Technology Services Business

Overview

L&T Technology Services Limited (LTTS) is a leading global pure-play Engineering Research & Development (ER&D) services company. LTTS offers design and development solutions throughout the product development chain, and provides services and solutions in the areas of mechanical and manufacturing engineering, embedded systems, engineering analytics and plant engineering. Headquartered in India, LTTS employs over 12,000 personnel spread across 16 global delivery centres, 28 global sales offices and 39 innovation labs in India as of March 31, 2018.

The Company's customer base includes over 50 Fortune 500 companies and 51 of the world's top ER&D companies, across industrial products, transportation, telecom & hi-tech, medical devices and the process industries. The key differentiators for LTTS are its domain expertise and multi-vertical presence in major industry segments. LTTS also provides service offerings in the domains of Embedded Systems, Application Engineering, Verification and Validation and Mechanical & Digital Manufacturing Services.

The services and solutions provided by LTTS in its key industry segments are as under:

Transportation

LTTS offers engineering services and solutions over the complete spectrum of the transportation industry that includes OEM and Tier 1 suppliers in the automotive, trucks & off-highway vehicles, aerospace and rail sectors. The segment delivers end-to-end services from concept to detailed design through manufacturing, testing, after-market and sourcing support helping OEMs and Tier1 suppliers develop products in a cost-effective manner. LTTS also helps its clients develop cutting-edge transportation technologies such as autonomous driving, electric vehicle and drones. LTTS's domain expertise, glocalized and customer-centric approach, proprietary solutions and a repository of over 150 co-authored patents drive innovation and sustain business growth. The adherence to safety protocols, design and processes and the use of cross-disciplinary engineering facilitates give a superlative experience to LTTS's customers.

Telecom & Hi-tech

LTTS's expertise in digital engineering – such as the Cloud, IoT, Artificial Intelligence, Data Analytics & other areas in the telecom domain – enables its partners to leverage the right telecommunications strategy. With expertise in product variant development, 5G capabilities, simulation & automation, and product & mid-life support, LTTS is a one-stop solution for its clients. It also provides futuristic solutions and IP cores that address some of the pressing needs of the semiconductor industry. LTTS's Narrow Band IoT (nBIoT) solution provides complete IoT device management designed with low memory and a low power footprint, enabling easy integration to custom target platforms.

Headquartered at Knowledge City, Vadodara, L&T Technology Services helps clients build smart products, enable smart manufacturing and offer smart services.

LTTS's experience in Product Development, Digitalization, User Experience Engineering and Testing & Certification enables its customers to expand to new markets, innovate newer and smarter products, and roll-out products faster and cheaper. The Company's designs for 3D cameras, speech recognition, smart glasses and connectivity programmes involving wireless mesh networks are seeing increasing traction from the industry.

Industrial Products

LTTS's Industrial Products practice helps OEM customers across building automation, home and office products, energy, process control and machinery. The Company's expertise in engineering industrial products helps its customers drive innovation and efficiency, and retain a competitive edge. LTTS helps streamline the product development value chain, enabling customers spearhead business growth.

This Industrial Products segment offers end-to-end product development counsel, leveraging expertise spanning software, electronics, connectivity, mechanical engineering, industrial networking protocols, user interface / user experience (UI / UX), test frameworks and enterprise control solutions.

Plant Engineering

The plant engineering practice provides end-to-end engineering services to leading plant operators across the globe. LTTS provides services in E/EPCM, Engineering Reapplication and Global Rollouts, Plant Sustenance and Management, Regulatory Compliance Engineering along with chemical, consumer packaged goods (FMCG) and energy and utility sector clients. LTTS specializes in traditional EPCM and operational maintenance projects, as well as contemporary digital engineering enterprises. The Company is advancing its engineering footprint to encompass the digital sphere, and is working with customers on 'Smart Manufacturing' technologies such as automation, IoT, analytics, and augmented reality (AR).

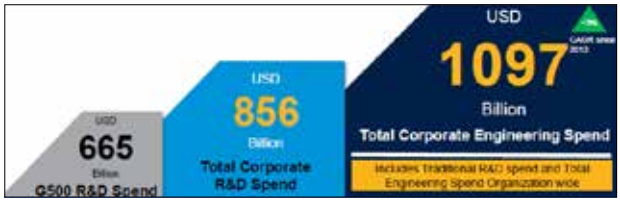
Medical Devices

LTTS' domain expertise, supported by robust technological capabilities, helps medical device OEMs address industry challenges, accelerate time to market, and optimize costs. LTTS focuses on delivering solutions in diagnostics, patient mobility services, musculoskeletal services, life sciences, surgical services, cardiovascular, home healthcare and general medical.

Business Environment

According to Zinnov, corporations spent more than USD 1 Trillion in 2017 on ER&D activities such as product and process development, manufacturing engineering and other allied engineering. Of this, the 500 biggest corporate spenders in ER&D globally (G500 ER&D spend) contributed nearly 60% i.e. USD 665 billion.

Global Corporate Engineering Spend

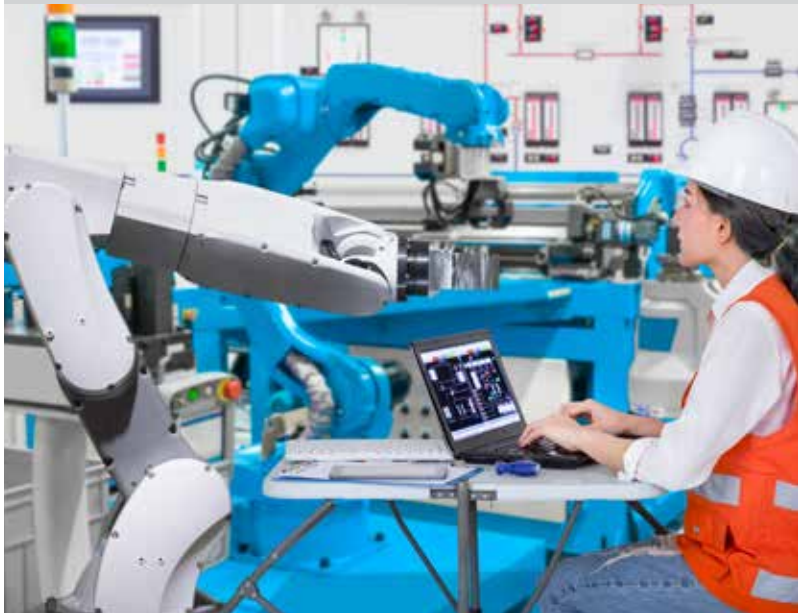


Source: Zinnov

It is expected that the global ER&D spend will reach USD 1,341 billion by 2022. This momentum is majorly affiliated

L&T Technology Services' Bangalore campus

Smart manufacturing services facilitate real-time visibility of plant operations



to growth in sectors like automotive, pharmaceuticals, software & internet, semiconductor and consumer electronics. Corporates are expanding in various areas to be competitive and relevant. Corporates are building onshore labs / centres of excellence, developing new IPs and engaging in M&A activities for expansion.

Significant Initiatives

LTTS aspires to continue being a global leader in the ER&D segment. The Company has undertaken several significant initiatives to achieve this objective. These initiatives include:

- **Talent & Delivery**
  LTTS is leveraging hotspots across the globe to tap into the engineering talent having experience in Digital Engineering, Design & Application Engineering, etc. to improve its onshore presence in low-cost geographies. Towards this objective, LTTS has launched a Centre of Excellence in Jerusalem, Israel which acts as a global hub for developing advanced solutions in Video, ASIC Design and Security. It also offers the full scope of engineering services in the areas of Telecom, Semiconductors, Medical Devices, Automotive, IoT and Plant Engineering.

- **Specialised Infrastructure**
  LTTS is focused on driving innovation and is adopting solutions in line with technological trends. To promote its culture of innovation, LTTS is investing in infrastructure and co-innovation to build innovation hubs and to facilitate solutions and offerings across industry verticals.

- **IP & Solutioning**
  LTTS is concentrating on building re-usable IP products and frameworks to enhance competitive differentiation. Proprietary platforms like UBIQWeise 2.0™, i-BEMS, WAGESAPP and IPs like MIPI and USB help LTTS in retaining its competitive advantage across industry segments.

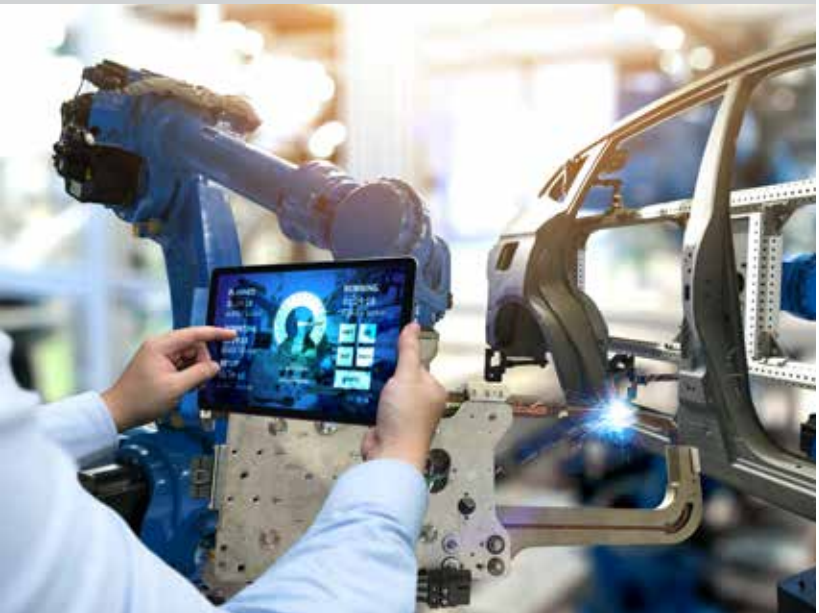
- **Technology Events**
  Continuing its efforts to identify and nurture future innovators, LTTS, for the second year, held TECHgium®, the pan-India platform for budding engineers to showcase their innovations. The response was very encouraging, with 220 institutes and over 17,000 engineering students signing up for the TECHgium® 2018, including marquee institutes like IITs, BITS Pilani, Delhi College of Engineering and NIT.

  LTTS invested over 100 working hours to mentor students shortlisted for the PoC round, with subject matter experts from respective industry domains mentoring the students. As a result, the winning teams in TECHgium® came up with remarkable solutions around IoT, Machine Learning, Advanced Image Processing and Smart Tools.

  LTTS also held an innovative technology hackathon nicknamed 'Just Code' across its global delivery centres to enable employees to convert their ideas into demonstrable products. The hackathon successfully ended with the creation of hundreds of PoCs across several technologies, including Media Processing and Entertainment, Cloud Programming, Sensor Fusion, Automation, Machine Learning and Artificial Intelligence.

- **Patents**
  At the end of financial year 2018, the patents portfolio of LTTS stood at 328, out of which 245 were co-authored with its customers and 83 were filed by LTTS.

Digital solution for automobile manufacturing displayed on the shop floor



An engineer wears a VR headset in an R&D lab

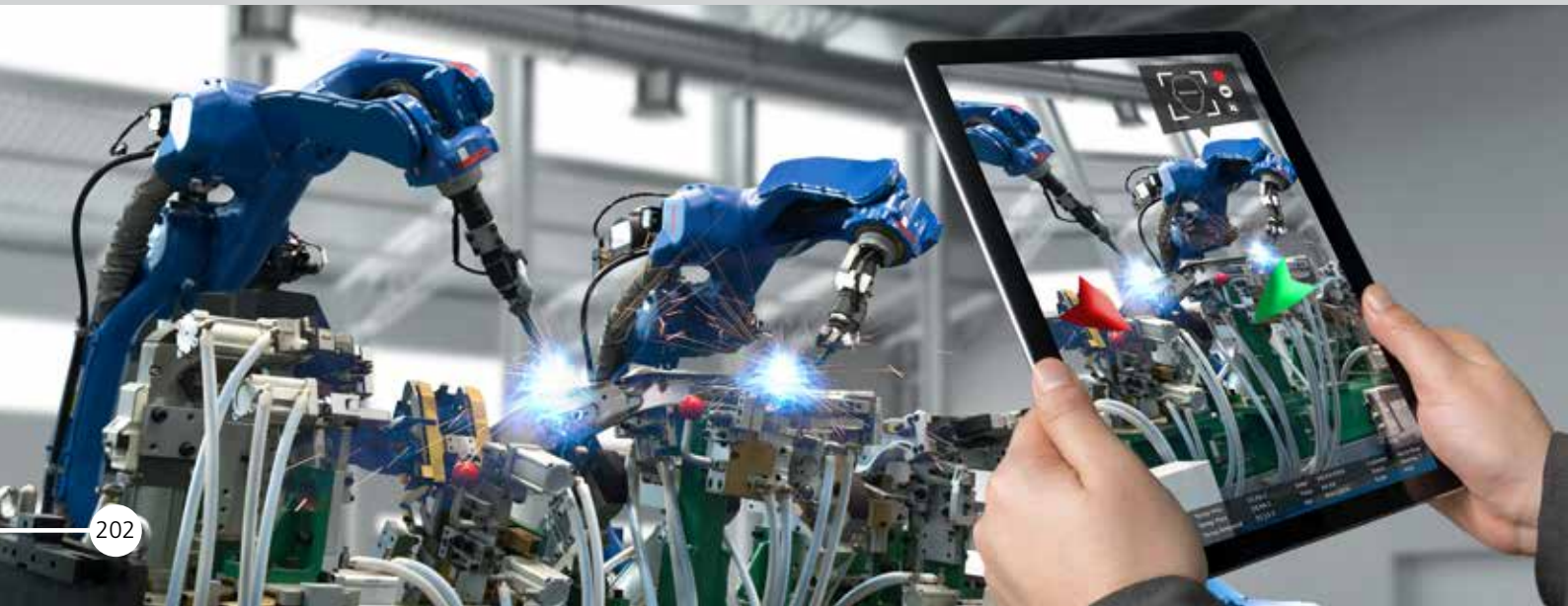
- **Awards & Recognition**
  LTTS has won a string of high profile industry accolades which are a testament to the Company's culture of innovation and best practices in technology and people management. Key accolades include:

  - The Golden Peacock Innovative Product/Service Award 2018 for LTTS's i-BEMS framework. This is the second year in succession that the Company has won a Golden Peacock trophy. In March 2017, LTTS was awarded the Golden Peacock National Quality Award for its best-in-class engineering services and solutions.
  - LTTS has been positioned in the 'Winner's Circle' for excellence in innovation and execution by HfS Research, the Service Research Company™. In its 'Blueprint Report for Automotive Engineering Services for 2018', HfS rated LTTS among the top 5 innovative organizations in the world.
  - The Company was also positioned in the 'Winner's Circle' of HfS's 'Blueprint Report on - Embedded & Semiconductor Engineering services 2017'. Not only was LTTS lauded for its excellent delivery capability, account management, partnership, hardware expertise, technology, in-house tools and IP solutions but it was acknowledged by HfS for its recognizable investments in future capabilities and strong client feedback to drive new insights and models.
  - LTTS cemented its position as a leader in overall ER&D Services across 10 verticals and as overall leader in Product Engineering Services in the Zinnov Zones 2017 Ratings.
  - It was rated as an 'Expansive and Established player' in the Zinnov Zones 2017 IoT Technology Services study, and positioned in the Zinnov Leadership Zone across seven unique expertise areas.
  - The Company was awarded the prestigious NASSCOM Digital Skills Award for 2017. NASSCOM, through this award, gave formal recognition to LTTS's continued success in aligning its offerings with the rising customer demand for digital engineering.
  - LTTS's culture of innovation and compelling portfolio of solutions led the Confederation of Indian Industry to recognize the Company as one of the most innovative organizations in India in the services category.
  - LTTS was positioned in the Leaders Category by independent global research firm, NelsonHall, in its evaluation for Internet of Things (IoT) services providers. LTTS was the only global pure-play engineering service provider to be positioned in the Leaders Category.
  - LTTS won the Businessworld magazine's 3rd HR Excellence Awards 2017 for 'Excellence in Change Management & Excellence in Compensation and Benefits'

Outlook

Technology has evolved over the past decade at such a rapid pace that the present times can be considered as the era of What You Perceive is What You Get (WYPIWYG). Devices have become smart, and customers expect them to become smarter by the day. Only the organizations that evolve with technology can succeed in this new world

Augmented Reality empowers manufacturers to gain insights into their product models and equipment health



of unlimited possibilities. ER&D service providers need to identify opportunities and evolve technologies to 'Build the New' and 'Renew the Old' thus creating value proposition. Intelligent Products, a sensor-enabled IoT platform with analytics coupled with digital engineering, is the key to evolution from old to new.

Digital Engineering is driving ER&D growth globally which is visible from the high concentration of investment made by global corporates. As per Zinnov, in 2012, the Digital Engineering spend was USD 121 billion which was 13% of the total ER&D spend. In 2017, it went up to USD 219 billion, having 20% share of total ER&D expenditure. By 2022, it is expected to reach USD 489 billion with 36% weight in total ER&D. Software will be the major factor driving growth in digital engineering, followed by embedded and mechanical.

There is increased wallet-spending on Digital Engineering because of crucial factors like technology innovation, business model innovation and growth of tech giants and start-ups. The world will see increased R&D activity in machine learning, human machine interface, artificial intelligence, collaborative robotics, etc.

In order to become 'the architect' of disruptive technologies that will help customers be ahead of the curve, LTTS has strategically decided to invest across futuristic technological areas, namely Digital Engineering, Smart Manufacturing, Perceptual Engineering and Pervasive Technologies.

- LTTS is focusing on and investing in Digital Engineering areas like Industrial IoT, Augmented Reality, Smart Supply Chain & Logistics, Power Electronics, Connected Vehicles, Imaging Algorithms & Edge Detection and Video Surveillance.

- LTTS has taken big strides in smart manufacturing, with cutting-edge projects that make a plant connected and intelligent. One of LTTS's recent smart manufacturing projects involved integrating a new model into existing manufacturing lines using virtual simulation of robotic welding, PLC programming and HMI design.

- Perceptual Engineering is another focus area where machines are made intelligent enough to interact with the five senses. LTTS has developed machine learning and deep learning technology for smarter solutions, and is deploying them into a variety of industries - Security & Surveillance, Robotics, Natural Language Processing and Image and Video Analytics.

- Pervasive technologies use sensor fusion which combines sensors to produce data and signal computing. This helps to analyse and connect systems, enabling businesses to transform to digital service-led models. Recognizing the power of the embedded sensor, LTTS has made a head-start in this area by undertaking some interesting projects for customers.

The above areas are the four pillars of modern-day industrial digital evolution which will lead the way for the Company to push the frontiers of innovation. These four are not mutually exclusive, they are in fact interconnected threads of technology, with considerable overlaps. Through these technology pillars, LTTS will be relevant today, tomorrow and the day after, to become the global leader in engineering services in the years to come.

Engineering industrial products helps clients drive innovation and efficiency and retain their competitive edge.