

# **Engineering Services by Global Service Providers in India**

*An excerpt for Infosys*

**MARKET ANALYSIS AND FORECAST  
THROUGH 2020**

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## Executive Overview

Engineering services augment and enhance the limited technical talent available in developed and developing countries to reduce costs, improve quality, create new products, and build infrastructure with increased value and shorter time-to-market. Engineering services provide a broad range of technical services including mechanical, electrical, mechatronics, software, information technology (IT), business process management, and more. This is essential for the development of product concept, product and industrial design, automation of plants, mechanical, electrical and embedded system design, maintenance of products and plants, asset management, product lifecycle related services, detailed engineering, testing and prototyping.

The industry has largely evolved in the last decade and more so in the last five years. In the early 2000's, India was thought to be a cost-effective destination for outsourcing of commodity IT skills, and so some of the non-critical functionalities of IT were outsourced to the global service providers (GSPs) in India. From the mid to the turn of the decade, GSPs were seen as a solution provider - to understand customers' business problems and solve it. From past few years, GSPs are considered for more strategic roles like co-innovation and joint development projects, which are based on risk sharing model. Today's competitive end user market and new enabling technologies are also expanding the horizon of ES providers. ARC has witnessed that GSPs in India focus on variety of use cases in areas of interconnectivity of products and plants, working in disrupted environment with new partner ecosystem to stay relevant, leveraging technologies such as Internet of Things (IoT), engineering analytics, 3D printing, artificial intelligence, machine learning, and innovative platforms to build intelligent, agile and differentiated and smart ecosystem.

## Scope of Report Research

This report provides a comprehensive assessment of engineering services for the current market and prospects during the five-year (2015-2020) forecast period.

**The Engineering Services Market Defined:** Engineering service refers to the development of a new product, process, or service. These services include design elements of the product or service itself, infrastructure, equipment,

and processes involved in manufacturing them, maintaining them or delivering them.

ARC groups engineering services into four major categories:

**Product Engineering:** Product engineering includes mechanical engineering, electronic engineering, embedded system design and parts of product lifecycle management. The key objectives include reducing the time-to-market as well as the design cycle time with low cost and high return on investment.

**Process Engineering:** Process engineering includes tools and techniques for designing a process. The design is set to optimize capital and operational expenditures and achieve efficient output of products and services.

**Automation Related Services:** Automation related services broadly comprise of design and development of control systems – often PLC (Programmable Logical Controller) or DCS (Digital Control Systems) based. These systems enable managing and executing production activities and the related information to be shared across the organization in real time for analysis and decision purposes.

**Asset Management Related Services:** These services have more to do with achieving better maintainability, reliability, and availability of assets at any particular instance. It includes application development, configuration, and testing for Computerized Maintenance Management Systems (CMMS) or Enterprise Asset Management (EAM) packaged testing for CMMS or EAM packaged software implementation or upgrade. Integration between maintenance activities and functions and plant control systems, Manufacturing Execution System (MES), Computer Aided Design (CAD)/ Computer Aided Manufacturing (CAM), Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) also form a part of these services.

## Major Trends

The 2015 calendar year worldwide engineering services revenues provided by GSPs located in India is \$6.6 billion. ARC forecasts the ESGSP market to grow at a compound annual growth rate (CAGR) of 11.8 percent for the years

2016 through 2020, resulting in a market size of almost \$11.6 billion in 2020. Infosys has around 9 percent market share in this market.

### Analysis by Geographic Regions

North America is the largest user of engineering services followed by Europe. Both regions are mature markets. Asia is not as mature as the other two regions when it comes to engineering services and this region is expected to grow faster in the coming years. Latin America is the smallest user of engineering services.

Figures in Millions of US Dollars

World Region	2015	2015 %	2020	2020 %	CAGR
North America	3,603.3	54.4%	6,299.2	54.3%	11.8%
EMEA	1,998.1	30.2%	3,493.2	30.1%	11.8%
Asia	982.0	14.8%	1,730.6	14.9%	12.0%
Latin America	41.0	0.6%	73.2	0.6%	12.3%
Total	6,624.5	100.0%	11,596.1	100.0%	11.8%

### Total Shipments of Engineering Services by GSP in India for 2015 as per ARC Report

#### Analysis by Solution Type

Worldwide shipments of **product engineering** services provided by GSPs in India for the year 2015, is around \$4.4 billion. ARC forecasts the product engineering market to grow at a CAGR of 12.2 percent for the years 2016 through 2020.

Worldwide shipments of **process engineering** services provided by GSPs in India for the year 2015 is around \$739 million. ARC forecasts the process engineering market to grow at a CAGR of 11.1 percent for the years 2016 through 2020.

Worldwide shipments of **automation related** services provided by GSPs in India for the year 2015 is \$743.7 million. ARC forecasts the automation

related services to grow at a CAGR of 12.2 percent for the years 2016 through 2020.

Worldwide shipments of **asset management** related services provided by GSPs in India for the year 2015 is \$659 million. ARC forecasts the asset management related services to grow at a CAGR of 10 percent for the years 2016 through 2020.

### **Factors Contributing to Growth**

The main factors that are contributing to the growth of this market include:

**Maturity of Services:** As the ES market matures, more and more customers are realizing that outsourcing of ES is much more than just the cost factor. ESP's have upgraded their engineering competencies and have made huge investments in infrastructure for compliance, certification, and technology adoption. Hence, they are in a position to execute end-to-end product engineering projects in line with customer expectations. ER&D services portfolio is witnessing greater emphasis on product engineering (end-to-end ownership) and innovation at both product and process levels.

While cost continues to be a relevant factor globally, other factors like innovating products for emerging markets, lowering time-to-market (gaining first-mover advantage), meeting government regulations, etc. are also gaining prominence and influencing outsourcing strategies. As a result clients are becoming more open to offshore both low-to mid-complexity work (testing & validation, etc.) to very high complexity work (prototyping, concept development, etc.).

**New Technology Trends:** Many new technology trends have hit the market which has contributed to the growth of ESGSPs.

- **Internet of Things (IoT)** - This is a major driver of ES offerings especially in machinery, healthcare, entertainment, automotive, security etc. IoT will result in development of new device categories. This will result in explosive growth in connected devices and a great need for engineering services across the lifecycle of the product/device.
- **Analytics** - The convergence of interests among the Chief Technology Officer (CTO), Chief Information Officer (CIO), and Chief Marketing Officer (CMO) is resulting in increased pace of new developments in



analytics space. Real-time analytics is resulting in faster and better decision making systems.

- **Sustainability** - Sustainable and eco-friendly engineering like renewable and alternative energy production, green buildings with energy modeling, Leadership in Energy and Environmental Design (LEED) certified buildings.
- **Integration of automation and technology** - Engineering services play a key role in efficiency and productivity of manufacturing industries. For that reason, a high level of efficiency is needed at the engineering stage, as the first step toward better production. Efficient interoperability of all automation components based on open system architecture covering entire production process with consistent data management, global standards, and uniform hardware and software interfaces is where the engineering service providers will find more opportunities in future.

**Developing Countries Seek More Services:** In developed countries the service sector generates more revenue than the industrial sector; whereas in developing countries, there is more scope for industrial growth. According to the International Monetary Fund, the ten largest advanced economies in 2015 according to GDP are the United States, China, Japan, Germany, the United Kingdom, France, India Brazil, Italy, India and Canada. The emerging economies in BRIC (Brazil, Russia, India and China) countries have more scope of service growth.

**Product Localization:** The benefit of localization is to have access to more markets. However, there are considerable costs involved, which go far beyond just engineering. Firstly, the software needs to be re-engineered. Secondly, providing a localization package for a specific language is in itself a tedious task. This requires specialized technical writers to construct an appropriate syntax for potentially complicated technical concepts, coupled with engineering resources to deploy and test the localization elements.

### **Factors Inhibiting Growth**

Some of the key factors that are retarding the growth of ESGSPs market include:

**Unavailability of Skilled Resources and Ecosystem:** Availability of appropriately skilled engineers who want to make a career in hard core engineering services is very limited. Almost all ES providers struggle to get right mix of resources. In the first place, the segment is challenging and

requires a lot of technical as well as vertical knowhow. The Indian educational system vs. the industry requirements is being bridged, but slowly. Additionally, there is a scarcity of consulting ecosystem of sourcing advisors as well who can provide business justification for large scale ES initiatives. Limited availability of talent for high end services such as system engineering, analytics etc.

**Geopolitical Issues:** Majority of the revenues earned by the ESGSPs based in India come from NA and EMEA. In case these regions suffer an economic setback, the ES industry is adversely affected. Volatility in mature markets delaying some of the new investment plans of OEMs. Market volatility like the slowing China economy, Brexit, adds to the delay in decision making and many times reconsidering existing contracts.

**Lack of Standardized Process:** Outsourcing as a process, especially in engineering services is yet to mature; hence, the debate about core and non-core activities/skills continues. The risk-sharing model has its own liabilities, indemnities, and long term warranties on production as engineered by the GSPs. Some competing standards in automation and automotive space are causing non-uniform and non-compatible products. Lack of adequate standardization for numerous emerging technologies (e.g. in IoT), coupled with regulatory constraints hinder the growth of engineering services outsourcing. Earlier bigger companies were more involved in standardization that would then be followed by medium and smaller companies. But now, there are many SMBs and startups which are also involved in making standards.

**Increased Competition from the Captives:** Increasing captive centers by the OEMs such as R&D centers by companies like GE, Honeywell, GM, Philips, Siemens, and Toyota etc. creates a stiff competition for outsourcing service providers. Customers prefer captives to ES providers, despite lack of skill and operational efficiency. Captive operations have grown significantly, although the rate of that growth is slowing as customers begin to recognize the need to optimize and focus on improving captive operations. In some cases, captives provide lower costs and significant benefits to parent firms. Increasing usage of captives as an offshoring model by companies has been a major factor inhibiting the growth of the engineering service provider industry.

**Growing Competition from Low-cost Countries:** Competition from other low cost (local) countries like Eastern Europe and South East Asian countries is overtaking the cost advantage that GSPs in India have. Emergence of engineering services destinations such as China, Argentina and Eastern Europe could pose a potential threat to Indian engineering service providers.

**Lack of Control over Product Development / Intellectual Property Concerns:** Reservation about loss of intellectual property has been another major concern which has limited the number of companies collaborating with service providers for engineering activities.

**End-to-end Services by Product Vendors:** More and more product companies are providing end-end services themselves. This is having a direct impact on growth of traditional and pure play engineering services.

## Industry Trends

Figures in Millions of US Dollars

Industry	2015	2015 %	2020	2020 %	CAGR
Aerospace & Defense	825.1	12.5%	1,426.3	12.3%	11.6%
Automotive	1,040.1	15.7%	1,785.8	15.4%	11.4%
Chemical & Petrochemical	65.5	1.0%	116.0	1.0%	12.1%
Electric Power Generation	134.8	2.0%	266.7	2.3%	14.6%
Electric Power T&D	142.3	2.1%	289.9	2.5%	15.3%
Electronics & Electrical	743.4	11.2%	1,264.0	10.9%	11.2%
Machinery	674.7	10.2%	1,345.1	11.6%	14.8%
Medical Products	384.2	5.8%	788.5	6.8%	15.5%
Mining	13.5	0.2%	34.8	0.3%	20.9%
Oil & Gas and Refining	457.7	6.9%	811.7	7.0%	12.1%
Pharmaceutical & Biotech	122.6	1.9%	243.5	2.1%	14.7%
Semiconductors	406.5	6.1%	742.2	6.4%	12.8%
Telecommunications	875.3	13.2%	1,333.6	11.5%	8.8%
Transportation	274.2	4.1%	521.8	4.5%	13.7%
Water & Wastewater	28.5	0.4%	54.5	0.5%	13.8%
Other Industries	436.4	6.6%	571.7	4.9%	5.5%
<b>Total</b>	<b>6,624.5</b>	<b>100.0%</b>	<b>11,596.1</b>	<b>100.0%</b>	<b>11.8%</b>

### Total Shipments of Engineering Services by GSP in India by Industry as Per ARC Report

Vertical-specific trends such as deconsolidation in automotive and low cost products from medical devices for emerging markets have increased competition and forced multinationals to equip themselves with latest technological advances in the products and services space. Some of the

industries with increasing involvement of engineering services and fast growth are automotive, aerospace, machinery manufacturing, electronics and electrical, semiconductors, and telecommunications. There are some other industries like medical products, mining & metals, and chemical & refining which do not have a bigger share in ES but are growing very fast. It is also obvious that IoT is having a major impact on all these industry segment and the trend will only grow.

**Automotive:** Automotive has always been a major consumer of engineering services. With all kinds of complex mechanical, electrical, and electronic engineering going into making an automobile, the importance of ES has grown substantially. Designs of dashboards, enhanced user experience, and home integration systems are among the most common trends and gives more opportunities to ES providers apart from the smart devices.

**Aerospace:** Today, major aerospace & defense companies around the world are active and significant users of external engineering services, resulting in the creation of a large, mature, and stable market for these services. The type of activities typically outsourced to an ES provider includes system, concept and detailed design, engineering study and analysis, manufacturing engineering, and maintenance. More opportunities arise in the area of composites (for fuel efficiency and weight), interiors, and avionics.

**Machinery Manufacturing:** Machinery manufacturing is a mature industry primarily comprising of standalone machines used in job shops to large machining centers used for high precision manufacturing. The industry evolves with technology products and remains optimistic on its initiatives to automate processes through transfer lines, or through robotics to deliver products. Though R&D spends in this segment is small there is always a need to automate the processes and build high-precision machines to work efficiently.

**Electronics and Electrical:** Electronics and electrical industry includes power, electronics, control systems, signal processing, and telecommunications. It is mainly used by equipment manufacturers and encompasses services like re-engineering, value engineering, and new product development. It also requires an integrated software-hardware approach. Globally, telecommunications, industrial controls, and consumer electronics firms are increasingly outsourcing design work to India.

**Telecommunications:** There are various types of services provided to the telecom industry. One is for the telecom equipment manufacturers, while the second is for network engineering. The second type (network engineering) is a big market catered by Indian GSPs but this market is not the focus area of ARC's Engineering Services study. The equipment manufacturers are supported by engineering service providers in many ways. They provide end-to-end manufacturing services like complex electro-mechanical products, printed circuit board (PCB) assembly, product enhancement and sustainability engineering services, end-to-end product development services, very-large-scale integration/ field-programmable gate array (VLSI/FPGA) design services, and such others

**Semiconductors:** Semiconductor market is driven by the growth in many other industries, such as consumer electronics, automotive, communication equipment, industrial applications, and such others. Since all these industries are set to grow at a faster pace, so is the semiconductor market. Creation of new electronic and equipment market, digital set-top box, vehicle power electronics, smart power grids, photovoltaic panels for solar energy, and strong demand for smart phones drive the semiconductor market.

## Infosys Profile

<http://www.infosys.com/pages/index.aspx>

<http://www.infosys.com/engineering-services/Pages/index.aspx>

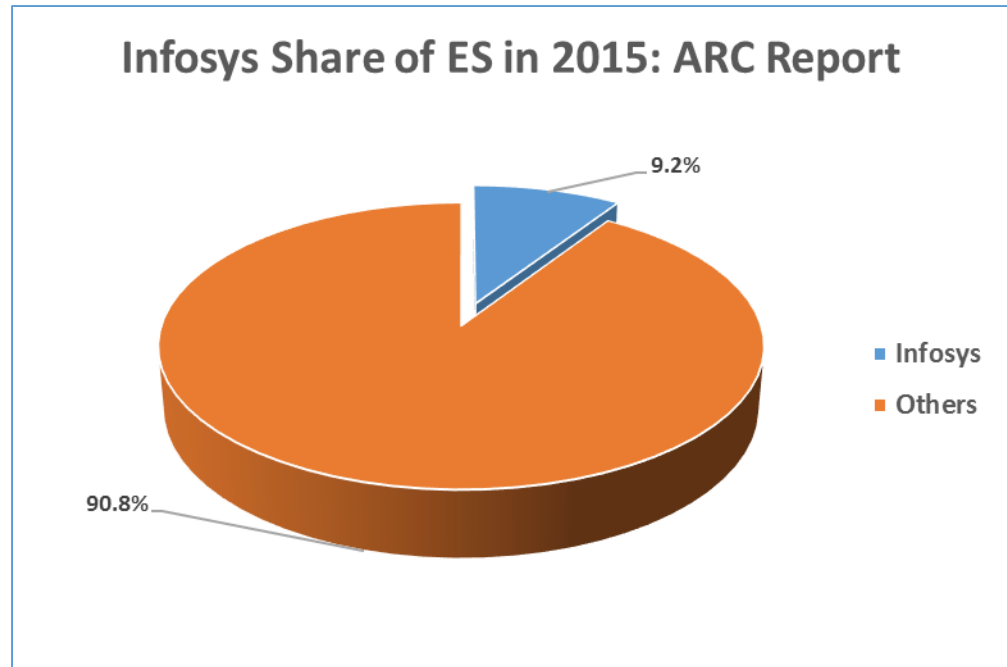
## Key Services

Infosys engineering services has the following sub-service lines:

- a. **Core Engineering:** This predominantly involves mechanical product design including Turbo Machinery Plant Engineering, Aero Structures, Product Lifecycle Management (PLM), Knowledge-Based Engineering, Product Design, Value Analysis & Value Engineering (VAVE), Plant Automation Control and Systems (PACS) including industrial automation and control, Manufacturing Execution system.
- b. **Networking and Embedded Engineering:** this includes product R&D, Network Engineering, Network Service Assurance, Network Systems and Enterprise services, Embedded system Engineering services, Contact Center Engineering, Unified Communications, SDN/NFV and Media services.
- c. **Software Product & Platform Development Engineering:** This includes Specialized Software Product and Platform Engineering, product platform & QA Engineering, ISV Product Professional Services, DevOps Automation &

Software Release Management and Point of Sale and Geographical Information Systems (GIS).

Infosys also focuses on emerging technologies such as Internet of Things (IoT), Industry 4.0, Additive Manufacturing (3D Printing), Composites, Artificial Intelligence, Digital Manufacturing, Digital Twin etc.



#### Description

Infosys was established by a group of farsighted IT professionals three and a half decade ago. What began as a garage startup company is now synonymous with world-class IT services. Infosys has a global presence with more than 199,829+ employees worldwide, across 119 nationalities and 114 development centers in 43 countries including the United States, India, China, Australia, Japan, Middle East, and Europe.

Infosys engineering services unit provides engineering solutions to support clients across product lifecycle of their offerings from product ideation and creation to sustenance and end of life management. This practice features deep core and emerging engineering skills, and strong ecosystem partnerships along with manufacturing and supply chain expertise that ranges from embedded firmware to composite material design to enable clients to reduce time to concept to market, redesign products for new demands, and value-engineering for emerging markets. The company focuses on entire value chain improving the engineering (via Knowledge-Based Engineering Practice), manufacturing shop floor efficiency and service efficiency. Infosys has built “New” and “Renew” strategy within engineering

domain. Renew is for serving the legacy and retrofit market while New is for new and emerging opportunities like IoT, Software defined Networking (SDN), Additive Manufacturing, Artificial Intelligence Machine learning, and Platforms like IIP, IAP, IKP.

Infosys has come up with some encouraging concepts and products listed below.

- “Zero Distance” - This concept involves being continually in touch with outside reality by continuously sensing it.
- “Infosys Mana”, is a new product, designed to provide “artificial intelligence (AI) for the enterprise.
- AiKiDō is a concept for Next-Generation Services in Design Thinking, Platforms and Knowledge-Based IT. Ai stands for Platforms and Platform as a service, Ki for Knowledge-based management and evolution of landscapes and Do for Design Thinking and design-led initiatives.
- Infosys Information Platform (IIP) is an analytics platform that enables customers to quickly garner insights from varied data sources for accurate decisions across industries.

### **Partnerships and Acquisitions**

**Key Partnerships:** Global Alliance partners: Microsoft; Oracle; SAP & IBM. Alliance partners include: Adobe, Amazon, Apigee, HP, Hitachi, Huawei, Infomatica, NTT, Pegasystems, VMWare, Salesforce, Tibco, Tableau, ServiceNow, Splunk Teaming Partners include: EMC; MicroStrategy; Netezza; Red Hat; Software AG; SAS and JDA Software Group, Inc. Teaming Partners include: EMC; MicroStrategy; Netezza; Red Hat; Software AG; SAS and JDA Software Group, Inc. and Teradata.

For engineering services, Infosys has partnerships with key industry players such as Bosch, IBM, GE, and PTC for the IoT technologies. In addition to this, Infosys also has the partnerships with key consortiums in the industrial IoT space including Industrial Internet Consortium (IIIC).

Infosys have also partnered with University of Aachen on Industrie 4.0, Design School of Stanford University, Coventry University, IITs.

**Strategic Alliances:** Infosys announced partnership with one of the world’s leading automation companies Kuka. This cloud based partnership would jointly develop solutions to provide a software platform that will allow customers to collect, evaluate and utilize data for improving their own processes and support companies embracing Industrie 4.0.



Infosys along with Acatech, the German Academy of Science and Engineering, announced the formation of a consortium to create an Industry 4.0 maturity index which will enable companies to assess “Industrie 4.0” and understand machines and humans integration through the Industrial Internet.

**Key Acquisitions:** Panaya (March 2015); Skava (June 2015); Kallidus (June 2015); Noah Consulting (November 2015).

In addition Infosys has invested in 6 start-ups last year in areas such as air quality monitoring (Airviz), wearable technology (Whoop), data wrangling, and 3-D imaging using the US \$500 million start-up fund.

### **Strengths and Opportunities**

**Strengths:** Infosys focuses on developing standards for system engineering for simplifying single source of engineering truth. The unique knowledge-based engineering automation tools reduce design and development time through design thinking approach. Infosys has established a strong foothold in the IIoT segment. One another strength of Infosys Engineering Services is the domain knowledge acquired across industries by performing a whole variety of services under the umbrella of engineering services thus leveraging each of them and cross pollinating the learnings to provide clients with the best possible solutions and learnings to choose from and be more. With Infosys’ partnerships in new areas such as IoT, Additive Manufacturing etc. and partnerships with industry consortiums such as IIC and with academia such as Aachen University and Acatech; Infosys has a very good positioning of ecosystem integrator in the Engineering domain.

**Opportunities:** Increasing the IIoT footprint in the manufacturing segment.

### **Key Industries**

Aerospace & defense; automotive; electronics & electrical; electric power T&D; machinery manufacturing; oil & gas; telecommunications