

The Next Frontier in Global Sourcing

Engineering services is an exciting new offshore outsourcing opportunity, especially for India. The market is expected to grow ~40 percent over the next five years, based on demand patterns, but increasing resource constraints need to be addressed quickly through privately funded education and training programs

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Global sourcing for services remains a dynamic and fast evolving, area of strategic business activity. Over the last few years, the basic business model — offshore outsourcing of simple, stable and repetitive tasks, primarily designed to save cost of labor — has seen a transformation to where complex, intellectual capital intensive functions can be effectively outsourced. This, the third wave in the evolution of offshore outsourcing (after IT services and BPO), is broadly termed Knowledge Process Outsourcing (KPO).

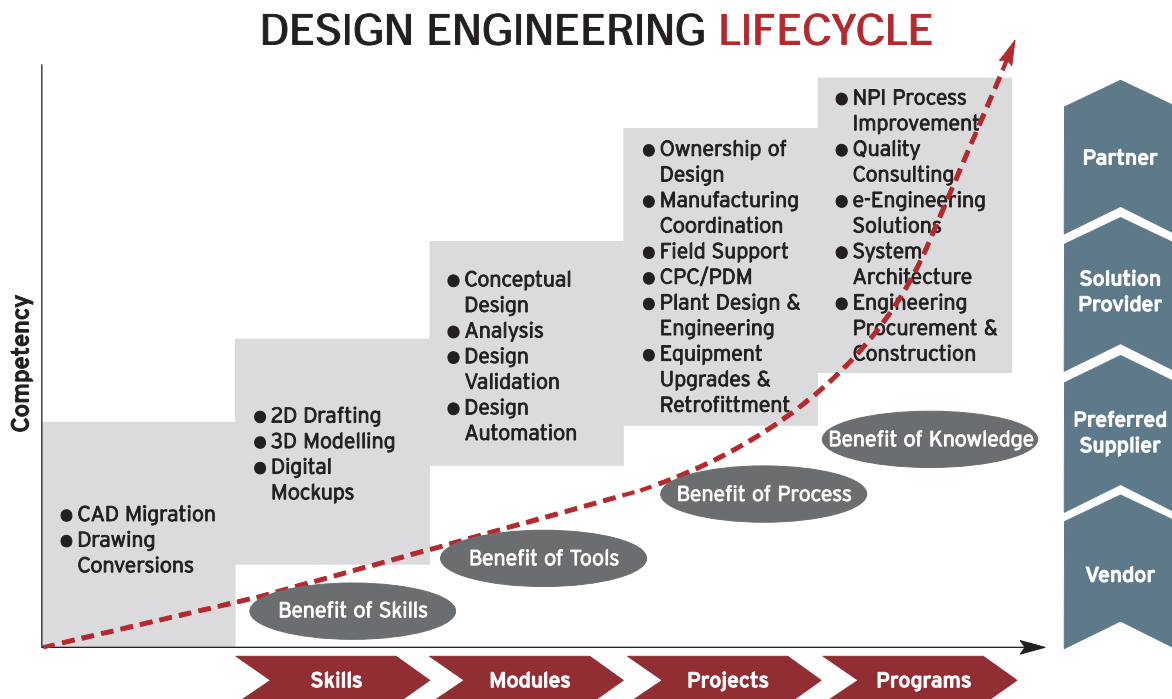
Within the KPO umbrella, a key area gaining attention and interest among Global 2,000 enterprises is ESO, where a significant part of the core IP development activities in industrial sector companies is outsourced to specialized offshore vendors with highly skilled resources.

ESO deals have moved fairly quickly from simple 2D and 3D drafting and architectural drawing services to high-value

analysis and design services, including CAD/Engineering and finite element analysis that test the structural soundness of manufactured components; Computational Fluid Dynamics that test properties of fluid flow through manufactured components; and Noise, Vibration and Harshness analysis (NVH), that analyze external noise in automotive design. The chart below shows the typical trajectory of a Design Engineering Lifecycle.

As it stands today, ESO broadly covers the following:

- Product Design Services — especially CAD and drafting, concept validation, finite element analysis, etc.
- Prototyping — manufacturing prototypes and testing involving advanced simulation
- Process Design — design and implementation of processes associated with product engineering, including core manufacturing processes



Source: TCS

- Product Testing — testing design, its execution and reporting
- Quality Control — QA checks and management of the QC processes
- Product Lifecycle Management (PLM) — design and implementation of PLM applications for information management across the product lifecycle
- Plant automation and enterprise asset management.

The Emerging Offshore Opportunity

Global spending on engineering services is currently estimated at \$800 billion per year. By 2020, this figure is expected to increase to over \$1 trillion. Of the \$800 billion spending, however, less than 2 percent is currently outsourced offshore. Considering the growing imbalance between the demand for engineering skills and the availability of skilled resources within industrialized nations, and the active transformation of businesses into globally organized manufacturing centers, we expect to see a high rate of transition to global sourcing for Engineering Services over the next five years. ESO is expected to grow at an average annualized rate of ~40 percent over this time period.

Domains that have already started leveraging offshore outsourcing include mechanical, electrical and construction engineering design, embedded systems and chip design, instrumentation and controls systems, manufacturing processes and tools design, industrial design, product lifecycle management (PLM) and software product engineering.

The demand for ESO comes primarily from the six key sectors, which are stated below:

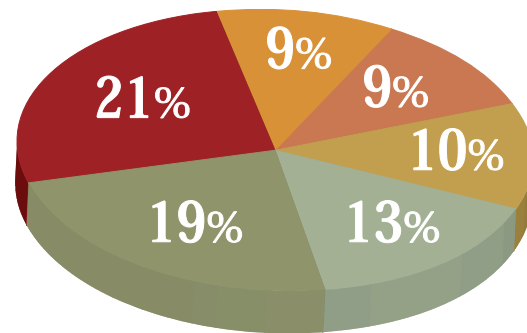
1. Hi-tech/Telecom (21%)
2. Automotive (19%)
3. Pharmaceuticals (13%)
4. Construction/Industrial Products (10%)
5. Aerospace (9%)
6. Consumer Electronics (9%)

These sectors together account for 81 percent of the ESO spend, with the remaining 19 percent coming from a wide range of other specialized verticals.

Drivers for ESO

On the demand-side, there are several key factors driving offshore engineering services, though the primary driver remains the ability of enterprises to access highly skilled, but less expensive resources. For example, India and China both have a very large pool of engineering graduates (India graduates over 4 million engineering and equivalent majors each year) available to support the product design, process design, prototyping, testing, QC and reporting functions. In addition, with many industrialized nations across North America and Western Europe leveraging offshore manufacturing capabilities to bring down production costs, the deep knowledge of manufacturing processes accompanying that experience in contract manufacturing provides the export-

SECTOR-WISE BREAKUP



- Aerospace
- Consumer Electronics
- Construction/Industrial Products
- Pharmaceuticals
- Automotive
- Hi-tech/Telecom

BUSINESS METRICS FOR ESO MODEL

Metrics	ESO
Margins(EBIT)	Overall margins in ESO range between 30 to 40 percent
Utilization	65 to 80 percent
Attrition	10 to 15 percent
Salaries	Entry level salaries in ESO range between \$6000 to \$11000 per annum in India. Selected domains within Hi-tech, Automotive can be 40 to 50 percent higher.
Technology Cost	Typical technology cost in ESO are similar to other BPO businesses – 25 to 30 percent of total cost, with high-configuration hardware and high license cost of tools balanced by lower telecommunications and connectivity costs.

Source: BNI

ing countries with the ability, now, to offer services in upstream areas thereby further reducing the total cost of the production process.

The skills, knowledge and capabilities can be leveraged to lower cost (estimated at ~30 percent), reduce time to market (reductions of ~15 to 20 percent in product development cycles), acquire intellectual capital, gain access to markets in geographies where work is outsourced, and build flexibility

SERVICE PROVIDERS IN VARIED LANDSCAPES

Company	TCS (Offshore IT provider with ESO capability)	Infotech (Offshore pure-play ESO provider)
Locations	Bangalore for Engineering Services	Hyderabad, Mumbai, Delhi, Bangalore
Employees	4,500 +	5,500
Verticals	Aerospace, Automotive, Manufacturing, Hi Tech, Consumer Electronics, Health Care, Mining/Metals, Chemicals, Oil and Gas, Power	Aerospace, Rail, Marine, Automotive, Oil and Gas, Energy, Telecommunications, Government, Other Utilities, Retail, Banking Services, Finance and Insurance
Key information	Partners – Flowmaster (world's leading supplier of 1D fluid simulation systems), Apriso Corporation (A provider of adaptive operations execution solutions for manufacturing)Key Customers include Airbus, Boeing, Pratt & Whitney, GE Aircraft Engines, TRW Automotive, Tata Motors, Nissan, Ferrari, GE Power Systems, MAN B&W, FMC, Caterpillar, John Deere, GE Oil & Gas, Ingersoll Rand	Partners – IBM, HAL, UTC Geospatial analysis contributes to 40% of the company's revenue Key customers include Pratt & Whitney, Tele Atlas North America, Bombardier Transportation

Company	ABB (Captive arm of MNC)	Cadence Design Systems (Foreign pure-play setting offshore ESO operation)
Locations	Bangalore (R&D, Robotics and Plant Automation)	China, Europe, India, Israel, Japan, Korea, North America, Taiwan
Employees	4,000 in India	5,200
Verticals	Automotive, Plant Automation, Oil & Gas, Life Sciences, Energy	Hi-tech
Key Information	Global leader in Power and Automation ESO areas include Compliance and Validation Services, Engineering Design Services, Process Optimization, Project Management, Safety Management, Reliability and Plant Performance Improvement	Program Partners – Chartered Semiconductor Manufacturing, IBM, Jazz Semiconductor, Fujitsu, Tower Semiconductor, FAB, Z Foundry ESO areas include Logic design, Advanced verification, Digital implementation, Custom design, PCB design, Advanced packaging/SiP

Source: BNI

into resourcing of the production process.

On the supply-side, the focus on engineering services is being driven by better business metrics than the other traditional outsourcing services. Given below are the typical business metrics for an ESO model:

Service Provider Landscape for ESO

In 2007, Black Book of Outsourcing surveyed over 130 ESO suppliers globally from 17 countries. The top 20 service providers in the field of ESO, identified by the survey, were: EASi, Eicher, Entegee, eServ Perot, Geometric, HCL Technologies, Hero Global Design, Hoyt Engineering, Infosys, Mahindra Engineering, NeilSoft, Onward Tech, Patni, Plexion, QuEST, Ranal, Rolta, Satyam, Tata Group and Wipro.

India and China were considered the two most important offshore ESO countries. However, given the shortage of the 'employable' resources, and the significant demand gen-

erated by the growing domestic economies, and other geographical regions, especially Eastern Europe and Latin America, are also likely to become highly competitive regions for ESO.

Companies providing ESO can be sub-divided into the following categories:

- Offshore IT service providers that are adding an ESO capability
- Pure-play offshore service providers with a primary focus on ESO
- Offshore Captive units of Multinational companies
- Foreign pure-play ESO service providers setting up delivery facility in offshore locations. (See the above *table*.)

Inhibitors to ESO

From the buyer's perspective, investment in ESO is inhibited by the relative immaturity in managing the collabora-

tive process across the multiple interfaces, and a deep concern for the loss of core Intellectual Property (IP) through lax security and IP protection standards among providers (See the *chart* below).

However, in our judgment, one of the primary inhibitors to the offshore engineering services industry is the supply issue — a significant dearth of qualified engineering resources available to support the business model. The ITO and BPO industries have been facing resource issues for several years, where rising salaries and increased attrition is challenging vendors in their ability to match customer expectations of quality and productivity. According to HR executives of IT service and BPO companies in India, only a quarter of the available pool of resources are employable.

These challenges are only exacerbated in the engineering services space, where the growth of economies like India and China, each of which is growing by double digits, is adding to the demand for strong engineering skills, leading to a severe resource constraint, especially in the industrial and construction engineering industries.

Risks in ESO

Though companies have been quick to spot the opportunity and are beginning to embrace ESO, there are a few key risks that need to be managed effectively:

- Highly collaborative processes mean that the challenges in developing and managing virtual global teams is even greater than in ITO and BPO operations
- Large number of deliverables, compliance requirements add to the complexity
- Highly iterative and 'what if' oriented optimization makes standardizing processes and measuring productivity more difficult
- Very high domain knowledge requirement lowers the 'employability' and 'trainability' thresholds for vendors, making recruitment even more challenging
- High degree of knowledge transfer from client is essential. This implies greater transition times, higher transition costs, and longer lead time to savings
- Customer's cost of exit is high, requiring a high level of commitment from the buyer.

As a result, careful planning, provider selection, transition management, and most importantly commitment from executive leadership is critical to the success of a strategic ESO initiative.

Conclusion

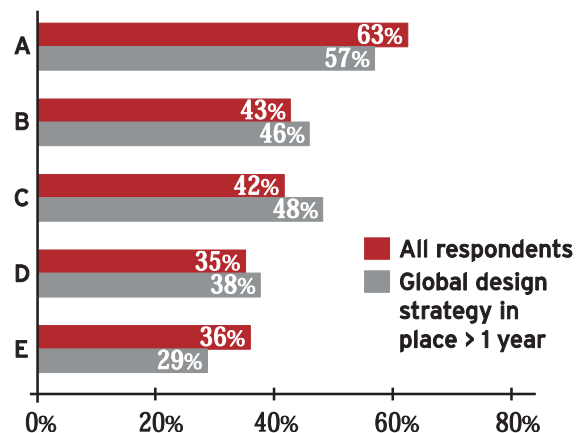
ESO provides a great opportunity to the organizations to develop strategies that significantly reduce the time to develop and market new products at a lower cost. In the current economic environment, this will definitely provide organizations with a new

competitive edge. For this reason, the offshore ESO opportunity looks interesting and, we believe, is likely to grow very quickly over the span of next five years.

But, while the opportunity to reduce time and cost is enticing, and from the supplier's perspective the business metrics look good, buyers should enter a relationship with an abundance of caution, understanding that outsourcing core business processes will require significant investment by the buyers, and with the realization that while the overall numbers for the global resource pool appear high, recruiting a strong, skilled team will be hard, in an environment where competition for talent is perhaps even greater than the competition for customers. **GS**

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BUSINESS METRICS FOR ESO MODEL



- A: Protecting intellectual property
- B: Synchronizing distributed designs
- C: Managing changes across dispersed teams
- D: Collaboration partners with limited infrastructure
- E: Retaining company knowledge

Source: BNI

