pivotal for providing early detection and alerts for unauthorized entry attempts at the boundaries of a protected area. PIDS consists of sensors and

IoT devices that track motion, sound, pressure, or heat, integrated with video surveillance and alarm systems to monitor fences, boundaries, gates, and access points around a facility. During an attempt of intrusion, these sensors trigger alarms and send real-time alerts to security personnel, often supported by visual verification through live camera feeds for rapid assessment and response.

Following mentioned below are the different types of PIDS suited for different environments and security requirements:

- **Fence-Mounted Sensors:** Generally installed on fences to detect vibrations, pressure, or motion when an intruder tried to climb or cut through a fence. Examples include vibration sensors, fiber optic sensors, and taut wire systems.
- **Ground-based or Buried Cable Sensors:** These sensors are concealed underground or at ground level and are used to detect footsteps, vibrations, or pressure above the surface. Pipeline PIDS aligns with the Ground-based or Buried Cable Sensors category because the sensing elements are installed underground. Pipeline PIDS is specifically designed to detect unauthorized access, third-party interference, or malicious attempts along buried pipelines. These pipelines typically run through remote or hostile areas and thus Pipeline PIDS are used to monitor the integrity of the pipeline in real-time (leveraging distributed fiber optic sensing, particularly Distributed Acoustic Sensing – DAS).
- **Free-standing Systems:** Some examples of this type of system include bistatic microwave links and radar systems that detect intruders in open areas. Free-standing Systems are deployed above the ground and do not require a physical barrier.
- **Microwave or Radar Sensors:** Leverages microwave or radar technology to create invisible detection zones triggering alerts when breached.
- **Infrared (IR) or Laser Sensors:** Detects light or heat interruptions generated by movement crossing a protected zone.
- **Video-based Systems:** Employs smart cameras to detect human motion, loitering, and boundary breaches.
- **Seismic, Acoustic, or Magnetic Sensors:** Detects vibrations, sounds, or magnetic disturbances caused by intruder movement

Cybersecurity

- **Quantum Computing Threats:** With the invention of quantum computing, there has been a risk that future quantum computers will be able to break most of the encryption currently used to secure digital systems and communications, dramatically endangering cybersecurity for data, businesses, and governments. Virtually all public key cryptography, including the systems protecting internet traffic, banking, critical infrastructure, and government communications, can be broken by quantum computers. Attackers are believed to steal encrypted data now and simply wait until quantum computers are powerful enough to decrypt it, putting long-lived, sensitive information at special risk - which is known as Harvest Now, Decrypt Later.
- **Convergence of IT and OT Security:** While IT and OT security always stayed apart, with the increasing complexity of cyber-attacks, a convergence of IT and OT security has become

inevitable. This refers to strategic integration of traditional data-centric IT systems with industrial and operational control systems. The convergence of IT and OT security enables enhanced efficiency, real-time data analytics, and streamlined processes across enterprise and industrial environments. It requires robust approaches such as network segmentation, unified security policies, continuous monitoring, and cross-functional collaboration between IT and OT teams to ensure safe, resilient, and compliant integrated operations.

- **Zero Trust Architecture:** Often referred to as ZTA, Zero Trust Architecture is a cybersecurity model based on the principle of "never trust, always verify". This requires every device, user, and application to be verified every time regardless of whether the resource or asset is inside or outside an organization's network. ZTA believes breaches are inevitable and therefore it is critical to limit access strictly on a need-to-know basis with the least privilege principle. The architecture works on critical components of identity management, access management, network segmentation, continuous monitoring, and dynamic policy enforcement.
- **AI and ML enabled cybersecurity:** To counter today advanced cyber-threats, it is important to enable next-generation technology. AI and ML based cybersecurity refers to the application of advanced data-driven technologies that use artificial intelligence and machine learning algorithms to enhance detection, prevention, and response to cyber threats. These technologies analyze massive volumes of data in real time to identify patterns, detect anomalies, and predict potential attacks that traditional rule-based security systems may miss. Based on vendor inputs, the best-in-class cybersecurity products, solutions and services have already leveraged AI and ML.

Surveillance

- **Shift from analog to IP cameras:** The move from analog to IP cameras has elevated video quality, storage capacities, and remote accessibility. IP cameras have redefined the surveillance landscape, as they offer better clarity, versatility, and ease of use, indicating a significant shift in the industry. Some of the IP cameras come with motion detection, two-way audio, and advanced encryption protocols, while ensuring a higher level of security. In addition, the integration of IP cameras with network video recorders (NVRs) has streamlined video management, allowing efficient storage and retrieval of footage, marking a pivotal advancement in surveillance technology.
- **The emergence of cloud video surveillance:** Also known as Video Surveillance as a Service (VSaaS), the emergence of cloud-based video surveillance has brought forth advantages in terms of scalability, accessibility, and cost-efficiency. The shift towards cloud video surveillance solutions represents a strategic transition from traditional on-premises systems to cloud-based infrastructures. This transformation has been fueled by the need for centralized management, advanced data protection, and operational flexibility. It offers features such as remote/cloud video storage, automated software updates, and the ability to integrate with other security systems, thus enhancing overall operational efficiency. Cloud-based video surveillance has empowered organisations and individuals with seamless access to surveillance data, enabling simplified infrastructure management.

- **The rise of AI-driven video analytics:** The integration of AI-driven video analytics algorithms represents a technological breakthrough in the surveillance domain, enabling advanced processing, real-time analysis, and proactive threat detection. These algorithms leverage the power of AI to analyze vast amounts of video data with precision and efficiency, outperforming traditional surveillance systems. It simplifies and eases the burden of repetitive and tedious tasks of long-hour video observation by humans. It also helps perform video analysis, identify trends, categorize, and automatically tag specific objects, much beyond just creating use-cases in security and surveillance and hence enable operational efficiency.
- **Demand for remote monitoring:** The surge in the requirement for remote monitoring capabilities highlights the increasing emphasis on proactive security measures and real-time insights. The demand has driven the development of sophisticated surveillance systems that allow seamless remote access and monitoring, enabling businesses and individuals to remain vigilant and responsive to security incidents regardless of their physical location.
- **Smart Access Control and biometrics:** Advanced access control systems use biometrics features like fingerprints, facial features, iris patterns, or voice recognition for identification and access management. Biometrics offer unique and non-transferable identifiers that are difficult to counterfeit, offering stronger security compared to conventional keys or cards. Nevertheless, keys, cards, and PINs continue to see demand due to their cost-effectiveness, simplicity, and ease of implementation in certain scenarios. The advancement of AI and sensor technology has made biometric authentication even more accurate and reliable as the integration of biometric systems help in real-time monitoring, centralized credential management, and seamless compatibility with other security systems.
- **Use of blockchain technology for securing surveillance data:** Still considered as an emerging concept, blockchain technology securely records and timestamps video feeds and sensor data, making any unauthorized modifications detectable and traceable. This ensures that surveillance data remains authentic and reliable for later analysis, legal evidence, or audit purposes.

4.3.3 Trends in Safety Systems

- **Public Addressal Systems (PAS) – also referred to as PAGA (Public Address and General Alarm Systems):** These systems serve as a critical role in emergency communication where they deliver clear, real-time instructions (mainly voice and text alerts) during incidents like fire or security threats, including panic and rescue operations by integrating with fire alarms and other emergency controls. These systems mostly use pre-recorded messages to minimize human intervention and can pinpoint danger zones or blocked exits while guiding people through the nearest safe exits.
- **X-ray scanning systems:** X-ray scanning systems screen luggage, parcels, and personal belongings at critical check points. The latest trends in these scanning systems include strong emphasis on automation, AI integration, and heightened operational efficiency to address the increasing demands in transportation, cargo, and high-security environments.
- **Explosive detection systems:** Often used as an additional and specialized security arrangement, explosive detection systems use advanced technology like X-ray imaging, mass spectrometry, and

trace detection portals to identify explosives and other hazardous materials accurately. The use of AI helps improve automatic threat recognition, real-time image analysis, and adaptive scanning. Enhanced dual-view X-ray scanners and computer tomography (CT) systems provide comprehensive multi-angle imaging, improving the ability to identify concealed and complex threats.

4.3.4 Trends in Voice and Video Communications

- **Unified Communication (UC) Platforms:** A trend that has picked up in the last 7-8 years, UC platforms are integrated systems that merge various communication modes like voice, video, messaging, and collaboration features—into a single cohesive interface. Since the COVID-19 pandemic, the demand for UC platforms have picked up strongly, particularly due to the global shift toward hybrid and remote work environments, making robust and flexible collaboration essential for both productivity and operational efficiency. Some of the commonly known UC platforms include Microsoft Teams, Webex by Cisco, and Zoom One. AI has now become a fundamental feature across most UC platforms, providing features like real-time transcription, virtual assistants, predictive analytics, and intelligent call routing. Cloud-native Unified Communications-as-a-Service or UCaaS, is fast replacing traditional on-premises systems, offering organizations greater agility, scalability, and cost efficiency. Security has become prime as providers offer advanced security measures like multifactor authentication, end-to-end encryption, and AI-powered threat detection.

4.3.5 Trends in Power Systems

- **IoT integration and smart monitoring:** The most advanced versions of UPS (Uninterruptible Power Supply) systems use IoT technologies with advanced sensors and connectivity, enabling real-time monitoring of performance, battery life, environmental conditions, and proactive maintenance through data analytics. Real-time monitoring of the UPS systems are carried out as information is transmitted to cloud-based platforms. Smart monitoring helps in remote access, thus providing users with the option to oversee and control backup power operations from any location through the web or mobile applications.

4.3.6 Adoption of AI/ML

- ITSS systems are no longer a collection of a large and varied number of equipment merely generating data left for human operators to interpret and act on. Smart inter-system interfaces allow meaningful information to flow between the elements of different systems. This information is organized in purpose-built structures that takes a shape and form beyond a collection of data-sets to give greater insights into operational situations. This can be very effectively accomplished by applying reinforcement-learning (RL) and other AI techniques on state-machine diagrams, class diagrams, OOL analogues or declarative programming. Functional modules of different sub-systems are leveraged to give added intelligence spanning the operations landscape.
- Traditionally, IT (Information Technology) and OT (Operations Technology) systems have operated as disconnected domains managed by separate teams. Intelligently networked systems

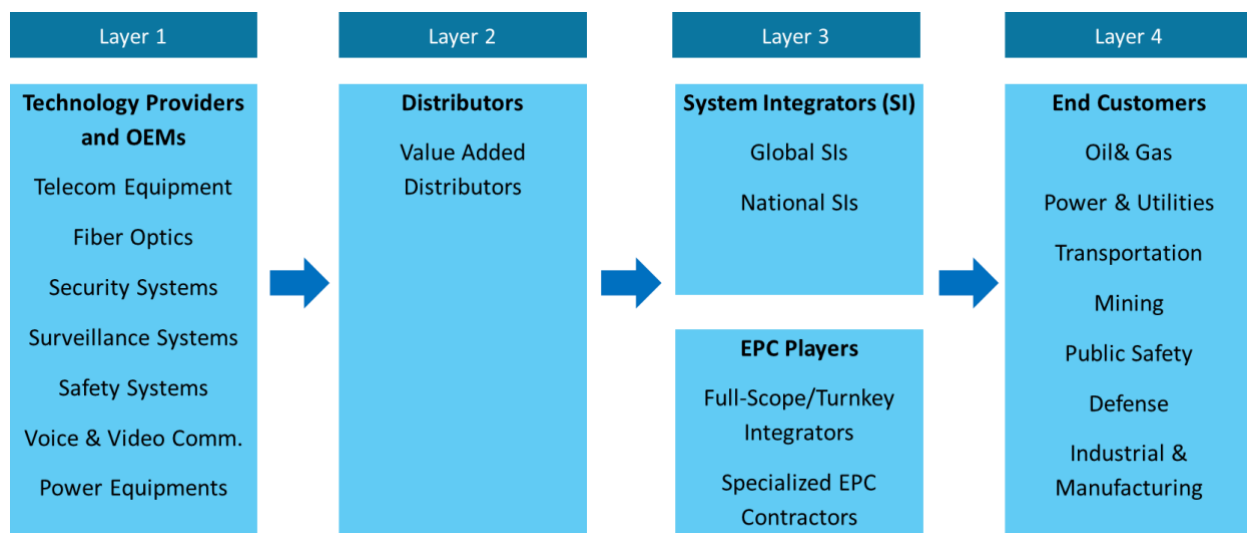
enable high level of collaboration through tight IT/OT integration. For instance, by feeding process control and other OT data into AI models on the IT side along with ERP systems and analytics tools it is possible to optimize production in real-time in response to fluctuating market demands in utilities and oil-and-gas plants. This results in lower wastage, faster-time to market and meeting customer needs more effectively.

- Another evolving area is the application of AI-based learning models for predictive maintenance. By collecting real time data from operating equipment and from the operating environment through sensors, analyzing it with deep learning techniques and contextualizing it with the system knowledge-base, it is possible to predict the overall system health and its individual components. Based on the results, it is possible to undertake targeted maintenance activities, thus reducing system down-time and resulting in more efficient spares management.

4.4. ITSS Value Chain Analysis

4.4.1 ITSS Value Chain

Exhibit 14: ITSS Value Chain Diagram



Source: Frost & Sullivan

The ITSS stakeholder value chain is a multi-layered ecosystem in which diverse players collaboratively create, secure, and deliver robust communication and safety solutions for critical infrastructure sectors including defense. The value chain starts with technology providers and OEMs who supply essential hardware, software, and network equipment. These products are delivered to the SI (system integrator) or EPC (engineering, procurement, and construction) firm through a distributor or reseller who finally implements, installs and delivers the solution to the end customer. Regulatory bodies and government agencies underpin the entire value chain by setting security frameworks, compliance mandates, and resilience standards for networks and data.

4.4.2 Role of Each Value Chain Player

Level 1: Technology Providers and OEMs

Technology providers and original equipment manufacturers (OEMs) form the backbone of the entire technology solutions and services ecosystem, dedicated to design and develop the core software/hardware solutions that form the basis of telecom, IT, and technology infrastructure. OEMs are strongly focused on developing innovative and sustainable technologies that address evolving customers' needs, driving the growth of the entire technology infrastructure. These companies leverage foundational technologies like automation, AI, IoT, enterprise software and more, to develop products and solutions. These companies deliver platforms, software, or managed solutions—such as integrated network management tools, AI-based platforms, or telecom management software—which enable telecom operators to efficiently manage, optimize, and innovate within their complex, multi-vendor network environments. They are also manufacturers/developers of network equipments like routers, switches, and telecom management applications, that get assembled into cohesive, market-ready solutions for telecom operators. Beyond telecom, OEMs also develop and manufacture surveillance systems like CCTV cameras, digital video recorders (DVRs), network video recorders (NVRs), access control readers, and specialized sensors—that form the physical infrastructure of surveillance systems.

Level 2: Distributors

Distributors serve as a vital link between OEMs and system integrators. They procure hardware, software, and IT services in bulk from leading vendors, store them in strategically located warehouses, and distribute these products efficiently to resellers, system integrators, or directly to businesses. However, value added distributors (VADs) go beyond simple logistics and offer value-added services such as technical support, product configuration, training, financing options, and supply chain management assistance to help partners deliver comprehensive solutions in an ever-evolving market. VADs utilize their extensive knowledge and experience of specific technologies or industries to offer pre-sale support, implementation support and integration advice. Additionally, VADs also manage inventory, logistics and the whole supply chain operations for OEM products, ensuring system integrators receive timely delivery of products.

Layer 3: System Integrators

SIs often front-end customers and specialize in integrating multiple technologies into comprehensive solutions. Their ability to deliver comprehensive implementation and deployment services for sophisticated telecom and digital transformation projects derives from their extensive knowledge and experience of specific industries, technology or business processes. They build robust and secure telcom and computing systems by combining hardware, software, networking, storage and other products. They provide design, advisory, implementation, testing, support and lifecycle management and services, making them a reliable service partner. By leveraging their skilled resources, customer relationships, they have a major market capture and recall amongst end users. They enable digital ecosystems, and potentially expand into adjacent services like cloud computing, IoT and data analytics, to be a one stop shop for the end customer. SIs can be further segmented into global and national SIs depending on their geographical presence and scale of operations.

Layer 3: EPC Players

An EPC player is a company who provides engineering, procurement, and construction services under a single contract for large-scale or complex infrastructure projects. The vendor is responsible for managing

the entire project from initial design to handover of a fully operational facility. This type of EPC vendor is normally referred to as full-scope EPC player. On the contrary, a specialized EPC contractor is a type of provider who focuses on a specific segment (eg. telecom, security, surveillance, or safety) rather than taking responsibility for the entire project. The specialized provider often works in collaboration with other system integrators or full-scope EPC vendors to deliver the project. However, they remain responsible for just its area of expertise.

Layer 4: End Customers

End customers are the final and the most important stakeholders for whom the ITSS project is being delivered. ITSS customers include oil & gas companies, power & utilities providers, transportation vendors, mining companies, public safety departments, the defense sector, and industrial and manufacturing companies. These sectors support national critical infrastructure, which means their operations are fundamental to economic stability, public safety, and even national security. Secure, reliable communication networks are necessary to prevent service disruptions that could have wide-reaching consequences.

4.4.3 Leading Players in the Value Chain

Level 1: Technology Providers and OEMs

- Telecom Equipment
 - Huawei, ZTE, Ericsson, Alcatel-Lucent, Huawei, Tejas Networks, etc.
- Security Systems
 - Bosch, Honeywell, Johnson Controls, Siemens, etc.
- Surveillance Systems
 - Hikvision, Axis Communications, Dahua, CP Plus, Bosch, etc.
- Safety Systems
 - Honeywell Safety, Siemens, Johnson Controls, Bosch, etc.
- Voice & Video Communications
 - Cisco, Microsoft, Avaya, Polycom, etc.
- Power Equipment
 - Schneider Electric (including APC), Delta Electronics, Eaton, Toshiba, etc.

Level 2: Distributors

- Global Distributors and VADs
 - Ingram Micro, Redington Limited, Arrow Electronics, A1 Security Cameras, CCTV.net, etc.

Level 3: System Integrators

- Global System Integrators
 - Commтел Networks, ABB, Honeywell, Hitachi, Raitel Corporation, etc.

Level 3: EPC Players

- Full-Scope/Turnkey Integrators

- Larsen & Toubro (L&T), Tata Projects, Hindustan Construction Company (HCC), NCC Limited, Bechtel, etc.
- Specialized EPC Contractors
 - Tejas Networks

4.5. Service Requirements in ITSS Client Projects

4.5.1 Design Engineering

Design engineering is an important aspect of any project that is focused on applying engineering principles to design products, systems, or processes before they are being developed that meet specific requirements and effectively solve practical problems. This is the first step towards executing any project that follows a systematic, iterative process that transforms ideas into functional and manufacturable solutions through the integration of scientific knowledge, engineering expertise, and creative problem-solving. Design engineering is critical in any ITSS project because it provides the structured process and technical rigor needed to ensure all subsystems—telecommunication, security, and life safety—work together seamlessly, efficiently, and reliably. ITSS projects involve integrating a diverse range of technologies from the fields of telecom, voice and video communications, video surveillance, security, and safety and hence require in-depth designing by carefully defining requirements, interfaces, and dependencies to avoid conflicts, gaps, or failures during operation. Designing ensures alignment to stringent safety standards, legal requirements, and relevant codes to prevent incidents and enable traceability and accountability throughout the asset lifecycle.

4.5.2 Procurement of Subsystems

In an ITSS requirement, usually the SI or the EPC provider delivers the project through a turnkey engagement model. SIs have partnership with leading OEMs and technology vendors who supply equipments and systems to the provider that is later installed or integrated into the project. They have strategic alliances with the suppliers that SIs and EPC providers leverage to deliver complex, integrated solutions. The OEM or technology vendor, supplies specialized products, components, or software crucial for system functionality, ensuring high technical standards and ongoing support. These partnerships often go beyond basic supplier-customer relationships, which may involve collaborative solution development, customization, technical integration, and joint support services. Based on project needs, OEMs also offer tailored adaptations or provide direct engineering assistance to ensure their products fit seamlessly into a broader ITSS requirement.

4.5.3 Integration of Complete System

The SI or the EPC player works as a central expert, referred to as a provider, responsible for designing, implementing, and unifying the project's diverse subsystems into a seamless, reliable, and functional whole. The involvement of the SI or EPC player starts with analyzing the client's business requirement, designing the architecture and workflow, integrating the equipments and sub-systems according to the architecture, maintenance support, and project lifecycle management. However, the most important role of the provider lies with system integration. The provider oversees the installation, configuration, and integration of hardware and software components, rigorously testing interoperability and performance

to validate system integrity and security. They also manage project timelines, manpower, and vendors, acting as the central point of contact for all contractors, OEMs, and stakeholders, mitigating risks to avoid delays or budget overruns. The provider remains accountable to the client for the successful execution and delivery of the project. Finally, after deployment, they ensure smooth transition to operations by providing troubleshooting, system optimization, documentation, and maintenance support.

4.5.4 Onsite Installation and Commissioning

This phase of the project involves physically installing the equipment at the site, connecting the hardware, following safety and compliance processes, testing for correct installation, and ensuring that each component works as designed. Through commissioning, it is verified that all systems and components are installed correctly and function as intended. Fundamental hygiene checks are done which includes configuration, basic power-up, and health checks to ensure readiness for full operation.

4.5.5 Support Services and Lifecycle Management of Systems

After the systems go live, the focus shifts to operating and maintaining the ITSS systems. This includes continuous monitoring for performance, regular software updates, security management, and user support to ensure optimal performance and mitigate risks. Support services also includes technical assistance for troubleshooting and resolving issues with hardware, software, or integration. Change management is being done for applying software patches, firmware updates, and configuration changes, including validation of update authenticity and safe rollout procedures. Over time, as systems reach end of life or requirements evolve, lifecycle management ensures phasing out of outdated components through decommissioning, data migration or disposal of hardware. Lifecycle management helps with system reliability, cost efficiency, and security, while ensuring the infrastructure remains meaningful, aligned with organizational objectives and ready to adapt to future needs.

4.6. Team Capabilities in Project Execution

An able team is always considered as the critical success factor in any project, especially when it is about complex technology-driven environments like ITSS. An experienced and high-performing team possesses diverse range of skills, covering not only technical proficiency in areas like networking, programming, and system integration, but also expertise in project management, business analysis, quality assurance, and user experience design. Technical expertise includes network infrastructure design and management, covering knowledge of protocols such as TCP/IP, UDP, SIP, and familiarity with routers, switches, firewalls, and wireless technologies (RF engineering, 3G/4G/5G standards) for dependable connectivity and performance. Other telecom capabilities include deep knowledge of VoIP, GSM, LTE, and evolving trends such as 5G and IoT device integration, ensuring systems are interoperable and future-ready. Programming and automation skills are fast becoming relevant for configuring network equipment and developing AI- or machine learning-driven solutions for monitoring, analytics, and customer service. Certifications are also important for attaining expertise, a few of which includes CCNA, CCIE, CISSP, PMP and more.

- **Cisco Certified Network Associate (CCNA):** This is a globally recognized IT certification offered by Cisco that validates foundational knowledge and practical skills in networking fundamentals, network access, IP connectivity, IP services, security fundamentals, and

automation/programmability. ITSS projects require complex, reliable, and secure networking infrastructures and hence it is essential that professionals design, implement, and troubleshoot right integrated networks that form the backbone of telecom, security, and safety systems. The certification ensures that team members have up-to-date knowledge of current networking standards, security protocols, and best practices, which are critical for mitigating risks, ensuring system interoperability, and maintaining regulatory compliance in ITSS projects.

- **Cisco Certified Internetwork Expert (CCIE):** Unlike CCNA (which is the entry-level Cisco certification), CCIE is Cisco's highest-level and one of the most respected technical credentials in the networking industry. Professionals having CCIE certification demonstrate expert-level skills in planning, designing, implementing, and troubleshooting complex enterprise network infrastructures which is considered highly valuable in ITSS projects due to its complex nature and use of multi-technology networks where reliability, security, and seamless integration are critical.
- **Certified Information Systems Security Professional (CISSP):** Certified Information Systems Security Professional or CISSP is a global certification administered by ISC2 meant for experienced professionals in information technology (IT) security. The eligibility for professionals to attain the certification includes at least five years of cumulative paid work experience in two or more of the eight CISSP domains. CISSP certified professionals bring extensive knowledge on establishing risk management strategies, securing network communications, implementing identity and access controls, and complying with global security standards—all essential for protecting complex ITSS infrastructures.
- **Project Management Professional (PMP):** Awarded by Project Management Institute (PMI), the PMP certification verifies an individual's expertise and capability to lead and manage projects effectively. Taking the certification confirms that the professional has advanced knowledge and experience in project management including managing people, processes, and business priorities. In ITSS, PMP certification remains critical for some of the senior employees since most of these projects are large-scale, multidisciplinary, and complex, requiring the coordination of multiple teams, technologies, and rigorous compliance with industry standards.

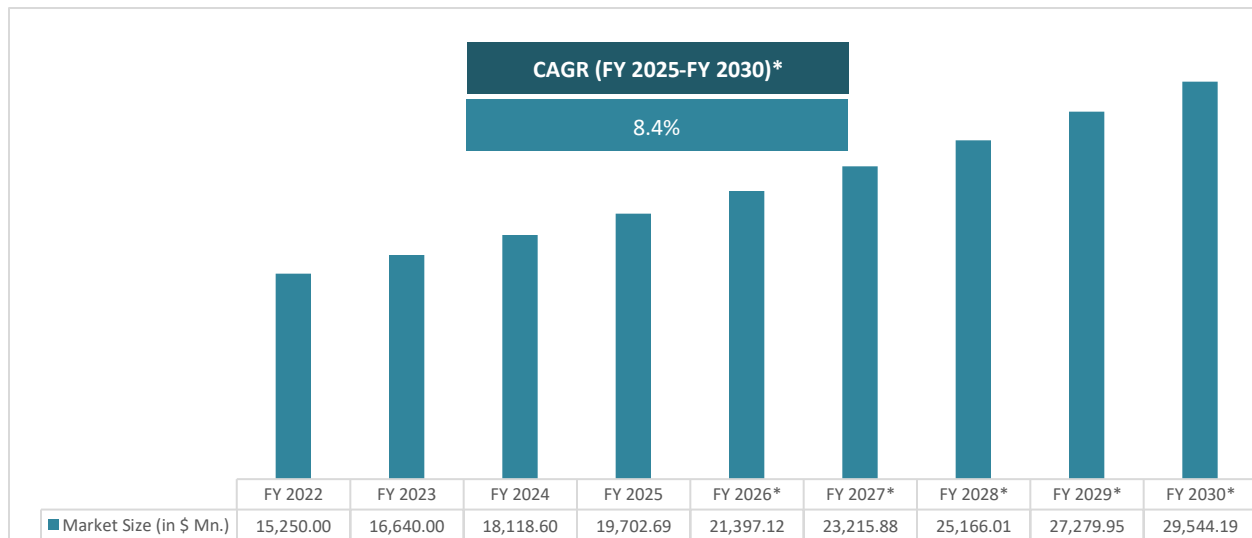
5. Global ITSS Market Size and Forecast

5.1. Global ITSS Market Size and Forecast

In this report, the integrated telecom, security and safety (ITSS) market is defined as a domain where digital communications (as referred to as telecom & communications), security & surveillance, and safety are unified and offered through turnkey projects via single-point responsibility projects encompassing every stage (from design engineering, procurement of subsystems, and hardware & software installation/integration to project management, testing, commissioning, and life cycle management) for the critical national infrastructure (CNI) sector including oil & gas, power & utilities, transportation, mining, public safety, defense, industrial and manufacturing. This approach ensures robust, efficient, and secure communication networks by leveraging advanced technologies like artificial intelligence (AI) in telecom infrastructure and services, security systems and services, and safety protocols.

Frost & Sullivan estimates the global ITSS market to be \$19,702.7 Mn. in FY 2025 and expected to grow at CAGR of 8.4% to become \$29,544.2 Mn. in FY 2030. Technological advancements (AI/ML integration, IoT adoption, analytics), infrastructural investments (expansion of the CNI and infrastructure sector, demand for smart and sustainable projects), rise of customer-focused innovation (proprietary AI platforms, tailored solution, software and lifecycle support), and need for security, compliance and risk management, are some of the important growth drivers to the ITSS market.

Exhibit 15: Global Integrated Telecom, Security and Safety (ITSS) Market, FY 2022 – FY 2030, in \$ Mn.



*projected

FY: Financial Year (April to March)

Source: Frost & Sullivan

Sample list of select Projects deployed worldwide by pure-play ITSS SIs:

- Commтел Networks: Served as the main ITSS system provider for one of the world's largest refineries covering 16 sq. km, delivering complete project management from design through warranty support in Kuw`ait⁴¹
- Commтел Networks: Delivered a complete ITSS solution for the Mexico's first floating liquefied natural gas (FLNG) - an innovative offshore project built on three repurposed Jack-up rigs with 1.4 MTPA production capacity⁴²
- Commтел Networks: Provided ITSS system infrastructure for a gas processing facility in Central Asia (Turkmenistan), delivering a fiber-based digital communication highway for a section of a 4,000 sq. km gas field⁴³
- MMR Group: Performed electrical and instrumentation services, telecommunications, start-up and commissioning assistance for the Kinder Morgan Elba Island's \$110 Mn. mega project⁴⁴
- Aesthetix: Worked on telecom and security systems for the BCDS new control building at Abu Dhabi National Oil Company) ADNOC Onshore⁴⁵
- 3W Networks: 3W Networks, a subsidiary of Elsewedy Electric, delivered Telecom Security Systems and OT Cybersecurity for ADNOC Belbazem Full Field Development⁴⁶
- 3W Networks: Provided telecom system integration for Saudi Aramco⁴⁷
- 3W Networks: Worked as a system integrator for providing modern telecommunication solutions systems including Telephone System, Hotline Systems, Structured Cabling, LAN System, PAGA System, Access Control System & CCTV System Passive Equipment, Tetra Radio System, VSAT, Entertainment System, Meteorological System and UPS System for AIN TSILA⁴⁸

5.2. Global ITSS Market Split by Regions

Currently, North America (excluding Mexico) is the biggest ITSS market in the world with major contribution coming from the USA. The continent forms 32.2% of the total market pie and is sized at \$6,350.65 Mn. in FY 2025. However, by FY 2030, North America would lose some of its market share to become the second biggest ITSS market after APAC.

⁴¹ As shared/mentioned by Commтел Networks during the report creation

⁴² As shared/mentioned by Commтел Networks during the report creation

⁴³ As shared/mentioned by Commтел Networks during the report creation

⁴⁴ MMR Group, Oil & Gas Midstream, Relevant Projects, <https://mmrgroup.com/experience/oil-gas-midstream>

⁴⁵ Aesthetix, Aesthetix Delivers Advanced Telecom and Security Infrastructure for ADNOC's BCDS Control Building, <https://aesthetixglobal.com/en-ae/news-and-updates/design-and-engineering-of-telecom-security-systems-for-adnoc-onshore-bab-degassing-station>

⁴⁶ 3W Networks, <https://www.3wnetworks.com/3w-networks-to-deliver-telecom-security-systems-and-ot-cybersecurity-for-adnoc-belbazem-full-field-development/>

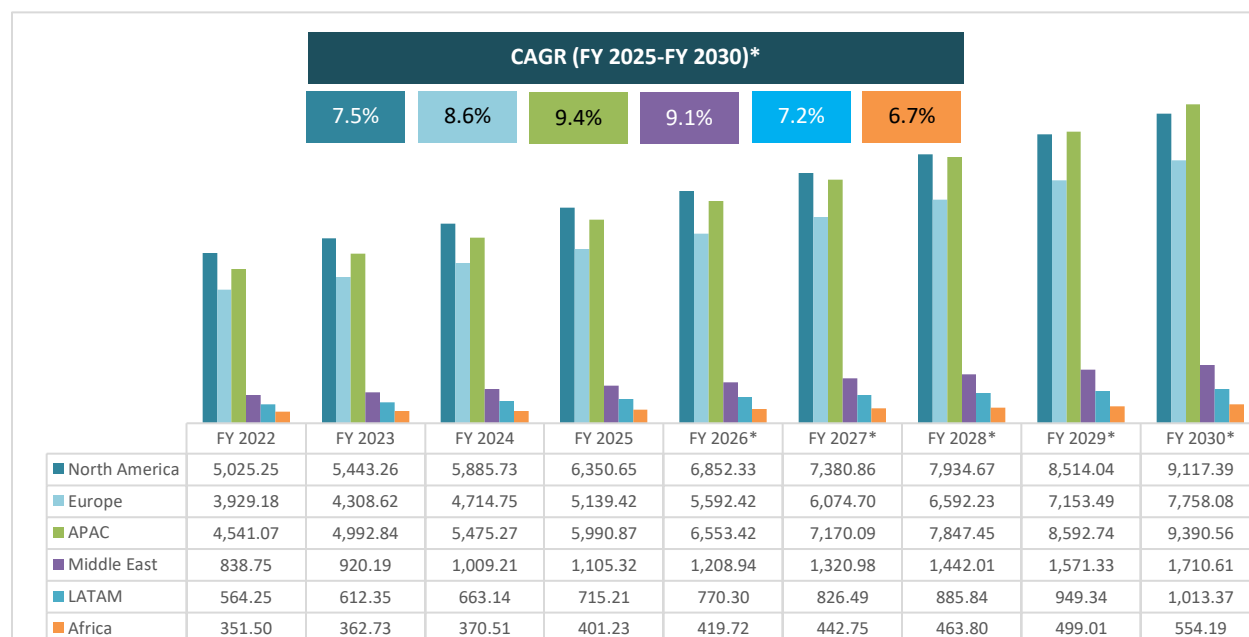
⁴⁷ Elsewedy Electric, <https://elsewedyelectric.com/en/page?v=News%20Room&i=3W%20NETWORKS%20WINS%20TELECOM%20SYSTEMS%20INTEGRATION%20FOR%20SAUDI%20ARAMCO>

⁴⁸ Elsewedy Electric, <https://elsewedyelectric.com/en/page?v=News%20Room&i=3W%20NETWORKS%20PROVIDES%20TELECOM%20AND%20SECURITY%20SYSTEMS%20FOR%20AIN%20TSILA>

APAC remains the fastest growing market in the world. Last year (in FY 2025), the region grew at 9.4%, higher than most other markets. India contributes to 6.4% of the total market which is expected to increase further in the next five years.

Exhibit 16: Global Integrated Telecom, Security and Safety (ITSS) Market, By Regions,

FY 2022 – FY 2030, in \$ Mn.



Note: North America excludes Mexico (included under LATAM)

*projected

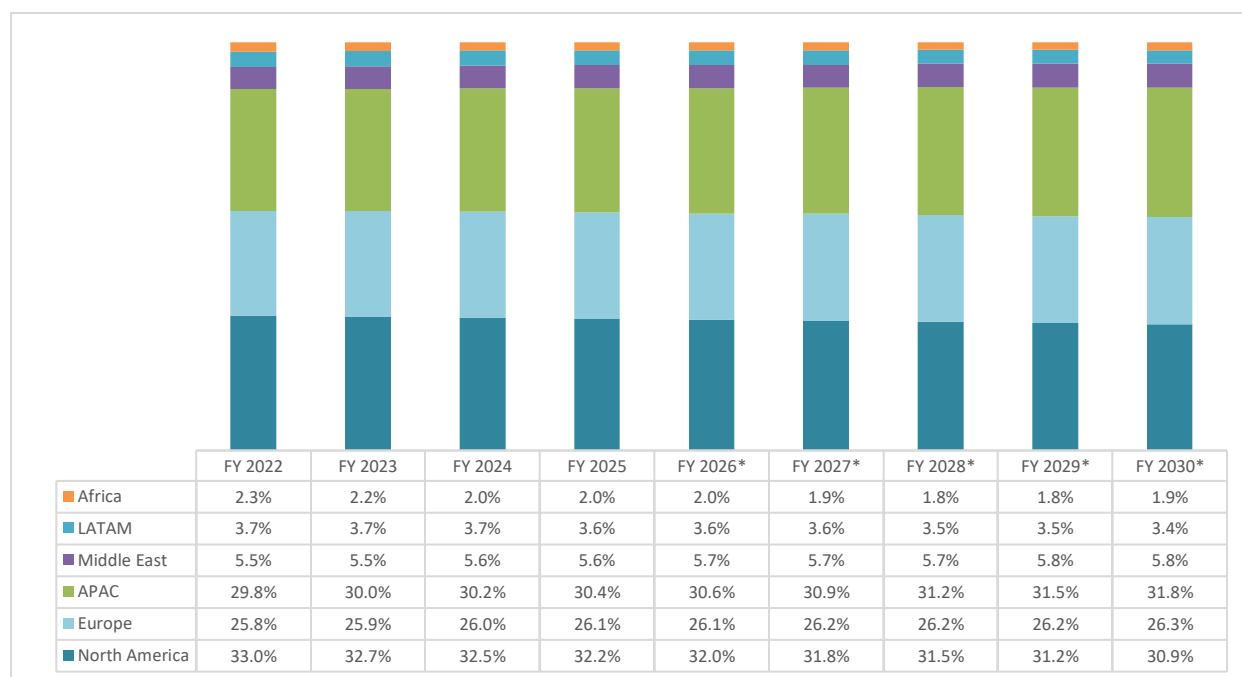
FY: Financial Year (April to March)

Source: Frost & Sullivan

Europe is also expected to grow faster than North America, predominantly driven by the demand from Western Europe. In FY 2025, Europe was estimated at \$5,139.42 Mn. and likely to grow at CAGR of 8.6% to become \$7,758.08 Mn. in FY 2030.

With strong investments in the oil & gas, and energy & utilities vertical, Middle East would be the next biggest market after APAC in terms of growth (estimated CAGR 9.1% from FY 2025 to FY 2030) – Saudi Arabia (KSA) would continue to be the largest market in the region. In parallel, UAE would pursue to be a premier global logistics and business hub with critical importance of cities like Dubai, Abu Dhabi and Sharjah, thus connecting multiple continents (Asia with Europe).

**Exhibit 17: Global Integrated Telecom, Security and Safety (ITSS) Market, By Regions,
FY 2022 - FY 2025, in %age Contribution**



Note: North America excludes Mexico (included under LATAM)

*projected

FY: Financial Year (April to March)

Source: Frost & Sullivan

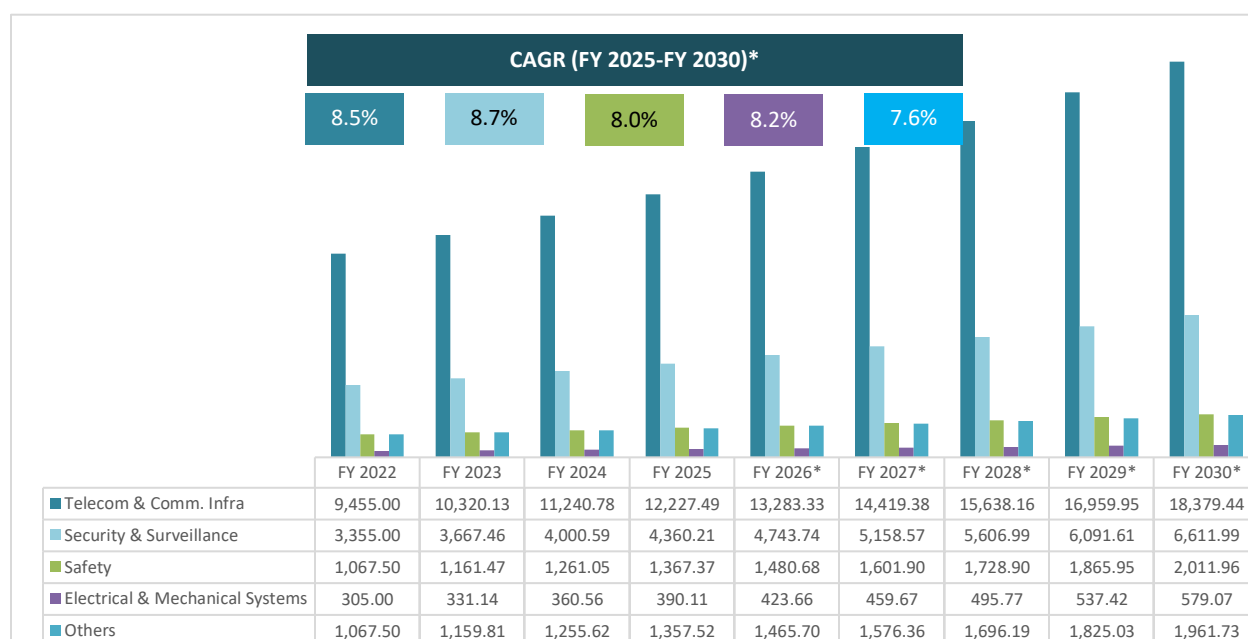
5.3. Global ITSS Market Split by Product Segments

The ITSS market definition includes three major components – digital communications, security & surveillance, and safety. Beyond these, the market definition also includes associated segments like electrical & mechanical systems, and entertainment systems and customized/special solution (classified under others).

- **Digital Communications (also called as telecom & communications):** Includes
 - Telecom & communications backbone networks: Switches, routers, network equipment, cabling systems, optical communication systems, etc.
 - Vital communication systems: IP systems, analog systems, voice and video communication systems, storage area networks, etc.
 - Wireless communication systems: Ultra high frequency (UHF) and very high frequency (VHF) communication systems, digital microwave radio (DMR), radio interoperability systems, radar communications, etc.
- **Security & Surveillance:** Includes CCTV/video surveillance, video analytics, perimeter intrusion detection systems (PIDS), pipeline intrusion detection systems, access control systems, integrated control and command centers, etc.
- **Safety:** Includes public announcement systems, x-ray scanning systems, explosive and hazardous chemical detection systems, etc.

- **Electrical & Mechanical Systems:** Includes power systems (UPS), poles for CCTV, speakers, beacons, self-supporting towers, equipment shelters, equipment cabinets, etc.
- **Others:** Includes entertainment systems, customized solutions, and industry vertical specific solutions

Exhibit 18: Global Integrated Telecom, Security and Safety (ITSS) Market, By Product Segments, FY 2022 – FY 2030, in \$ Mn.



*projected

FY: Financial Year (April to March)

Source: Frost & Sullivan

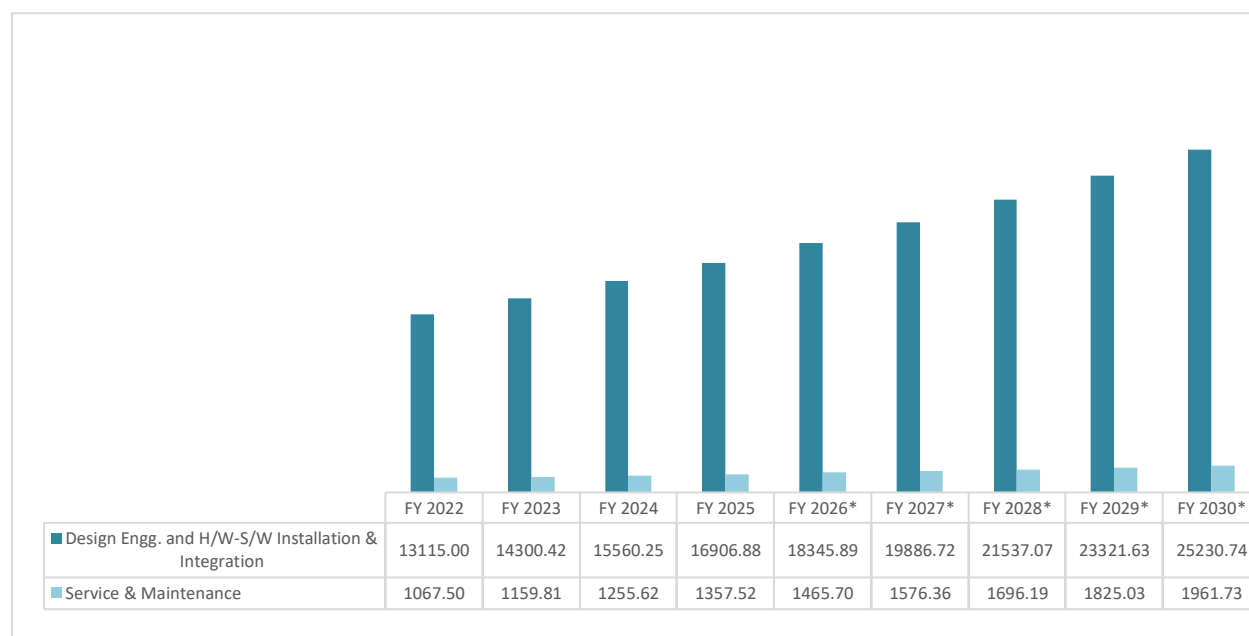
Frost & Sullivan estimates the global Telecom & Communications (Comm.) Infrastructure (Infra) market to be sized at \$12,227.49 Mn. in FY 2025 and expected to grow at CAGR of 8.5% till FY 2030. This is in-fact the largest product segment within the global ITSS market. Security & Surveillance market which currently (FY 2025) contributes to 22.1% of the overall market and is likely to grow the fastest (CAGR 8.7) by the end of the forecast period (FY 2030).

5.4. Global ITSS Market Split by Service Types

Most ITSS project involve a few of the services. A typical end-to-end project starts with design engineering and follows procurement of subsystems, installation & integration before service & maintenance is offered to the client. Design engineering focuses on rigorous requirements analysis, security architecture blueprinting, alternatives evaluation, and the creation of detailed project plans. System engineers and domain specialists gather input from stakeholders, analyze the operating environment, specify system requirements, and select technologies that best fit operational, safety, and regulatory needs. The next step includes installation & integration, which involves physical setup and systematic configuration of telecom and security subsystems, including video surveillance, access control, perimeter detection, and alarms. Service & maintenance focuses on the system's longevity and performance. Timely maintenance

and life-cycle-management of the systems and equipments are performed to enable uninterrupted service.

**Exhibit 19: Global Integrated Telecom, Security and Safety (ITSS) Market, By Service Types,
FY 2022 – FY 2030, in \$ Mn.**



*projected

FY: Financial Year (April to March)

Source: Frost & Sullivan

The Global Design Engg. and Hardware-Software Installation and Integration market is currently (FY 2025) sized at \$16,906.88 Mn. and expected to grow at CAGR 8.3% till FY 2030. However, the Service & Maintenance market is expected to grow faster at CAGR 9.1% to become \$4,313.45 Mn.

5.5. Global ITSS Market Split by Industry Verticals

The ITSS market has remained critical in shaping high-risk and infrastructure-intensive industries. It not only helps in digital enablement but also improves efficiency, allows risk mitigation, provides operational continuity, and enables the safety of people, assets, and data in a complex and connected environment. ITSS services offered to CNI facilities require high-reliability, industrial-grade ITSS, which are more complex than ITSS required for other commercial sectors. CNI operations present fundamentally different challenges compared to conventional commercial environments, demanding extraordinary levels of system performance across diverse and extreme conditions. For instance, in the oil and gas industry, ITSS systems must function in offshore platforms subjected to corrosive marine atmospheres, high winds, and temperature fluctuations. Onshore facilities present challenges including hydrocarbon vapor environments, extreme temperature variations, and requirements for intrinsically safe equipment certifications. Refineries and petrochemical complexes demand systems capable of operating in potentially explosive atmospheres with stringent compliance requirements.

Similarly, in the power industry, systems must withstand temperature extremes in outdoor substations and confined control rooms while operating continuously during fault conditions when grid stability depends on reliable communication and control systems. In the transportation sector, installations in across tunnels present complexities including confined spaces with limited ventilation, potential fire hazards requiring specialized fire-rated cabling and equipment, and stringent safety system requirements that must function reliably during emergency evacuation scenarios. In summary, it is critical that ITSS providers who aim to cater to CNI sectors has the understanding, capability and expertise in operating in such adverse environments.

The following mentioned below lists the use of ITSS in key CNI industry verticals:

- **Oil & Gas:** The oil & gas vertical is considered as an important part of the CNI sector. It is utmost important that systems remain running, failing which can impact the national economy. ITSS unifies telecom networks, real-time monitoring, security & surveillance, safety, and emergency response tools in an oil & gas setup. The integration ensures seamless connectivity even in the harshest of environments and strengthens operational safety and regulatory compliance, while taking care of infrastructure needs.
 - **Upstream**
 - Integration of communication, security, and safety systems at remote and hazardous exploration and production sites
 - Real-time remote monitoring and control of operations and assets
 - Improved situational awareness through video surveillance and PAGA systems
 - Emergency response coordination
 - Support for harsh environment operations with resilient telecom infrastructure
 - Adherence to compliance and regulatory requirements
 - **Midstream**
 - Secure communication and control of pipeline networks, compressor stations, and storage facilities
 - Integration of sensors for leak detection, flow monitoring, and integrity management
 - Facilitating quick incident detection and response
 - Adherence to compliance and regulatory requirements
 - **Downstream**
 - Integration of communication and safety systems in refineries and processing plants
 - Access control management
 - Coordination of plant operations through secure communication networks
 - Supporting digital transformation initiatives including IoT and AI-based surveillance
 - Adherence to compliance and regulatory requirements
- **Power & Utilities:** ITSS helps in converging operational technology (OT) with information technology (IT), facilitating real-time data analytics, remote monitoring, and asset management

in the power & utilities sector. ITSS provides reliable grid performance, reduces downtime, and improves visibility across legacy and new infrastructures.

- **Transportation:** In airways, ITSS helps secure ground-to-air communications, protect & secure airport perimeters, manage access control to entry points and critical zones, video surveillance, and enable automated emergency response systems, reducing incidents and ensuring operational continuity. Railways use integrated telecom, security and safety solutions for video surveillance, intrusion detection, and control networks to protect trackside equipment and stations, coordinate signalling, and enable timely communication between train operators and command centers. Road transport deploys ITSS for deployment of Intelligent Transportation Systems (ITS). Even in road tunnels, ITSS projects are being used to provide centralized management of various safety, control, and communication systems through integrated platforms, particularly needed in emergency communications. In waterways, the solutions are used for integrated communication between vessels, ports, custom authorities and safety agencies, real-time monitoring, perimeter intrusion detection, access control, and more.
- **Mining:** The mining industry is one of the industry verticals where building a reliable network communication is difficult due to its remote location. Thus, to build a trusted network, it is critical to deploy wireless sensor networks to enable communication and real-time monitoring of critical environmental parameters such as gas concentrations, temperature, humidity, and airflow, alongside miner location tracking in underground tunnels. Telecom infrastructure, including private LTE/5G, satellite, optical fiber, and wireless mesh networks, provides reliable, low-latency connectivity across vast and remote mining sites.
- **Public Safety:** The traffic management sector moving through substantial change with high level of modernization taking place. Traffic management is being upgraded to provide seamless and congestion free vehicle movement at a time when the world is experiencing the rise in new vehicles every day especially in the fast-emerging countries. ITSS provides real-time communication between control systems and securing interconnected urban infrastructure. Solutions include cyber-resilient traffic systems, secure vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communications, and system-wide monitoring to mitigate vulnerabilities in increasingly digital and automated transport networks.
- **Defense:** With increasing unrest and wars across several part of the world, defense becomes highly critical. Defense budgets have been increasing with the US defense spending the biggest in the world and inching towards \$1 Tn. defense budget (\$895 Bn. in FY 2025⁴⁹ and \$961.6 Bn. in FY 2026⁵⁰). Spending has ramped up across some of the largest countries for defense modernization. Advanced technologies such as encrypted Satellite Communications (SATCOM), Software-Defined Radio (SDR), and tactical communication networks are being deployed to enable real-time, reliable, and resilient voice and data links in even the harshest or most contested environments.

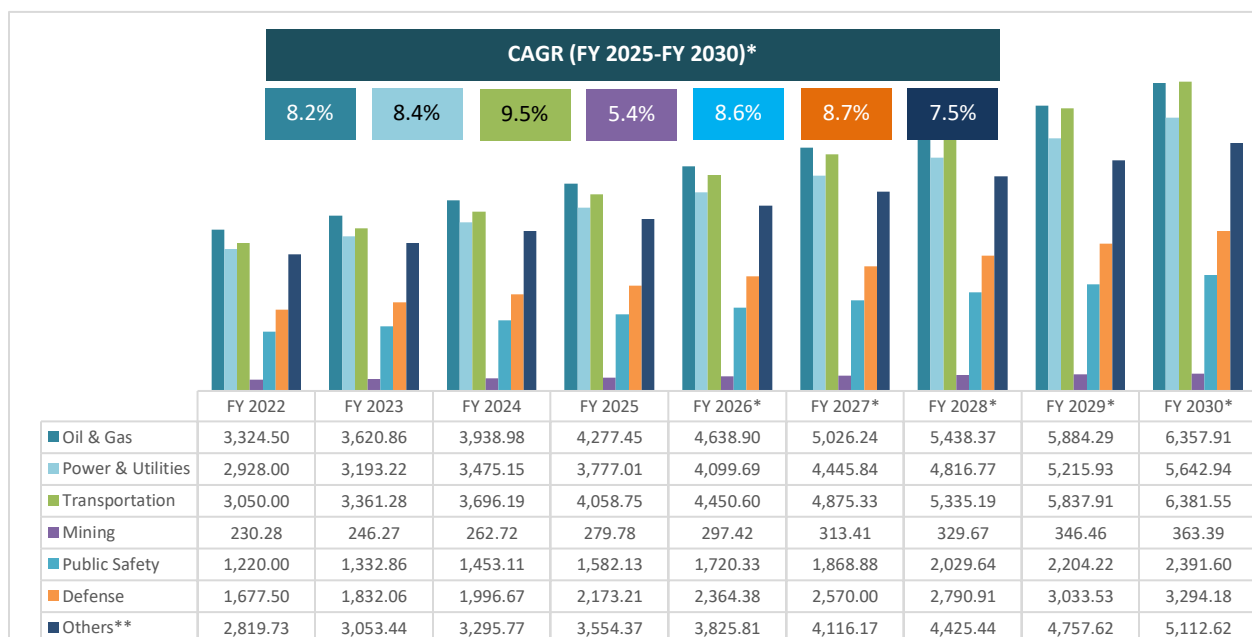
⁴⁹ Center for Strategic & International Studies, February 2025, <https://www.csis.org/analysis/what-are-key-milestones-and-decisions-affecting-us-defense-spending-2025>

⁵⁰ Background Briefing on FY 2026 Defense Budget, US Department of Defense, June 2025, <https://www.defense.gov/News/Transcripts/Transcript/Article/4228828/background-briefing-on-fy-2026-defense-budget/>

This includes ensuring interoperability between different forces and ensuring communications remain available even when attempts are being made to jam or intercept networks. 5G network communication and non-terrestrial networks (NTN) are being used for intelligence gathering, rapid data dissemination, and broad area connectivity for remote or broader deployments.

- **Others (industrial and manufacturing):** With concepts like Industry 4.0, the dependency on ITSS has increased considerably. Industrial and manufacturing units are being employed with real-time communication across devices, intelligent automation, and advanced cybersecurity frameworks. This remains pivotal to the vision of smart, resilient, and digitally driven factories. ITSS helps manage process control, communications, and safety and security systems on a unified technology platform, eliminating isolated point solutions and streamlining alarm management and emergency response across the entire facility. Real-time communication and data flow between people, devices, industrial control systems (like PLCs and SCADA), and applications remain seamless build through robust digital networks and hierarchical computing architectures.

Exhibit 20: Global Integrated Telecom, Security and Safety (ITSS) Market, By Industry Verticals, FY 2022 – FY 2030, in \$ Mn.



Note: The market sizing excludes smart cities projects

*projected

**includes industrial and manufacturing

FY: Financial Year (April to March)

Source: Frost & Sullivan

According to Frost & Sullivan, the Oil & Gas vertical is the biggest user of ITSS projects followed by Transportation (air, water, road and rail) and Power & Utilities. The Oil & Gas vertical contributes 21.7% of the total market with an estimated market size of \$4,277.45 Mn. in FY 2025. By the end of FY 2030, the market is expected to reach \$6,357.91 Mn. Likewise, the Transportation vertical (current market share of 20.6%) is expected to become \$6,381.55 Mn. in FY 2030. The Mining vertical is believed to be the smallest industry vertical for ITSS with a current market contribution of just 1.4%.

5.6. Impact of AI on ITSS

Today, AI has become one of the most talked about advanced technologies. Across all industry verticals and sectors, AI is being used to improve accuracy or efficiency. Within the ITSS market, AI and ML are being used for improved protection, operational efficiency, and future growth. AI helps provide unified intelligence and security. It integrates digital communications, security & surveillance, and safety systems while using big data analytics, to provide actionable intelligence, enabling 360-degree protection, real-time monitoring, and threat response for critical infrastructure. AI enables data collection and analysis from a diverse range of devices, systems, and sensors for telecom and safety operations providing predictive capabilities (like foreseeing equipment failures) and ensuring reliability. The technology helps bridge the gap that exist in cyber-physical systems allowing detection of cyber threats and physical anomalies that threaten safety, security, and asset performance. Incident response can be automated using AI that isolate compromised systems, block malicious traffic, and even deploy patches almost in real time, minimizing downtime and service disruptions. With the introduction of 5G networks and rise in use of IoT devices, AI has become critical in managing complex network traffic, identifying vulnerabilities, and mitigating risks across distributed and edge computing environments. Summarily, AI has started to transform the ITSS market by enabling smarter, faster, and more adaptive security and safety solutions for integrated telecom infrastructure, fostering both technological advancement and business growth.

5.7. Market Drivers

5.7.1 Global

Following listed below are the growth drivers to the global ITSS market.

- **High infrastructure investments in the CNI sector:** In 2000, the world electricity generation stood at 15,436 TWh.⁵¹ and is likely to become 34,140 TWh. by 2030. While focus would be on renewable energy, coal-based electricity generation would also continue to see high demand. The number of hydro power plants was ~3,000 and expected to become ~4,500+ by the end of the decade. In terms of air transportation, China currently has 223 airports and plans to add 216 new airports by 2035⁵². Likewise, India plans to develop 220+⁵³ airports (including upgrade and new facilities) by 2035. For defense, the spending is expected to increase from \$776.6 Bn.^{54 55} in FY

⁵¹ World Energy Outlook, International Energy Agency, 2019, <https://iea.blob.core.windows.net/assets/98909c1b-aabc-4797-9926-35307b418cdb/WEO2019-free.pdf>

⁵² Airport Infrastructure Market Growth and Recent Trends by 2030, The Insight Partners, <https://www.theinsightpartners.com/reports/airport-infrastructure-market>

⁵³ AME CET, India's Plan to Develop 220+ Airports by 2035: A Game Changer for Aviation, March 2025, <https://amecet.in/blog/indias-plan-to-develop-220-airports-by-2035-a-game-changer-for-aviation/>

⁵⁴ Defense Budget Overview, Office of the Under Secretary of Defense (Controller)/Chief Financial Officer, March 2023, https://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2024/FY2024_Budget_Request_Overview_Book.pdf

⁵⁵ Defense Budget Overview, Office of the Under Secretary of Defense (Controller)/Chief Financial Officer, March 2024, https://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2025/FY2025_Budget_Request_Overview_Book.pdf

2022 to \$961.6 Bn. in 2026. The aforementioned suggest, there are new projects and upgradations in the plan that would require ITSS solutions.

- **Diversification of the manufacturing and industrial sector:** China has always been the largest manufacturing sector in the world. However, due to the growing geopolitical rift between countries, companies are looking for China+1 strategy. The intent in decrease the dependence on China and look for alternative cost-effective locations for manufacturing. This includes countries in Asia like India, Vietnam, Thailand, Malaysia, Indonesia, etc. This is likely to push investments in industrial and manufacturing verticals in the next few years. One such example is of India; the country's manufacturing output has increased from \$377.70 Bn. in 2020 to \$461.38 Bn. in 2023⁵⁶. In parallel, the European countries have also seen a rise over the years. UK's manufacturing output stood at \$242.64 Bn. in 2020 as against \$279.78 Bn. in 2023⁵⁷. The continued trend in manufacturing output implies the setting up of manufacturing and industrial units that would require telecom, security, surveillance, and safety solutions.
- **Transition towards digital enablement and modernization:** Sectors like oil & gas, power & utilities, transportation, defense, and manufacturing are undergoing robust digital transformation. This includes upgrading IT/OT infrastructure and strengthening security (including cyber) capabilities to meet regulatory compliance and operational resilience requirements.
- **Alignment to evolving telecom trends:** 5G, IoT and cloud/edge computing have been some of the important telecom trends. 5G adoption has increased while 6G technologies are still evolving. There has been AI integration, and uptake of virtualization (SDN, NFV). These advances expand network capabilities but also increase complexity and potential vulnerabilities. To keep pace, ITSS solutions must evolve to secure, manage, and optimize these modern, software-defined, and cloud-based telecom infrastructures, thus fueling market demand.
- **Emergence of advanced technologies:** AI, ML and big data analytics has been revolutionizing industry verticals. AI-powered automation helps reduce manual interventions in network operations and security management. It helps companies with deeper insights while collecting and analyzing data. Likewise, ML algorithms identify patterns associated with cyber threats and vulnerabilities dynamically, enabling proactive security incident prevention and faster response. AI synced in with big data analytics facilitate real-time decision-making by monitoring network behavior.

5.7.2 North America

In addition to the earlier mentioned growth drivers, the following mentioned below apply to the North American market:

⁵⁶ India Manufacturing Output, Macrotrends, as accessed on 22nd July 2025, <https://www.macrotrends.net/global-metrics/countries/ind/india/manufacturing-output>

⁵⁷ U.K. Manufacturing Output, Macrotrends, as accessed on 22nd July 2025, <https://www.macrotrends.net/global-metrics/countries/gbr/united-kingdom/manufacturing-output>

- The **US and Canadian governments** are investing heavily in emergency response, city surveillance, and disaster management systems – which would require control rooms. One such example is the Canadian government completing a new, modernized Government Operations Centre (GOC) facility in 2024–2025 designed to support a federal approach to emergency preparedness and response.
- The US **energy** market is growing rapidly with ambitious projects expanding renewable energy, reviving natural gas development, and grid modernization – all of which would fuel the growth for ITSS solutions. The US is poised to add approximately 63GW of new utility-scale power generating capacity in 2025, with solar power leading, followed by battery storage, wind, and natural gas. Natural gas-fired power plant construction is resurging, with plans for approximately 65,000 MW of new capacity from 2025–2029.
- Despite the competition from China, the US is strategically advancing in **manufacturing** through projects focused on automation, modernization, and semiconductor expansion, driving demand for related monitoring technologies. The US is expanding advanced manufacturing with significant investments in automation and robotics, targeting a 15% increase in production capacity by 2026. Manufacturers are modernizing steel plants with a focus on sustainable practices, planning to upgrade 10 major facilities by 2025.
- Based on secondary sources, the US **defense** spending in FY 2026 is capped at \$961.6 Bn. – the largest in the world by miles (2nd being China at \$245 Bn. in 2025). The Department of Defense (DoD) in the US has been coming up with several projects and initiative. Budget of \$5 Bn. is directed toward hypersonic weapons and advanced missile defense systems. The DoD has a planned initiative to integrate air, land, sea, space, and cyber domains for real-time command and control. FY 2025 RDT&E (Research, Development, Test, and Evaluation) funding is approximately \$1.2 Bn.
- **Transportation** is an important industry vertical that sees high investment and growth in the US. US transportation investments are focused on enhancing real-time efficiency, safety, and network management across air, rail, and port infrastructure. Plans are being chalked out to modernize the Federal Aviation Administration (FAA) facilities, including the acquisition of modern radar systems and new terminals. Also, the Bipartisan Infrastructure Law funds over 60,000 projects to modernize U.S. infrastructure, including roads, airports, and ports.
- The Canadian government has been promoting energy efficiency, sustainability, and carbon footprint reduction in buildings and infrastructure and is coming up with regulations and incentive plans that will drive rapid adoption of building automation and control room solutions in commercial and industrial sectors. Regulators like Natural Resources Canada (NRCan) and provincial energy commissions enforce strict standards for smart building systems.

5.7.3 Gulf Cooperation Council (GCC)

The following mentioned below are the growth drivers for the GCC market.

- Large modernization plans are already in place in the GCC. This include themes like
 - **In Saudi Arabia:** Saudi Vision 2030, National Transformation Program, Digital Health Strategy

- **In UAE:** We the UAE 2031, Digital Dubai, Abu Dhabi Vision 2030, UAE Digital Govt. Strategy 2025
- **In Qatar:** Qatar National Vision 2030, TASMU Smart Qatar
- **In Kuwait:** Kuwait Vision 2035
- **In Bahrain:** Bahrain Economic Vision 2030, Digital Government Strategy
- Governments in the UAE and Saudi Arabia invest heavily on infrastructure including **smart cities, airports, and industrial complexes** that require advanced ITSS solutions
- **Airport** modernization and expansion are already underway for the following mentioned below:
 - King Salman International Airport (Riyadh, Saudi Arabia): aims to build the world's largest airport
 - Al Maktoum International Airport (Dubai, UAE): Started work to construct the world's largest airport terminal
 - Sharjah International Airport (UAE): undergoing a terminal expansion
 - Kuwait International Airport (Kuwait): new terminal construction underway with 28 gates to increase capacity
- While some of the European countries like Germany are decommissioning their **nuclear power** plants, Saudi Arabia plans to invest in new nuclear plant projects. The country's **renewal energy** production has also increased from 219.5 Mn. KWh. in 2020 to 1,322.6 Mn. KWh. in 2027. Solar energy has been the biggest renewal energy contributor – from 210.0 Mn. KWh. in 2020 to 1,313.0 Mn. KWh. in 2027. KSA's (Kingdom of Saudi Arabia's) power & utility projects include the National Renewal Energy Program (NREP) that aims to achieve 50% renewable energy in the electricity mix by 2030, with over 8 GW of projects under construction and 13 GW in development by 2023.
- Saudi Arabia's **manufacturing** sector is currently undergoing rapid transformation with major investments and automation initiatives. The country's manufacturing value added was \$72.9 Bn. in 2020 and likely to become \$91.3 Bn. in 2027. The National Industry Strategy aims to triple manufacturing contribution to GDP to over \$238 billion by 2030, targeting a tripling of factories to 36,000 by 2035, with \$345.9 billion in planned investments.
- **NEOM**, one of the world's most ambitious projects, will require ITSS systems and solutions for managing safety, security, and efficient operations across the project. NEOM is deploying AI-powered surveillance, emergency sensors, and safety alarms to enable real-time monitoring, automated incident detection, and rapid emergency response.
- Saudi cities use AI-powered **traffic systems** with IoT sensors and data analytics to monitor flow, adjust traffic signals, reduce congestion, and improve road safety and urban mobility. This becomes a use-case for the ITSS market and a potential opportunity as the demand for such increases further.

5.8. Global Growth Opportunities

Following listed below are some of the ITSS growth opportunities:

Across Industry Verticals

- **Oil & Gas:** Continues to present significant opportunities in ITSS as global energy companies accelerate infrastructure investments to meet growing demand while improving operational efficiency and safety standards
- **Energy & Utilities:** Opportunities are also expected to expand through global transitions to renewable energy sources and smart grid implementations that create substantial demand for advanced telecommunications and control systems
- **Transportation:** Growth opportunities emerge from government investments in infrastructure development, high-speed rail networks, and intelligent transportation systems
- **Mining:** Presents significant opportunities as operations become increasingly automated and require sophisticated communication and safety systems, and the defence and government sectors offer substantial potential given increasing focus on critical infrastructure protection and national security considerations

Across Regions

- **North America:** Represents significant opportunity given the region's focus on infrastructure modernization and critical infrastructure protection
- **GCC:** Continues to remain as important global investment hub especially in Saudi Arabia and UAE with projects around smart cities and infrastructure development & modernization

5.9. Market Restraints

5.8.1 Global

The following listed below are the market restraints for the global ITSS market.

- **High initial cost:** ITSS projects are generally capital intensive. It requires considerable CAPEX on hardware, software, and infrastructure set-up. While large enterprises, defense and the government can still be able to absorb the cost, it becomes difficult for mid-market and small companies. Beyond initial deployment, ongoing maintenance, upgrades, system optimization, and employee training represent substantial recurring expenses, challenging the financial planning of organizations.
- **Complexity of system integration:** Many large organizations who have been in the market for several decades have legacy systems and solutions. These old traditional systems were not designed at that time to be integrated with next-generation products. To gain complete benefit from ITSS systems, it is important to handshake old legacy systems with modern telecom, security and safety solutions. However, it is often a challenge for ITSS providers as it is technically complex and prone to compatibility issues. Implementation delays happen and can even cause disruption of operations.
- **The concern around data security and privacy:** The consolidation of multiple security systems with ITSS systems increases the attack surface area. The risk of security breaches and unauthorized access increases, making organizations cautious about adoption. For highly regulated markets like Europe, businesses and government enterprises need to adhere to regional laws like General Data Protection Regulation (GDPR) that adds compliance costs and effort.

- **Rapid technological change:** Technology has been fast paced like never before. Newer technologies and concepts have been evolving on a regular basis. Emergence of technologies like 5G, cloud/edge computing, IoT, virtualization, software defined everything, AI, ML, data analytics, etc. require constant upgrades, updates and upskilling, which strains budgets and resources. Implementing new technology often makes organizations reliant on vendors for expertise and support, causing potential delays in issue resolution.

5.8.2 North America

In addition to the above-mentioned market restraints, the following mentioned below is one of the important challenges that ITSS providers in North America face.

- **Impact of ongoing tariff war in the US:** The tariff war in the US refers to higher import taxes levied by the US government on goods from countries like China, Mexico, Canada, and others, aiming to discourage imports and protect domestic industries and reduce trade deficits. Broad-based U.S. tariffs, including a 10% baseline and 20–25% or higher targeted rates on technology imports (with China and some countries facing even steeper duties), would sharply raise the cost of importing telecom, security, and safety hardware and components. ITSS providers would be compelled to pass on the additional cost to the end-customer thereby increasing the cost of projects even further. To mitigate this risk of tariff and geopolitical tension, senior executives and decision makers are prioritizing geographical diversification of supply chains, balancing growth opportunities with the complexity and cost of reconfiguration.

5.8.3 Gulf Cooperation Council (GCC)

The GCC region also faces some challenges, one important challenge has been discussed below:

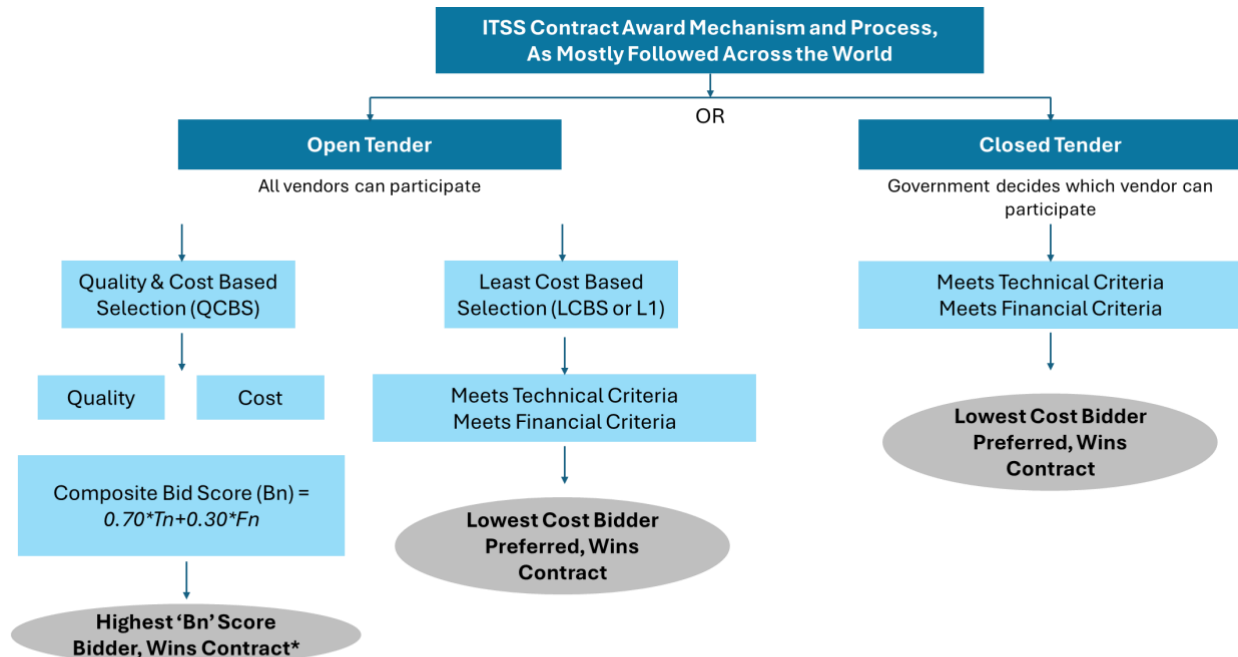
- **Talent scarcity and skill gaps:** While countries in the GCC (especially KSA and UAE) have introduced schemes and programs to attract and enable skill development in the latest technologies, there remains a current challenge in leveraging and retaining specialized talent. Upskilling and reskilling existing employees is an ongoing challenge amid rapidly evolving technology requirements. This is likely to impact ITSS providers, as handling complex ITSS projects require expertise.

5.10. Contract Award Mechanism

Across the world, in most government sectors - oil & gas, power & utilities, transportation, mining, public safety, defense, and industrial/manufacturing - requirements are assigned to vendors through the tendering process. These could be open tenders or closed tenders. Open tender is a process where any vendor who wishes to offer service participate in the tendering process. On the contrary, closed tendering is a mechanism where the government (or the customer) decides as to which all vendors can participate in the process. Open tenders can be further classified as Quality & Cost Based Selection (QCBS) and Least Cost Based Selection (LCBS). In QCBS, bidders are evaluated on two parameters: quality, and cost. A formula is used to calculate the Composite Bid Score of a bidder and the vendor/bidder with the highest Composite Bid Score wins the contract. For LCBS and closed tenders, the bidder with the lowest cost is preferred after it meets the technical and financial criteria. In ITSS project requirements, QCBS tendering

process is followed which fairly evaluates a bidder based on not only the lowest cost but the capability of the vendor. Capability is a critical criterion for managing complex and extensive ITSS projects.

Exhibit 21: Contract Award Mechanism and Process, in Government Sector



Please note, 0.70 (or 70%) and 0.30 (or 30%) used in the formula of Bn is used as an example and can be changed by the tendering authority

Bn: Composite Bid Score

Tn: Technical Score of the Bidder (out of maximum of 100 marks)

Fn: Normalized Financial Score of the Bidder (out of maximum of 100 marks)

*In the event of a "tied Composite Bid Score", the bidder securing the highest technical score will be adjudicated as the Best Value Bidder for award of the Project

Source: Frost & Sullivan

5.11. Choosing the Right Provider

In a market which is fragmented with the presence of a diverse set of players – SIs (global and national) and EPC Players (full-scope integrators, specialized EPC contractors), it is important to have the right vendor selection criteria. Both the government and enterprise customers tend to judge vendors based on some of the key aspects that remain critical in the selection process. While cost is an important aspect given the high investment required in most projects, it is not the most important factor in the overall vendor selection process. Mentioned below are some of the important and most looked after parameters in the ITSS provider selection process:

- Experience in handling large scale complex projects:** ITSS projects demand specialized knowledge, robust resources, and advanced problem-solving skills tailored to the unique challenges of the industry. Expertise is built through years of in-depth problem-solving and solutioning. Providers who have proven to have successfully delivered large, complex projects display the capability to set the right customer expectations, manage requirements, timelines, and stakeholder communication. This eventually reduces the risk and increases the possibility for

the success of the project. Experienced providers demonstrate technical capacity to design, implement, operate and secure complex networks and services, are familiar with industry regulations and compliance, able to manage sub-contractors/3rd parties, and keep control of the cost and timelines.

- **Wide range of solutions and services:** Being a turnkey provider, customers expect suppliers to not just offer one solution/service but can cater to multiple aspects of the requirement. The provider should be able to take care of the telecom needs, communication needs, build wireless networks, implement surveillance (video, perimeter), access control, public addressal systems, power systems, and more.
- **Client relationships:** A happy customer is important for the growth of a provider. These customers often become an indirect influencer to promote the vendor. Project appreciation and customer recommendations that highlight timely completion of the project, reasonable costing, quality delivery, and efficient team are important measurement tools for customer success. Providers who maintain a healthy relationship with their customers often enjoy repeatable business and new business orders.
- **Financial strength:** Vendors who have high net worth and strong revenue numbers have financial independence. They are able to not only execute and participate in large-scale tender based projects but can also handle inadvertent situations. Small and local vendors often lack financial stability and are unable to manage unforeseen situations.

6. India ITSS Market Size and Forecast

6.1. Trends Impacting Growth of ITSS in India (Market Drivers)

While the global ITSS market is expected to see single digit growth figures till FY 2030, the Indian market is expected to experience double digit growth. The growth in India would be spurred by several transformative national initiatives and evolving technological landscapes impacting not only the government or defense sector but also the private infrastructure segment. Major government programs like the Smart Cities Mission, Digital India, and ongoing defense modernization are driving the expansion of digital infrastructure, smart surveillance, and command centers, laying a robust foundation for integrated security solutions and resilient urban management. A rapid shift is being noticed that moves beyond legacy analog communications to advanced digital technologies such as SIP, IPPBX, and broadband-enabled critical networks, fostering greater scalability, efficiency, and cybersecurity across public and private domains. Urbanization is on the rise in India with existing cities expanding and modernizing its infrastructure, and new Tier II and Tier III cities are being added on the list that comes with modern infrastructure facilities. Listed below are some of the important trends impacting the growth of ITSS in India.

6.1.1 National Infrastructure Development and Modernization

Smart Cities Mission

For several decades, Indian cities have been overloaded with exploding population with limited access to basic healthcare, education, transportation, and services. Most cities in the country struggled to deliver the necessities that a major city anywhere in an advanced country would take for granted. India being at the forefront of one of the fastest growing large economies, the Indian government realized the need for improved infrastructure not only for the Tier I cities but also develop cities that could be potential for economic activities and employment opportunities. To address the pressing need, the Government of India launched the Smart City Mission (SCM) in 2015 that seeks to deliver the core infrastructure services in an urban setting and enable cities with the required quality of life. ITSS plays an important role in SCM since it integrates telecom and communications network, security and safety – all three of which are critical elements of the mission.

Currently, the Indian government has planned 100 smart cities. The deadline for completion of projects in these cities was set to be between 2019 and 2023. As per the latest available data dated 9th May 2025⁵⁸, 94% of the total 8,067 projects under SCM have been completed, with an amount of INR. 1.64 lakh crore already invested. All 100 cities have been equipped with Integrated Command and Control Centres (ICCC) using technology like AI and IoT for efficient city management. Thousands of smart roads, cycle tracks, classrooms, and health centres have also been built. Initiatives like Cycles4Change and Streets4People are being promoted for open spaces and inclusivity.

⁵⁸ 10 Years of Smart Cities Mission, Press Information Bureau, Government of India, June 2025, <https://www.pib.gov.in/PressNoteDetails.aspx?id=154736&NotelId=154736&ModuleId=3>

Exhibit 22: Smart Cities Mission (SCM) Project Status, India (as on 9th May 2025)

The total allocated union budget for SCM was INR. 47,652 crores, which is supplemented by other sources of funding such as contributions by the state governments, urban local bodies, public-private partnerships, etc., making the total investment to INR. 1.64 lakh crores.

Mentioned below are some of the key initiatives and milestones achieved by SCM (as on 31st March, 2025):

- **Integrated Command and Control Centres (ICCC)**
 - All 100 Smart Cities have operational ICCCs
 - ICCCs have helped improve city operations such as transport, water supply, and solid waste management
 - Next-generation technologies like AI, IoT and data analytics have been used to improve operations and efficiency
- **Public Safety and Security**
 - 84,000+ CCTV surveillance cameras have been installed in 100 Smart Cities, aiding in crime monitoring
 - 1,884 emergency call boxes, 3,000 public address systems, and traffic enforcement systems for red light violations and automatic number plate recognition have been installed, enhancing public safety
- **Education**
 - 9,433 smart classrooms have been developed across 2,300 government schools in 71 smart cities
 - 41 digital libraries have also been developed
- **Healthcare**
 - 172 e-health centers and clinics (without dedicated beds) have been developed
 - 152 health ATMs also have been installed
 - 15 cities have developed e-Health record keeping system

Digital India Initiative

One of the most talked after initiatives from Prime Minister Narendra Modi's first term at office is the Digital India initiative. The Digital India campaign has been pivotal to the country's digital focus that has seen significant traction. The Digital India program is a flagship program by the Government of India with a vision to transform India into a digitally empowered society and knowledge economy. Launched by the Government of India and coordinated by Meity (Ministry of Electronics and IT) in July 2015, the Digital India campaign has a vision to ensure that government services are being made available to citizens electronically by reducing paperwork. The campaign also has a plan to connect rural India with high-speed connectivity (internet). ITSS systems and solutions act as critical instruments for the Digital India Initiative.

The Vision of Digital India primarily focuses on three distinctive areas:

- **Digital Infrastructure as a Core Utility to Every Citizen**
 - Availability of high-speed internet as a core utility for delivery of services to citizens
 - Cradle to grave digital identity that is unique, lifelong, online and authenticable to every citizen
 - Mobile phone & bank account enabling citizen participation in digital & financial space
 - Easy access to a Common Service Centre
 - Shareable private space on a public cloud
 - Safe and secure cyber-space
- **Governance & Services on Demand**
 - Seamlessly integrated services across departments or jurisdictions
 - Availability of services in real time from online & mobile platforms
 - All citizen entitlements to be portable and available on the cloud
 - Digitally transformed services for improving ease of doing business
 - Making financial transactions electronic & cashless
 - Leveraging Geospatial Information Systems (GIS) for decision support systems & development
- **Digital Empowerment of Citizens**
 - Universal digital literacy
 - Universally accessible digital resources
 - Availability of digital resources / services in Indian languages
 - Collaborative digital platforms for participative governance
 - Citizens not required to physically submit Govt. documents / certificates

The entire Digital India initiative primarily rests on 9 key pillars:

- Broadband Highways
- Universal Access to Phones
- Public Internet Access Program
- E-Governance
- eKranti – Electronic delivery of services
- Information for All

- Electronic Manufacturing – Target net zero imports
- IT for Jobs
- Early Harvest Programs

In order to boost the Information and Communications Technology (ICT) infrastructure of the country, the Government of India has taken the following key initiatives:

BharatNet Aim to provide broadband access to 250000-gram panchayats through a network of Optical Fibre Cable	Smart Cities Creation of 100 smart cities and allocation of INR. 10,000 million for a period of 5 years	Common Service Centre (CSC) CSCs are centers through which e-governance and related services will be made available to villages
Digitization of Post Offices Including setting up centralized data centers, networking of all post offices and enabling digital payments	Universal Access to Mobile Connectivity Covering 42,300 uncovered villages through universal mobile connectivity in the country	

Source: Secondary Data

Defense Modernization

India's defense spend has been increasing over the years. From INR. 500,681 crores in FY 2022, the defense spending in India has increased (budget estimate) to INR. 681,210 crores in FY 2026. From last year (FY 2025) to FY 2026, the defense budget has increased by 6.3%. While salaries constitute to become the biggest spending pie within the entire budget, capital outlay (modernization) is the next big pie.

Exhibit 23: Defense Budget Allocation by Line Items, India, FY 2025 – FY 2026, in INR. Crs.

Components of India's Defense Budget	Revised Estimate 2024-25	Budget Estimate 2025-26
Salaries	172,760	177,923
Capital Outlay (Modernization)	170,485	192,388
Pension	157,681	160,795
Maintenance	86,191	90,923
Other Expenses	53,943	59,181
Total	641,060.00	681,210.00

FY: Financial Year (April to March)

Source: PRS Legislative Research⁵⁹, India Budget (Ministry of Defense)^{60 61}

India's defense modernization in aspects beyond arms and ammunition has strategically focused on building a robust, integrated, and network-centric warfare capability. One of the most talked about achievements in the defense communications area is the establishment of the Defense Communication Network (DCN) in July 2016 which is a fully secure, integrated satellite communication system that connects the Indian Army, Navy, and Air Force, enabling seamless coordination among the services, the Integrated Defense Staff, and the Strategic Forces Command. DCN enables real-time communication among the defense units and improves command and control capabilities for critical and national emergencies. The Indian Airforce has also modernized its capabilities through its Air Force Network (AFNET), a state-of-the-art digital information grid linking command centers, airborne early warning systems, and attack platforms, integrated further into the air defence command and control systems, thereby providing a unified air situation picture with multi-layered cybersecurity measures. In one of the latest developments, the Indian Armed Forces has been implementing the Integrated Theatre Commands, a transformative structural reform aimed at unifying the command of Army, Navy, and Air Force assets in specific geographic areas to ensure joint operational effectiveness and faster decision-making – all of which require the use of advanced ITSS solutions.

6.1.2 Technology Upgradation of Critical Communications

India's public safety and emergency services rely on legacy radios, which use narrowband technologies like TETRA/P25 that do not carry video. The India government is currently putting in investments and undertaking strategic initiatives to modernize critical communication infrastructure and moving from TETRA systems to broadband-enabled, mission-critical networks leveraging 5G, IoT, artificial intelligence, and edge computing. These advancements support features like push-to-talk (PTT), real-time monitoring, mission-critical video, and predictive maintenance, which are crucial for efficient emergency response, public protection, transportation, and utilities sectors. However, migrating to the new technology architecture is not easy and requires deep planning and is time-consuming. ITSS providers who come with deep expertise and experience in developing and implementing telecom, security and safety systems/solutions help embrace the journey, that companies may find it challenging.

6.1.3 Use of IoT and AI powered analytics in Advanced Communication Networks

Technologies like IoT, AI and data analytics have transformed digital and network communication. IoT devices are embedded across telecom networks that generate large volumes of data, which analytics processes to optimize network performance, predict and prevent failures, and manage capacity dynamically. The further combination of AI to the communication systems improves quality of service (QoS), and reduced downtime, crucial for managing the rapidly expanding digital user base and 5G adoption. Furthermore, AI-based predictive maintenance systems help maintain the health of the equipments and increase the lifespan of the telecom assets, thereby reducing the operational cost. AI also

⁵⁹ Demand for Grants 2025-26 Analysis, PRS Legislative Research, https://prsindia.org/files/budget/budget_parliament/2025/DFG_Analysis_2025-26_Defence.pdf

⁶⁰ India Budget, Ministry of Defense, Demand 22, 2025-26, <https://www.indiabudget.gov.in/doc/eb/sbe22.pdf>

⁶¹ India Budget, Ministry of Defense, Demand 20, 2025-26, <https://www.indiabudget.gov.in/doc/eb/sbe20.pdf>

allow telecom and private network operators to tailor services and customize according to customer needs.

6.1.4 Government Funding and Support Driving Critical Communication

The Indian government has been undertaking initiatives for improving India's infrastructure by boosting support for local/domestic manufacturers and providers. Beyond the Digital India scheme (which promotes digital infrastructure expansion, including broadband highways and universal mobile connectivity), the government has also launched programs like PLI (Production Linked Incentive). The PLI program is aimed at providing financial incentives to boost domestic manufacturing and encouraging innovation and attracting foreign investment in critical segments such as 4G/5G networks and IoT devices. The government's liberalized regulatory framework, including 100% Foreign Direct Investment (FDI) under the automatic route in telecom, further accelerates capital inflow and technological upgrades. Together, these measures create a conducive environment for growth in ITSS by combining infrastructure development, manufacturing incentives, technological innovation, regulatory ease, and enhanced urban security deployments, positioning India as a expanding ITSS market with substantial long-term growth potential.

6.1.5 Rising Urbanization and Infrastructure Development

India aims to be an advanced country by 2047. And to achieve the goal, the government has been undertaking massive infrastructure projects such as industrial corridors, smart cities, and transportation networks, supported by government initiatives like the Smart Cities Mission and the Bharatmala Pariyojana. Rapid urbanization is expected in the years to come, driving demand for modern, resilient, and connected urban spaces. These urban cities would require seamless connectivity, infrastructure for digital communication, security, and world-class safety measures. The rise of integrated command and control centers would play a vital role in managing utilities, security, and mobility, which directly fuels the demand for ITSS systems and solutions in the country.

6.1.6 Strong Verticals Growths

Energy & Utilities

India has been rapidly scaling up renewable energy production, primarily solar and wind. From 3,00,765 GWh of electricity generation from renewal energy in 2020, the number has increased to 3,70,320 GWh by 2024 in India. Significant investments are being made in green hydrogen, nuclear energy, and gas infrastructure. The National Green Hydrogen Mission which has an outlay of INR. 19,744 crores⁶² (from 2023 to 2030), targets 5 MMT of green hydrogen production annually, supported by projects like NTPC's 20 GW facility in Andhra Pradesh. Likewise, announced in the 2025-26 budget, an INR. 20,000 crores⁶³ allocation is made for the Nuclear Energy Mission, focussing on R&D for Small Modular Reactors (SMRs)

⁶² National Green Hydrogen Mission, Ministry of New and Renewable Energy, <https://mnre.gov.in/en/national-green-hydrogen-mission/>

⁶³ Nuclear Power in Union Budget 2025-26, Department of Atomic Energy, February 2025, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2099244>

to expand nuclear capacity. Projects like these would create the demand for advanced communication systems, critical for its functioning.

Manufacturing

The “Make in India” Program has transformed the country’s manufacturing industry. There has been increasing investments in industrial corridors, electronics manufacturing, and PLI schemes that are driving India’s growing manufacturing sector. India’s manufacturing output has increased over the period of time, from \$377.7 Bn. in 2020 to \$455.7 Bn. in 2023. There has been development of industrial corridors like Delhi-Mumbai and Chennai-Bengaluru corridors to create globally competitive manufacturing zones. A focus has been created for electronics parts manufacturing in the country, with the greater focus on the PLI scheme.

Transportation

India has the 2nd largest road network and 4th largest rail network in the world. Nevertheless, the country continues to invest in its transport sector. India's aviation sector is set for a major boost with government plans to undertake 50 airport development projects in the next five years, including new constructions and significant upgrades to existing facilities. The Indian Railways (IR) has also planned a massive investment of INR. 16.7 lakh crores by 2031 for various infrastructure projects. The investment will focus on station upgrades, high-speed rail projects, and track electrification to enhance railway operations.

6.2. India Growth Opportunities

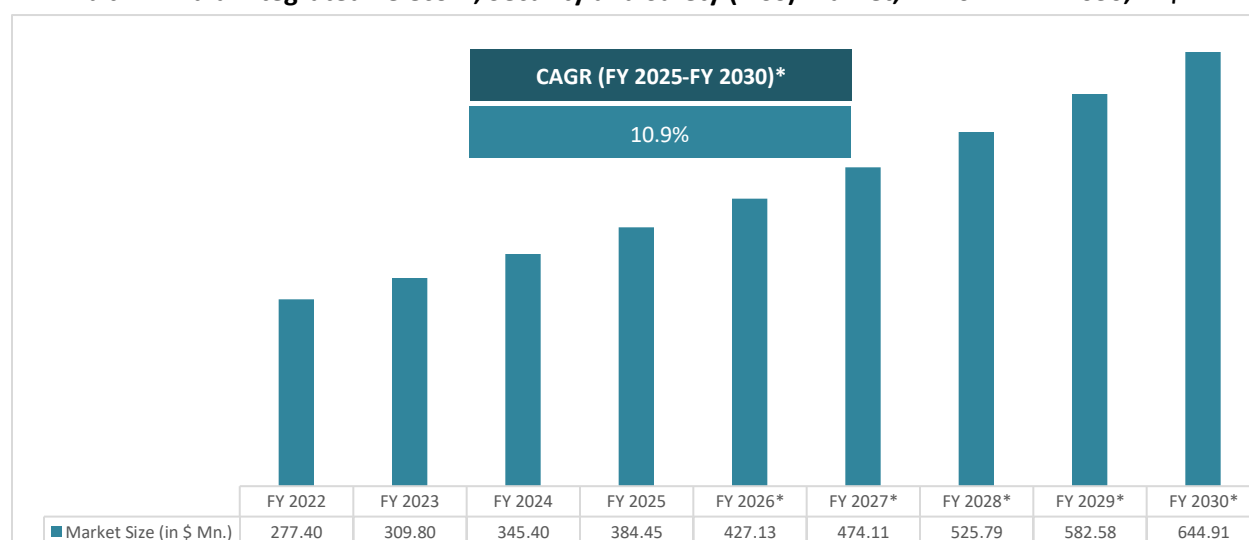
Following listed below are some of the ITSS growth opportunities in India across industry verticals:

- **Oil & Gas:** Drives demand for ITSS systems by creating the need for advanced telecom infrastructure and integrated security & safety solutions to support expanding exploration, pipeline networks, refining capacity, and compliance with evolving security regulations amidst rising energy consumption and digitalization efforts.
- **Energy & Utilities:** Creates opportunities in supporting expanding power generation, transmission, distribution networks, renewable energy integration, and smart grid modernization.
- **Defense:** Supports deployment of secure, resilient communication networks, advanced cybersecurity solutions, and rugged safety systems tailored to meet the modernization needs of military infrastructure, command and control centers, and indigenous technology development
- **Transportation:** Enables the development and deployment of intelligent transport systems (ITS) that integrate vehicle-to-everything (V2X) communications, real-time tracking, surveillance, and safety solutions to improve road safety, traffic management, and passenger security across public and commercial transport networks
- **Mining:** Enables seamless wireless communication, real-time monitoring with IoT and AI-driven safety helmets, video surveillance, and environmental sensing to enhance worker safety, operational efficiency, and emergency response capabilities in challenging and hazardous mining environments

6.3. India ITSS Market Size and Forecast

The India ITSS market is expected to grow at an estimated CAGR of 10.9% from FY 2025 to FY 2030. At the backdrop of various market trends boosting the ITSS market, India is expected to experience faster than global average market growth. In-fact, India is likely to grow faster than the APAC average of CAGR 9.4% estimated for the period of FY 2025 to FY 2030. Frost & Sullivan believes the India ITSS market to be sized at \$384.45 Mn. in FY 2025 and forecasted to become \$644.91 Mn. in the next five years.

Exhibit 24: India Integrated Telecom, Security and Safety (ITSS) Market, FY 2022 – FY 2030, in \$ Mn.



*projected

FY: Financial Year (April to March)

Source: Frost & Sullivan

Sample list of select ITSS Projects deployed in India by leading SIs:

- Commтел Networks: A comprehensive communication package featuring 10,023 kms. of a complex meshed OFC-based high-capacity network across 136 sites for a Central Transmission Utility in India's Eastern Region⁶⁴
- Commтел Networks: Implemented a multi-layered safety ecosystem including emergency communications, cellular connectivity, broadcast infrastructure, first-responder networks, and fiber-optic backbone for monitoring for South Asia's longest highway tunnel⁶⁵
- ABB India: Integrated automation and digital technology for India's largest pipeline network of IndianOil⁶⁶
- ABB India: Integrated Automation and Control Solutions to the Indo-Bangla Friendship Pipeline⁶⁷

⁶⁴ As shared/mentioned by Commтел Networks during the report creation

⁶⁵ As shared/mentioned by Commтел Networks during the report creation

⁶⁶ ABB, April 2025, <https://new.abb.com/news/detail/124823/abb-india-delivers-integrated-automation-and-digital-technology-for-indias-largest-pipeline-network-of-indianoil>

⁶⁷ Pro Mfg Media, April 2023, https://promfgmedia.com/abb-india-delivers-integrated-automation-and-control-solutions-to-the-indo-bangla-friendship-pipeline.php?article_id=1935

- Nelco: Integrated Security System for passenger safety at 29 of the large stations across the railway network covering the Southern, South-Central, Central and North-Western Railway Divisions⁶⁸
- Nelco: Deployment of electronic perimeter security, high-security intrusion detection, access control, alarm and surveillance systems for critical military ammunition depots and naval installations⁶⁹
- Honeywell Automation India: Creation of an Integrated Command & Control Center (ICCC) to manage a state-of-the-art video system with more than 7,000 cameras deployed at more than 3,000 locations across Bengaluru⁷⁰
- Hitachi Energy India: Upgradation of the Rihand Dadri HVDC link, the first commercial long-distance HVDC link in India, using Hitachi's advanced MACH hybrid control and protection technology, enhancing reliable power flow and cybersecurity of critical grid control infrastructure⁷¹

6.4. India ITSS Market Split by Product Segments

Much like the global market construct, the Telecom & Comm. Infra. segment is the biggest ITSS revenue pie in India. It currently contributes 62.9% of the ITSS market and the share is expected to rise even further (although marginally) to reach 63.0% by FY 2030. Security & Surveillance is expected to grow the fastest at CAGR 11.2% during the forecast period and touch \$148.91 Mn. by FY 2030.

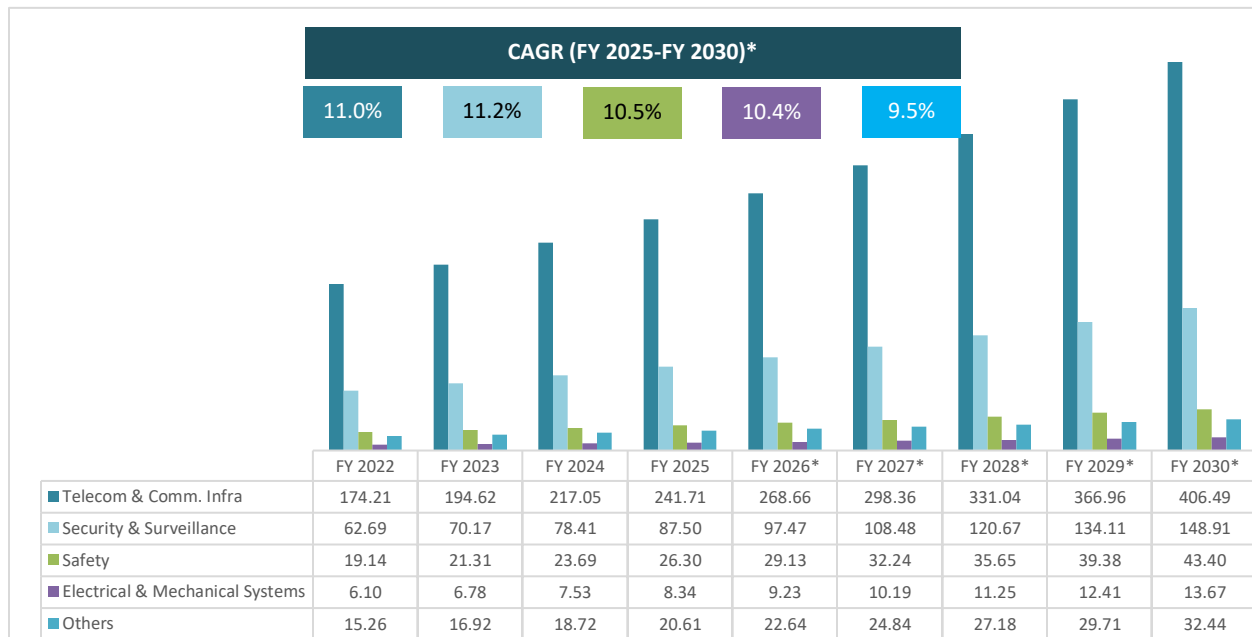
⁶⁸ Nelco, <https://www.nelco.in/key-services/issc.php>

⁶⁹ Nelco, <https://www.nelco.in/key-services/issc.php>

⁷⁰ W.media, <https://w.media/goi-partners-with-honeywell-automation-india-for-496-crore-bengaluru-safe-city-project/>

⁷¹ Hitachi, <https://www.hitachi.com/en-in/insights/articles/carbon-neutral-energy/>

**Exhibit 25: India Integrated Telecom, Security and Safety (ITSS) Market, By Product Segments,
FY 2022 – FY 2030, in \$ Mn.**



*projected

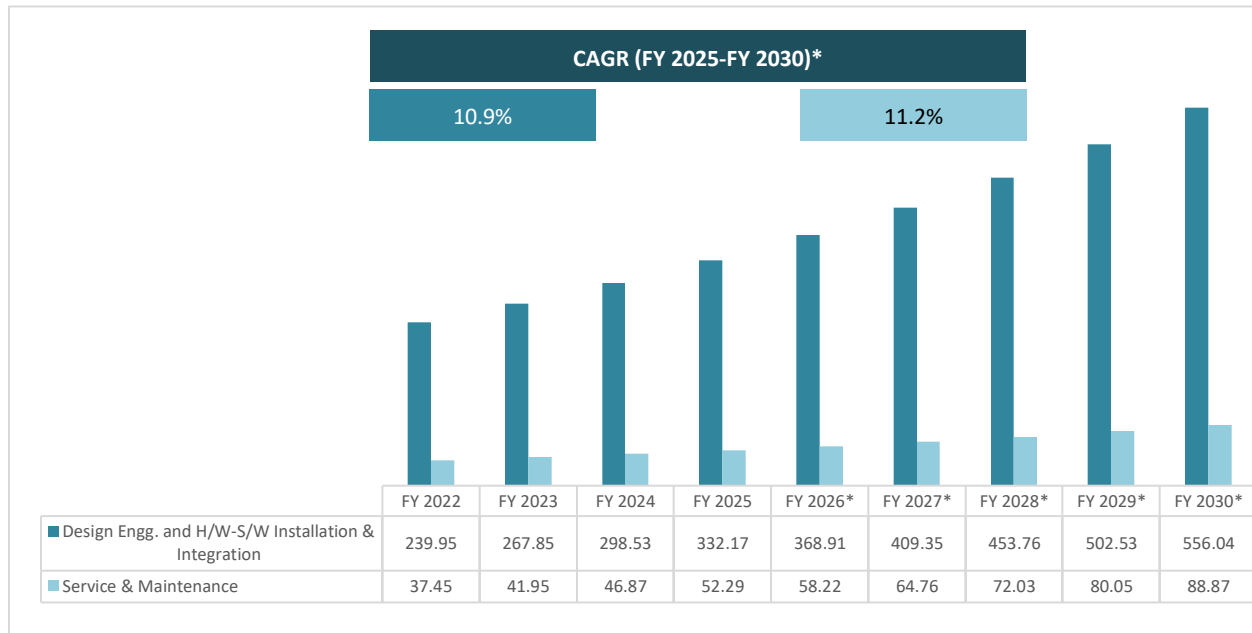
FY: Financial Year (April to March)

Source: Frost & Sullivan

6.5. India ITSS Market Split by Service Types

The India Design Engg. and H/W-S/W Installation & Integration market is currently (FY 2025) sized at \$332.17 Mn. and likely to grow at CAGR 10.9% from FY 2025 to FY 2030 to become \$556.04 Mn. by the end of the forecast period. Last year, the market grew at 11.3%, faster than the global growth figure. Conversely, the India Service & Maintenance market is sized at \$52.29 Mn. in FY 2025 and expected to grow at CAGR 11.2% till FY 2030. This year, the growth projection for the segment is at YoY 11.3%.

**Exhibit 26: India Integrated Telecom, Security and Safety (ITSS) Market, By Service Types,
FY 2022 – FY 2030, in \$ Mn.**



*projected

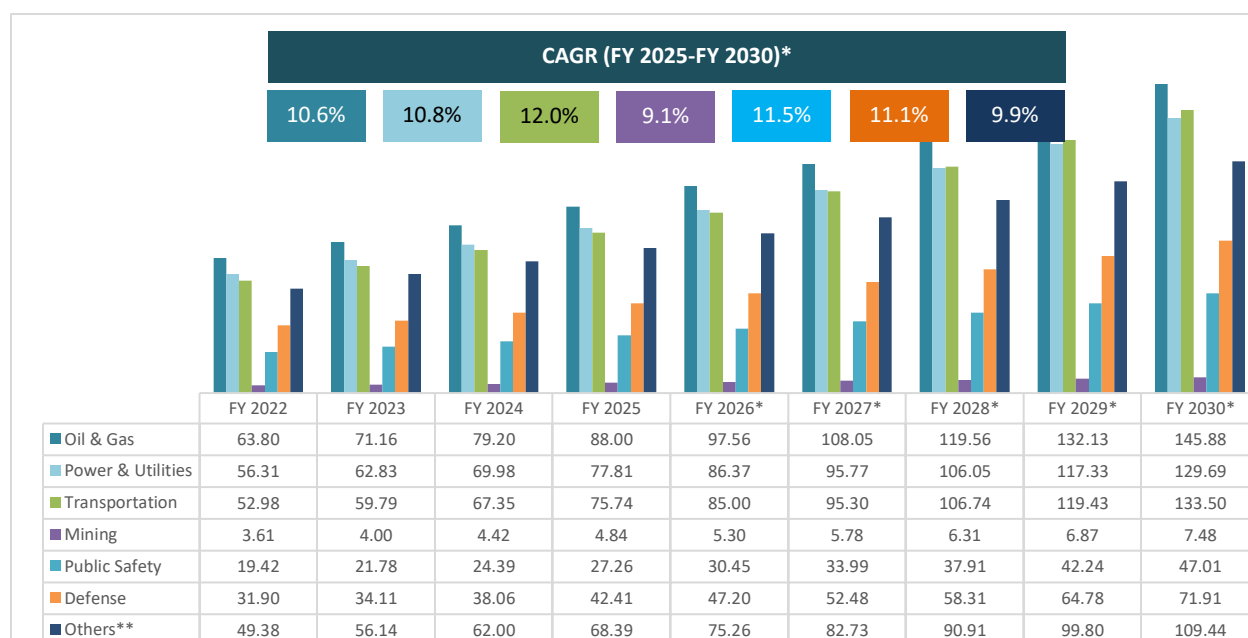
FY: Financial Year (April to March)

Source: Frost & Sullivan

6.6. India ITSS Market Split by Industry Vertical

The India Oil & Gas industry vertical is the largest industry vertical contributing to 22.9% of the total market followed by Power & Utilities and Transportation. However, the Transportation industry vertical is expected to grow faster than the Power & Utilities sector from FY 2025 to FY 2030. This would position the Transportation vertical to the next big industry vertical after Oil & Gas vertical by FY 2030. Mining would continue to be the smallest industry vertical using ITSS systems and solutions.

Exhibit 27: India Integrated Telecom, Security and Safety (ITSS) Market, By Industry Verticals, FY 2022 – FY 2030, in \$ Mn.



Note: The market sizing excludes smart cities projects

*projected

**includes industrial and manufacturing

FY: Financial Year (April to March)

Source: Frost & Sullivan

6.7. India ITSS Market Threats and Challenges

Inspite of a provider positioned well in the Indian ITSS market, there are business risks that exist and can impact the growth trajectory of the stakeholders. Few of these risks are influenced by external factors, some through internal concerns. Listed below are some of the threats and challenges that any provider operating in the Indian ITSS market faces/likely to face over the period of time.

Threats for a Provider

Business threats are predominately external factors that could potentially harm a business entity/organisation, its operation, and profitability. Many of these factors are beyond the control of the enterprise nevertheless, quicker the business entity works out a possible solution or alternative, faster it can bounce to growth trajectory.

- **Economic uncertainty:** It refers to uncertainty in business rising out of unpredictable economic conditions. Economic uncertainty rises because of fluctuating market conditions, political instability, changes in government policies, and inflation. Economic uncertainty often results in cautious spending by customers affecting revenue for companies.
- **Supply chain disruptions:** In a situation of supply chain disruption, the normal flow of goods is disrupted within a supply chain which includes delays in production, shipping, or distribution of products that can arise due to various internal or external factors. Common causes of supply

change disruption include natural disasters, pandemics, geopolitical instability, and logistical challenges.

- **Competition:** It is considered one of the biggest threats to any business. Competition impacts businesses by reducing their growth and market share. Profit margins are affected as businesses lower their product prices to attract customers. There remains constant pressure to innovate and to remain a step ahead of its competitors. A chance of customer erosion can be noticed since customers would have more options in a competitive market. Additionally, a new and disruptive market entrant can add even more pressure to the already competitive market.
- **Lack of regulatory mandates and compliances:** Currently there are few industry verticals that have regulations on the mandatory use of video surveillance and security solutions (like CCTV in examination halls, video surveillance in banks, or in public places in select states). While regulations play a critical role in driving the need for video surveillance and security products, a relaxation in the existing regulatory mandates or lack of regulations in any other industry vertical, can dampen the demand for the solutions.

Challenges for a Provider

Business challenges refer to difficulties that an organisation must overcome to achieve their goals and maintain healthy operations. Challenges are mostly internal to an organisation which can be addressed through better strategy formulation and course correction by the business entity.

- **Financial management:** Unstructured and poor financial management can lead to several challenges for a company, impacting growth and stability. It is important that the company develops an accurate and realistic financial plan for steady growth. Maintaining a healthy cash flow is critical for running day-to-day business operations. Companies should have minimum debt or liability and should have control over accounts receivable. Margins should be always maintained so that profitability is not questioned.
- **Talent management:** For a company to be leader in its space, it is important to attract, hire, develop, and retain the best talent. It is critical for the company to actively seek the best talent and ensure that the right person is selected for the job. A culture of innovation and idea sharing should be promoted within the company. Also, the best performing employees should be identified and rewarded to keep them motivated. It is imperative that talent acquisition and retention are critical aspects of a successful business strategy.

7. Competitive Landscape

7.1. Leading System Integrators Compared

The ITSS systems market is highly fragmented with different types of players in the value chain. This includes technology providers and OEMs, distributors, system integrators, and EPC players. Technology providers and OEMs create foundational hardware and software platforms, developing innovative and sustainable technologies that address evolving customers' needs. They develop the core software/hardware solution that forms the basis of digital communications, security & surveillance, and safety framework. The distributors facilitate product flow from the technology providers and OEMs to the implementation partners. The system integrators (SIs), who play a critical role in the entire value chain, deliver comprehensive project implementation, encompassing design through lifecycle support. In several cases, the EPC contractors manage large-scale infrastructure projects and typically engage with system integrators as specialized subcontractors for technology integration components.

Within the system integration segment, competitive analysis reveals two distinct strategic approaches. Pure-play ITSS specialists who maintain exclusive focus on critical infrastructure technology integration, and the diversified technology corporations who position ITSS as one of the components within the broader automation and industrial technology portfolios. Market research indicates limited number of large-scale players offering ITSS as primary business focus on turnkey basis, with CommTel Networks being one among them. Most established market participants - like ABB India, Honeywell Automation India, Hitachi Energy India, etc - provide ITSS capabilities as secondary offerings alongside broader product and service portfolios, creating market opportunity for specialized providers with dedicated focus on ITSS implementation.

For the purpose of the report, some of the leading system integrators with a focus on ITSS have been compared in the section below.

Exhibit 28: Portfolio Comparison of Leading ITSS System Integrators

	Digital Communications	Security & Surveillance	Safety
CommTel Networks	✓	✓	✓
ABB India	✓	✓	✓
Honeywell Automation India	✗	✓	✓
Hitachi Energy India Limited	✓	✓	✗
Nelco	✓	✓	✗

The above table is derived based on publicly available information

Note: For areas marked as tick (✓) refer to major areas of focus for the company, (✗) refers to minor or no focus

Source: Frost & Sullivan

Exhibit 29: Comparison of Leading ITSS System Integrators based on Vertical Expertise

	Oil & Gas	Energy & Utilities	Transportation	Mining	Public Safety	Defense	Others
Commтел Networks	✓	✓	✓	✓	✓	✓	✗
ABB India	✓	✓	✓	✓	✓	✓	✓
Honeywell Automation India	✓	✓	✓	✓	✓	✓	✓
Hitachi Energy India Limited	✓	✓	✓	✓	✗	✗	✓
Nelco	✓	✓	✓	✗	✓	✓	✓

The above table is derived based on publicly available information

Note: For areas marked as tick (✓) refer to major areas of focus for the company, (✗) refers to minor or no focus

Source: Frost & Sullivan

Commтел Networks

- About:** Commтел Networks is one of the leading India headquartered ITSS vendors⁷² with global coverage, and specializing in converged telecommunications, security & surveillance, and safety systems integration, primarily serving the Critical National Infrastructure sectors. The company has developed a comprehensive system-of-systems methodology through its ITSS framework, which creates unified technology platforms where telecommunications backbone networks, business and industrial communication systems, security platforms, and safety infrastructure function as coordinated operational environments. Commтел's delivery model spans the complete project lifecycle from initial requirements analysis through final system commissioning and long-term operational support. This approach encompasses detailed engineering design, supply chain management, system integration, installation and commissioning, comprehensive testing protocols, and lifecycle partnership services.

Over the last 26 years (since inception), Commтел has delivered ~600 projects and served 400+ customers spread across four continents. The company's technology integration capabilities span over 40 specialized systems, from edge IoT devices to complex backbone networks, delivered through strategic integration centres in Navi Mumbai (India) and Sharjah (UAE) that enable controlled environment assembly and pre-deployment validation. Some of the projects deployed by Commтел globally as well as in India includes (as mentioned earlier in the report):

- (1) Served as the main ITSS system provider for one of the world's largest refineries covering 16 sq. km, delivering complete project management from design through warranty support in Kuwait

⁷² Based on a mix of factors such as strong revenue (FY 2025), consistent revenue growth, competitive market position, and successful execution of projects in the CNI sector.

- (2) Delivered a complete ITSS solution for the Mexico's first floating liquefied natural gas (FLNG) - an innovative offshore project built on three repurposed Jack-up rigs with 1.4 MTPA production capacity
- (3) Provided ITSS system infrastructure for a gas processing facility in Central Asia (Turkmenistan), delivering a fiber-based digital communication highway for a section of a 4,000 sq. km gas field
- (4) A comprehensive communication package featuring 10,023 kms. of a complex meshed OFC-based high-capacity network across 136 sites for a Central Transmission Utility in India's Eastern Region
- (5) Implemented a multi-layered safety ecosystem including emergency communications, cellular connectivity, broadcast infrastructure, first-responder networks, and fiber-optic backbone for monitoring for South Asia's longest highway tunnel

Commтел has developed emerging technology solutions that represent strategic growth opportunities, including NetRRA 360 for AI-based facility health analytics and CRIMPS for advanced pipeline monitoring. These innovation driven initiatives position the company to expand its solution portfolio and capture additional value as these technologies transition from development to commercial deployment.

- **Founded:** 1998
- **Locations:** India (HQ), UAE, USA
- **Solution and Service Offerings (non-exhaustive list):**
 - Turnkey project implementation encompassing full lifecycle delivery
 - Engineering support services for operational phase requirements
 - Specialized technology solutions including AI-enabled monitoring platforms
 - Integrated infrastructure systems spanning telecommunications, security, and safety domains
- **Financial and Operational Performance**

Commтел is one of the well-recognized and specialized ITSS providers. Working for clients for the last 26 years, it has positioned itself as a specialized technology partner for industrial business-to-business ("B2B") organizations that operate infrastructure facilities where system failures can have severe economic and safety consequences. While currently, the company has strong customer base in oil and gas, and power sectors, it has the capability and expertise to execute projects in other CNI sectors as well.

The following table mentioned below analyses Commтел's financial and operational performance in the last three years.

Exhibit 30: Financial and Operational Performance, Commтел Networks, FY 2023 – FY 2025

	FY 2025	FY 2024	FY 2023
Financial Parameters			

Revenue from Operations ⁽¹⁾ (in INR million)	6,392.51	4,569.42	4,122.69
EBITDA ⁽²⁾ (in INR million)	1,345.56	670.58	715.30
EBITDA Margin ⁽³⁾ (in %)	21.05	14.68	17.35
Profit for the year ⁽⁴⁾ (PAT) (in INR million)	1,135.60	474.98	601.06
PAT Margin ⁽⁵⁾ (in %)	17.27	10.17	14.36
Net Cash Flow from Operating Activity ⁽⁶⁾ (in INR million)	293.45	209.60	441.94
RoE ⁽⁷⁾ (in %)	24.90	13.95	20.73
ROCE ⁽⁸⁾ (in %)	21.41	12.59%	17.86
Operational Parameters			
Revenue by customer industry ⁽⁹⁾ (in %)	Oil & Gas: 85.15 Power: 14.85	Oil & Gas: 76.53 Power: 23.47	Oil & Gas: 84.00 Power: 16.00
Revenue by service type ⁽¹⁰⁾ (INR Mn)	Turnkey Projects & Products: 6,047.95 Engineering / Maintenance Services: 344.56	Turnkey Projects & Products: 4,276.76 Engineering / Maintenance Services: 292.66	Turnkey Projects & Products: 3,877.37 Engineering / Maintenance Services: 245.32
Orders Received & Order Backlog ⁽¹¹⁾ (INR Mn)	Orders Received: 4,215.96 Order Backlog: 4,574.10	Orders Received: 7,139.52 Order Backlog: 6,729.79	Orders Received: 5,759.51 Order Backlog: 4,226.79
Total Employees ⁽¹²⁾ (in numbers)	418	371	342

Revenue by geography (13) (INR Mn)	India: 2,893.08 Outside India: 3,499.43	India: 3,028.40 Outside India: 1,541.02	India: 1,751.22 Outside India: 2,371.47
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FY: Financial Year (April to March)

Formulas:

- (1) Revenue from operations of the Company comprises (i) sale of Turnkey Projects and Products; and (ii) sale of Engineering / Maintenance Services.
- (2) EBITDA is calculated as profit for the year minus other income plus finance costs, depreciation and amortisation and total income tax expenses
- (3) EBITDA Margin is calculated as EBITDA divided by revenue from operations
- (4) Profit after tax (PAT) is the net profit for the year
- (5) PAT Margin is calculated as profit for the year divided by total income
- (6) Net Cash Flow from Operating Activity is the cash generated or consumed by a company's core business operation net of taxes paid
- (7) Return on Equity (ROE) is calculated as profit for the year divided by total equity
- (8) Return on Capital Employed (ROCE) is calculated as earnings before interest and taxes expenses (EBIT) for the year divided by capital employed. EBIT is calculated as EBITDA for the year less depreciation for the year and capital employed is sum of equity, total borrowings (current & non-current).
- (9) Revenue by customer industry is the industry wise revenue break-up.
- (10) Revenue by service type refers to the total revenue categorized by the specific type of services provided.
- (11) Orders Received represent the total value of purchase orders received from customers during the financial year.
- Order Backlog represents the total value of outstanding customer orders at the reporting date, calculated as the opening Order Backlog plus new orders received during the year (excluding cancellations), minus the sales executed during the same period. Foreign currency orders are converted into Indian Rupees at the average exchange rate of the reporting period.
- (12) Total Employees are employees on a consolidated basis.
- (13) Revenue by geography refers to the revenue categorized based on the geographic locations or regions where the customers are located.

Source: CommTel Networks

ABB India

- **About:** ABB India is a prominent engineering company that offers a wide range of products, solutions, and services in automation and power technology across sectors like power systems, power products, process automation, and robotics. The company has a strong manufacturing presence in India with facilities producing power distribution products, smart meters, electric motors including flameproof motors for hazardous environments, and digital substation products. The company offers services including predictive and preventive maintenance and digital modernization, thus supporting the CNI sector.
- **Founded:** 1949 (then known as Hindustan Electric Company Limited)
- **Locations:** India (HQ), and spread across various Indian cities
- **Solution and Service Offerings (non-exhaustive list):**
 - Building infrastructure
 - e-Mobility
 - Industrial software
 - Safety Information and solutions
 - Smart cities
 - Smart distribution
 - Smart living
 - Smart power

Honeywell Automation India

- **About:** Honeywell Automation India Limited (HAIL) is a company listed on the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE), and provides integrated automation and software solutions, including process solutions and building solutions. It has a wide product

portfolio in environmental and combustion controls, and sensing and control, and also provides engineering services in the field of automation and control to global clients. The company combines innovation with quality to provide tailored solutions that address operational challenges and improve productivity. Honeywell's services emphasize digital transformation, incorporating IoT and AI technologies to support smart infrastructure and energy-efficient operations.

- **Founded:** 1984
- **Locations:** India (HQ), and spread across various Indian cities
- **Solution and Service Offerings (non-exhaustive list):**
 - Distributed controls systems, transmitters, PLC, emergency shutdown systems
 - IIoT solutions
 - Comprehensive lifecycle services
 - Building management systems
 - Fire detection and alarm systems, access control systems
 - Video surveillance systems, integrated security systems
 - Automation and control systems

Hitachi Energy India

- **About:** Hitachi Energy India is one of the most prominent technology companies in the energy sector. The company plays a key role in India's energy transition by offering innovative power grid technologies and digital solutions. Hitachi Energy India has a focus on providing comprehensive grid solutions that support renewable energy sources like solar, wind, hydropower, and green hydrogen. It has been a key partner in supporting nation-building projects such as high-voltage direct current (HVDC) technology and power automation used in metro and rail systems. The company is currently listed in the NSE and BSE.
- **Founded:** 2019
- **Locations:** India (HQ), and spread across various Indian cities
- **Solution and Service Offerings (non-exhaustive list):**
 - Asset and work management
 - Energy portfolio management
 - Grid and generation management
 - Cybersecurity
 - Digitalization
 - Power Quality
 - Services (installation & commission, assess & secure, train & develop, maintenance, upgradation, repair, replacement & decommissioning)

Nelco

- **About:** Part of the Tata Group, Nelco is a leading provider of Satellite Communication (SatCom or VSAT) services in India. The company focuses on providing data connectivity solutions to both government and enterprise customers in India. Its portfolio of offerings include VSAT connectivity,

Satcom projects, integrated security and surveillance solutions, and end-to-end networking solutions with private hub and hybrid network maintenance.

- **Founded:** 1940
- **Locations:** India (HQ), and spread across various Indian cities
- **Solution and Service Offerings (non-exhaustive list):**
 - VSAT
 - Integrated Security & Surveillance Solutions
 - Consultation on security and surveillance
 - System Engineering, Integration and Technology absorption
 - Project management including installation and commissioning
 - Networking, Customization of interfaces and signal Processing
 - Integration & Testing
 - Product Lifecycle support

7.2. Financial and Operational Comparison of Peer Group with Commtel Networks

Exhibit 31: Peer Group Comparison with Commtel Networks

	Commtel Networks*	ABB India**	Honeywell Automation India***	Hitachi Energy India****	Nelco*****
Financial Parameters					
Revenue from Operations ⁽¹⁾ (INR Mn)	6,392.51 (FY 2025)	1,21,883.10 (FY 2024)	41,896.00 (FY 2025)	63,849.30 (FY 2025)	3,048.70 (FY 2025)
EBITDA ⁽²⁾ (INR Mn)	1,345.56 (FY 2025)	23,012.60 (FY 2024)	5,846.00 (FY 2025)	5,958.10 (FY 2025)	421.60 (FY 2025)
EBITDA Margin ⁽³⁾ (%)	21.05 (FY 2025)	18.88 (FY 2024)	13.95 (FY 2025)	9.33 (FY 2025)	13.83 (FY 2025)
Profit for the year ⁽⁴⁾ (PAT) (INR Mn)	1,135.60 (FY 2025)	18,716.40 (FY 2024)	5,236.00 (FY 2025)	3,839.80 (FY 2025)	95.30 (FY 2025)
PAT Margin ⁽⁵⁾ (%)	17.27 (FY 2025)	14.92 (FY 2024)	11.98 (FY 2025)	5.96 (FY 2025)	3.07 (FY 2025)
Net Cash Flow from Operating Activity ⁽⁶⁾ (INR Mn)	293.45 (FY 2025)	1,331.80 (FY 2024)	4,263.00 (FY 2025)	14,937.70 (FY 2025)	196.60 (FY 2025)
RoE ⁽⁷⁾ (%)	24.90 (FY 2025)	26.45 (FY 2024)	12.97 (FY 2025)	9.11 (FY 2025)	7.45 (FY 2025)
ROCE ⁽⁸⁾ (%)	21.41 (FY 2025)	30.70 (FY 2024)	13.13 (FY 2025)	11.97 (FY 2025)	15.63 (FY 2025)
Operational Parameters					

Revenue by customer industry ⁽⁹⁾ (%)	Oil & Gas: 85.15 Power: 14.85 (FY 2025)	NA	NA	Utilities: 81.00 Industries: 9.00 Transport & Infra: 10.00 (FY 2025)	NA
Revenue by service type ⁽¹⁰⁾ (INR Mn)	Turnkey Projects & Products : 6,047.95 Engineering / Maintenance Services: 344.56 (FY 2025)	Products: 1,15,360.80 Services: 5,515.90 Others: 1,006.40 (FY 2024)	Manufactured products and jobs: 23,596.00 Traded products: 6,082.00 Sale of services: 12,139.00 (FY 2025)	Products: 43,077.90 Projects: 17,760.20 Services: 1,402.80 Others: 1,608.40 (FY 2025)	Sale of products: 359.50 Sale of services: 2,688.50 Others: 0.70 (FY 2025)
Orders Received & Order Backlog ⁽¹¹⁾ (INR Mn)	Orders Received: 4,215.96 Order Backlog: 4,574.10 (FY 2025)	Orders Received: 1,30,790.00 Order Backlog: 93,800.00 (FY 2024)	NA	Orders Received: 1,81,738.00 Order Backlog: 1,92,459.00 (FY 2025)	NA
Total Employees ⁽¹²⁾ (in numbers)	418 (FY 2025)	3,625 (FY 2024)	6,807 (FY 2025)	3,157 (FY 2025)	305 (FY 2025)
Revenue by geography ⁽¹³⁾ (INR Mn)	India: 2,893.08 Outside India: 3,499.43 (FY 2025)	India: 1,08,235.40 Outside India: 13,647.70 (FY 2024)	India: 24,271.00 Outside India: 17,546.00 (FY 2025)	India: 46,589.90 Outside India: 17,259.40 (FY 2025)	India: 3,005.50 Outside India: 43.20 (FY 2025)

Note:

*For Commтел Networks, financial and operational numbers are for FY 2025 (April 2024 to March 2025)

** For ABB India, financial and operational numbers are for FY 2024 (January 2024 to December 2024)

*** For Honeywell Automation India, financial and operational numbers are for FY 2025 (April 2024 to March 2025)

**** For Hitachi Energy India, financial and operational numbers are for FY 2025 (April 2024 to March 2025)

***** For Nelco, financial and operational numbers are for FY 2025 (April 2024 to March 2025)

NA: Not Available

Formulas:

(1) Revenue from operations of the Company comprises (i) sale of Turnkey Projects and Products; and (ii) sale of Engineering / Maintenance Services.

(2) EBITDA is calculated as profit for the year minus other income plus finance costs, depreciation and amortization and total income tax expenses

(3) EBITDA Margin is calculated as EBITDA divided by revenue from operations

(4) Profit after tax (PAT) is the net profit for the year

(5) PAT Margin is calculated as profit for the year divided by total income

(6) Net Cash Flow from Operating Activity is the cash generated or consumed by a company's core business operation net of taxes paid

(7) Return on Equity (ROE) is calculated as profit for the year divided by total equity

(8) Return on Capital Employed (ROCE) is calculated as earnings before interest and taxes expenses (EBIT) for the year divided by capital employed. EBIT is calculated as EBITDA for the year less depreciation for the year and capital employed is sum of equity, total borrowings (current & non-current).

(9) Revenue by customer industry is the industry wise revenue break-up.

(10) Revenue by service type refers to the total revenue categorized by the specific type of services provided.

(11) Orders Received represent the total value of purchase orders received from customers during the financial year.

Order Backlog represents the total value of outstanding customer orders at the reporting date, calculated as the opening Order Backlog plus new orders received during the year (excluding cancellations), minus the sales executed during the same period. Foreign currency orders are converted into Indian Rupees at the average exchange rate of the reporting period.

(12) Total Employees are employees on a consolidated basis.

(13) Revenue by geography refers to the revenue categorized based on the geographic locations or regions where the customers are located.

7.3. Competitive Positioning of System Integrators

ITSS requires a specialized area of expertise. It primarily demands proven capability around digital communications, security & surveillance, and safety. In fact, there are very few large players who provide ITSS as core business offering on a turnkey project basis. Pure-play specialists demonstrate concentrated expert development in critical infrastructure requirements, including regulatory compliance navigation, operational environment adaptation, and high-availability system design. Providers like Commтел Networks tend to focus extensively on critical infrastructure requirements, including complex regulatory environments and operational constraints specific to mission-critical applications. This focused approach can be particularly relevant for projects with highly specialized integration challenges.

On the contrary, diversified participants including major automation and industrial technology providers leverage established customer relationships, global brand recognition, and comprehensive resource capabilities. These organizations compete across multiple technology domains simultaneously, with ITSS representing one element within the broader solution portfolio.

Among the several well-known ITSS providers, Commтел Networks is one of the leading pure-play ITSS vendors⁷³. The company has deep understanding and expertise in ITSS and has strong portfolio of offerings in turnkey solutions, AI solutions, life cycle management solutions, and support services. Commтел Networks has strong expertise on diverse CNI sectors like oil & gas, energy & utilities, transportation, mining, public safety, and defense, both in India and abroad. The provider's strong acceptance in the market can be well attributed through its revenue growth of CAGR 30.3% in the last three years (FY 2023 to FY 2025), much higher than the global or India ITSS market growth. Profit and PAT margin has increased during the period, highlighting the company's strong financial management. Number of new customer acquisitions has been on the upward trend, testifying Commтел's brand image. Based on inputs received from Commтел, the company has worked as the ITSS provider to some of the largest public sector undertakings (PSUs) in India like Indradhanush Gas Grid Ltd. (IGGL), Indian Oil Corporation Ltd. (IOCL), Hindustan Petroleum Corporation Ltd. (HPCL), and IHB Ltd. [JV of IOCL, HPCL and BPCL].

In contrast, companies like ABB India, Honeywell Automation India, and Hitachi Energy India operate at a larger global scale and offer a broader, diversified suite of solutions beyond just ITSS. While few of these players (specifically ABB and Honeywell) tend to focus on large-scale automation, industrial IoT, and enterprise-level security integration across various verticals, Commтел specializes in the seamless, end-to-end deployment (from design to lifecycle support) of converged telecom and safety networks, giving it an edge in mission-critical applications for oil & gas, power, and transport infrastructure. Nelco, another Indian player, has built notable momentum in satellite-based communications in India with strong market reputation, but operates primarily in the VSAT (satellite terminal) segment, differentiating its scope slightly from Commтел's tailored, integrated ITSS approach focused on terrestrial and fiber networks. Therefore, while the large and established multinationals dominate with brand scale and breadth, Commтел competes successfully through deep sectoral expertise, niche AI capabilities, and robust lifecycle management, particularly for Indian, South Asian, Middle Eastern and North American clients in critical infrastructure domains.

⁷³ Based on a mix of factors such as strong revenue (FY 2025), consistent revenue growth, competitive market position, and successful execution of projects in the CNI sector.

7.4. Strategic Assessment

Strategic assessment suggests sustainable competitive positioning may benefit from either specialized expertise development in high-value market segments or scale-based advantages enabling broad market coverage. Different approaches appear to serve different customer requirements across critical infrastructure sectors.

Market dynamics tend to favour participants with demonstrated performance histories in mission-critical applications, as customer qualification processes typically emphasize proven implementation capabilities. This factor can create barriers for new market entrants while benefiting established providers such as ABB India, Honeywell Automation India, and CommTel Networks, all of whom have developed documented project success records.

Technology evolution patterns suggest increasing integration complexity requirements, which may favour providers with comprehensive technical capabilities and vendor-neutral implementation approaches. Market trends indicate growing customer preference for lifecycle partnership models extending beyond initial project implementation phases, an area where different providers have developed various approaches to address these evolving customer needs.

8. APPENDIX

Critical National Infrastructure (CNI) Definition

Critical National Infrastructure (CNI) comprises the foundational systems, assets, networks, and services that underpin a nation's economic prosperity, public welfare, and security. This includes both physical infrastructure such as power grids, transportation networks, water systems, and healthcare facilities, as well as information and communication technologies that enable modern society to function. CNI spans multiple interdependent sectors including energy (oil & gas and power), finance, telecommunications, food production, emergency services, defense, and government operations. The defining characteristic of CNI is that its incapacitation, whether through natural disasters, cyber-attacks, or other disruptions, would produce cascading effects with debilitating consequences for national defense, economic security, public health, or social stability. Given the complex interconnections between these systems, the protection and resilience of CNI requires coordinated efforts to prevent, mitigate, and respond to threats that could compromise the essential services upon which modern society depends.

Definitions of Critical National Infrastructure (CNI) as Defined by Countries

Each country defines Critical National Infrastructure or CNI in somewhat similar yet in its own way. Given below are global references to CNI as prescribed by some of the few countries.

Sr. No.	Country/Jurisdiction	Terminology	Authority
1	Australia	Critical Infrastructure	https://www.cisc.gov.au/
2	Bahrain	Critical National Infrastructure	https://www.ncsc.gov.bh/
3	Canada	Critical Infrastructure	https://www.publicsafety.gc.ca/
4	European Union	Critical Infrastructure and Critical Entities	Under EU NIS2 and EU RCE
5	France	Critical Infrastructure	https://www.sgdsn.gouv.fr/
6	Germany	Critical Infrastructure	https://www.bmi.bund.de/DE/startseite/startseite-node.html
7	Ghana	Critical Information Infrastructure	https://www.csa.gov.gh/

8	India	Critical Information Infrastructure	https://www.nciipc.gov.in/
9	Malaysia	National Critical Information Infrastructure	https://www.nacsa.gov.my/
10	Nigeria	Critical National Information Infrastructure	https://nscdc.gov.ng/
11	Saudi Arabia	Critical National Infrastructure	http://www.nca.gov.sa/
12	Singapore	Critical (Information) Infrastructure	https://www.mha.gov.sg/
13	South Africa	Critical Infrastructure	https://www.gov.za/
14	UAE	Dubai: Critical Information Infrastructure Abu Dhabi: Critical Infrastructure	www.desc.gov.ae
15	UK	Critical National Infrastructure	www.npsa.gov.uk
16	USA	Critical Infrastructure	www.cisa.gov

Other References:

- US Presidential Policy Directive



US PRESIDENTIAL
POLICY DIRECTIVE PPI

- UNGA Resolution



UNGA Resolution
2004.pdf

- EU Council Directive



EU COUNCIL
DIRECTIVE 2008/114/EC

- Industry Paper



Capgemini Paper on
CNI.pdf

As is evident from all the above, the use of "Critical National Infrastructure" (CNI) is appropriate because infrastructure protection remains fundamentally a national responsibility, with each country determining what constitutes critical assets within its sovereign borders.

The "National" designation reflects that despite global interconnectedness, effective protection strategies must align with each nation's unique governance frameworks, regulatory structures, and strategic priorities that directly impact national safety, prosperity, and security.

CNI provides a comprehensive term encompassing all critical assets—both physical and information systems—under unified national oversight and coordinated response capabilities.