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HCL ENGINEERING R&D SERVICES: FIRST FLIGHT INTO THE FUTURE[[1]](#endnote-1)

Rahul Kumar Sett wrote this case solely to provide material for class discussion. The author does not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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G. H. Rao, president of the Engineering and Research and Development Services (ERS) division and senior corporate vice president at HCL Technologies Ltd. (HCL), had every reason to be proud as he congratulated The Boeing Company (Boeing) on the maiden flight of its 787 Dreamliner jet airliner (Dreamliner) on December 15, 2009. Out of the many companies working on the 787 Dreamliner project, HCL was the only Indian information technology (IT) services firm to be selected for the project.[[2]](#endnote-2) As part of the project, HCL worked closely with Boeing and some of Boeing’s tier-one suppliers in developing various onboard mission-critical software systems, such as the electrical power generation and distribution system and the pilot controls.[[3]](#endnote-3) The multi-million dollar deal between HCL and Boeing, valued at approximately US$110 million,[[4]](#endnote-4) marked a significant point in HCL’s corporate history in that it had important implications for HCL and its future in the $644.3 billion aerospace and defence (A&D) industry.[[5]](#endnote-5)

After 4 million hours of engineering services that culminated in the successful fulfillment of the requirements of the Dreamliner project,[[6]](#endnote-6) the time was ripe for Rao to make a crucial strategic choice. HCL ERS could choose to continue to excel in offering great value to its customers by helping them optimize costs and improve delivery time, or it could move up the value chain by investing more in research and development (R&D) capabilities, thereby emerging as a leader rather than a follower in the highly complex and technology-driven A&D industry.

BACKGROUND AND COMPANY PROFILE

HCL was a large Indian multi-national IT services and product engineering solutions provider, headquartered in Noida, India. The firm was a subsidiary of the $5 billion HCL Enterprise, with $2.3 billion in consolidated revenues as of September 30, 2009 (trailing 12 months; see Exhibit 1). Though HCL was primarily an engineering services outsourcing company, it positioned itself as a technology enabler and brought the end-customer’s experience to the forefront of its business. In 2009, HCL employed 54,443 individuals and offered an integrated portfolio of services comprising software-led IT solutions, remote infrastructure management, engineering and R&D services, and business process outsourcing, across five industry verticals: manufacturing, financial services, health care, public services, and consumer services.[[7]](#endnote-7) The firm earned almost 21 per cent of its revenues from engineering and R&D services.[[8]](#endnote-8) HCL was successful in establishing its reputation as a trusted partner that could manage important research and development projects. When Boeing chose HCL to participate in the Dreamliner project, this choice not only reinforced HCL’s reputation for reliability but also increased credibility about its overall competence.

In line with the entrepreneurial spirit that HCL strived to inculcate among its employees, the company referred to its engineers as “ideapreneurs.” Over the years, HCL was able to develop and establish an ecosystem and a corporate culture that allowed these employees to freely ideate and innovate. On average, HCL’s employees were older than those of competitors like Infosys Limited, due to HCL’s policy of hiring mostly experienced engineers versus fresh engineering school graduates. Analysts estimated that almost 65 per cent of HCL’s total workforce consisted of experienced professionals. Employees received an average salary that was approximately 20 per cent higher than that offered by competitors.[[9]](#endnote-9)

HCL’s global workforce mostly comprised Indian nationals, but the company expected to change this in the future by hiring more American citizens in order to allay fears of job migration and job loss among a section of the American public. In this regard, HCL demonstrated its commitment to the plan by opening a development and service centre in Raleigh, North Carolina in 2008. The company planned to staff its Raleigh centre mainly with fresh graduates from American engineering schools. However, by the end of 2009, HCL still had not fully staffed the centre. Meanwhile HCL continued to deliver its services to its customers through a network of offices in 26 countries across the world, with a strong presence in the United States, Western Europe, and Asia.[[10]](#endnote-10)

ENGINEERING AND R&D SERVICES DIVISION

The ERS division formed the core of R&D at HCL. The division offered engineering and research and development services to its customers and remained unfailingly focused on the end-consumer’s product or service experience. Typical projects included complete reengineering of complex legacy flight test systems, reducing costs for tier-one automotive component suppliers, creating and maintaining customer-facing software platforms for customers across a wide range of high-tech industries and reducing the time to market for various industrial product manufacturers, thereby enabling these original equipment manufacturers (OEMs) to deliver a superior end-customer experience. The ERS division endeavoured to deliver this experience through a mix of three ingredients: faster delivery (acceleration), superior value creation (by striking the right balance between costs and benefits), and access to advanced technology based on research and development.[[11]](#endnote-11)

HCL ERS served 10 industry verticals, including aerospace, and offered six horizontal engineering solutions across these verticals (see Exhibit 2). In 2008, HCL earned $1.9 billion from services. Out of this figure, almost 25.2 per cent was earned by HCL ERS. The greatest share of revenues came from the telecommunications and networking sector (38 per cent), followed by the A&D sector (20 per cent). Medical equipment accounted for 12 per cent of revenue; computing hardware and software, storage, and office automation accounted for 10 per cent; consumer electronics accounted for 7 per cent; automotive accounted for 5 per cent; and the remaining 8 per cent of revenue was earned from other sectors. HCL’s annual investment in R&D—including infrastructure, product development, and intellectual property—had remained at $15 million since 2007.[[12]](#endnote-12)

“Engineering Out of the Box”

Senior executives at HCL, including Rao, acknowledged the need for HCL to move up the value chain while creating greater value for end-consumers, their partners, and themselves.[[13]](#endnote-13) With this goal in mind, HCL ERS initiated its “engineering out of the box” (EOOTB) philosophy and method of service delivery in 2009. EOOTB involved looking at products and services as enablers, or as means to an end, as opposed to ends in themselves. EOOTB encompassed a collection of offerings, termed “productized solutions,” that were almost ready to be deployed. These solutions were subsequently customized to form a completely finished end product depending on specific customer requirements.[[14]](#endnote-14) Productized solutions were designed for efficiency as well as customizability.

Apart from assisting HCL customers in reducing their time to market, EOOTB provided a platform for creating meaningful differentiation.[[15]](#endnote-15) This philosophy of value creation and delivery was ultimately driven by the increasing complexity and sophistication of the end-consumer’s needs. At times, technological innovations opened up the possibility of creating and delivering value in ways that had been previously unimaginable. For instance, advancements in telematics made it possible for next-generation automobiles to communicate directly with consumers’ kitchen appliances, allowing customers to heat dinner during their drive home from work.

Further, as core products became increasingly commoditized and the technology matured, an ecosystem perspective of products allowed firms to create value by looking at how individual products functioned in conjunction with other products or services, over and above their standalone functionalities. Consequently, how consumers used products in combination, or the overall end-consumer experience, started to emerge as the most important factor in value creation. With EOOTB as its guiding principle, HCL considered the end-customer as part of a larger ecosystem that included various products and services, wherein the overall customer experience became central to designing solutions. Though the possibilities were immense, the key question remained whether HCL was ready for the challenge.

BOEING AND THE DREAMLINER PROJECT

The Boeing 787 Dreamliner reflected a paradigm shift in the way Boeing manufactured aircrafts. Deviating significantly from its traditional approach of developing most of the components and subassemblies, Boeing outsourced almost 70 per cent of its aircraft production across 50 tier-one suppliers.[[16]](#endnote-16) These primary suppliers were, in turn, expected to integrate subsystems and subassemblies manufactured by tier-two and tier-three suppliers. Boeing restructured its role as the primary systems integrator. This arrangement resulted in aircraft components being sourced from more than 100 suppliers spread across 12 countries.[[17]](#endnote-17) The extent of outsourcing was not only unprecedented in the history of Boeing but also unheard of in the entire civil aviation industry. While Boeing claimed to have purchased 65 per cent of the Dreamliner’s airframe from outside suppliers, Boeing’s major competitor, Airbus SAS, remained conservative, purchasing only 52 per cent of the airframe from outside vendors.[[18]](#endnote-18) Reductions in production costs and delivery times were the most important factors that motivated outsourcing at Boeing. Other factors included expanding its global footprint in manufacturing and mitigating financial risk by tying supplier payments to aircraft sales.

While leveraging a global supply chain and offshoring engineering services had its benefits, it posed significant challenges, especially for projects involving multi-tier suppliers. With multiple layers of contracting, it was easy for OEMs like Boeing to lose visibility of the supply chain, resulting in unprecedented delays, cost overruns, and quality problems. Though it was hailed as a revolutionary approach towards aircraft manufacturing, the Dreamliner project cost Boeing $32 billion*—*a figure that was grossly over the initially planned budget of $6 billion. Moreover, the first test flight took off two years behind schedule, following six delay announcements.[[19]](#endnote-19)

The production process aside, the Dreamliner itself reflected major changes in its design and use of materials. For instance, aluminum, the material typically used to construct parts of the fuselage (skin and airframe) was replaced by much lighter and stronger composites, which not only reduced structure fatigue and, consequently, maintenance cost, but also fuel consumption. Another key way Boeing reduced the Dreamliner’s fuel consumption was by replacing the mechanical systems on board the Dreamliner with electrical and electronic systems; this made the aircraft lighter by almost 907 kilograms (2,000 pounds).[[20]](#endnote-20) Boeing’s ultimate goal was to reduce the fuel consumption of the Dreamliner by as much as 20 per cent versus other aircrafts in the same category. This reduction was significant, given the higher cruising speed that the Dreamliner was capable of flying at (Mach 0.85 and a top speed of Mach 0.98)[[21]](#endnote-21) compared to other similar aircrafts.[[22]](#endnote-22) These speeds were close not only to those of the Dreamliner’s predecessor, the Boeing 767, and the directly comparable Airbus A300, but also to those of larger aircrafts. Further, the new design improved passenger comfort by allowing better climate control and lowering cabin noise. The lighter weight also increased the operating range of the Dreamliner, thereby reducing layovers and improving passenger convenience. The Dreamliner had a range of approximately 15,279 kilometres.[[23]](#endnote-23)

Boeing was already thinking beyond the Dreamliner’s dimmable windows and its starry ceilings in terms of improving passengers’ flying experience. Both Boeing and Airbus were experimenting and developing ideas involving radical shifts in structural design, aircraft navigation and control, and avionics—all with the ultimate aims of improving operational efficiency, augmenting the flying experience, and increasing passenger safety. One of these concepts, for example, included windowless fuselages with liquid-crystal display panels, replacing the traditional smaller aircraft windows in order to present passengers with an interactive augmented reality experience.[[24]](#endnote-24) Boeing and Airbus were well on their way toward patenting some of these innovations.

HCL, ROCKWELL COLLINS, INC., AND BOEING

HCL was introduced to Boeing by Rockwell Collins, Inc. (Rockwell), an American corporation based out of Cedar Rapids, Iowa. Rockwell, which was a supplier of avionics and communications systems to the A&D sector, was a tier-one supplier to Boeing, and had approximately $4.4 billion in turnover in 2009.[[25]](#endnote-25) Rockwell specialized in flight deck avionics, cabin electronics, mission communications, simulation and training, and information management.[[26]](#endnote-26) HCL’s association with Rockwell had begun in 2000, with a much smaller verification and validation project not specific to avionics. Since this partnership, HCL’s relationship with Rockwell had evolved, and the two companies partnered in executing more complex and higher-valued projects. In 2007, HCL and Rockwell set up two offshore design, development, and verification centres in the Indian cities of Bangalore and Chennai—one in each city—with the aim of developing high-value software and hardware design and verification services for the aerospace industry. The centres employed a dedicated team of HCL engineers who worked closely with their Rockwell counterparts.

Rockwell served as the systems integrator for the Dreamliner’s flight deck displays, crew-alerting system, and the more critical pilot controls, communication and surveillance systems, and common data network for the common core system. The integrated surveillance system, which included critical functions like hazard detection, traffic alerts, collision avoidance, Mode S surveillance, and terrain avoidance and warning competencies, was certified for the first time by the Federal Aviation Administration (FAA), the U.S. regulator, and its European counterpart, the European Aviation Safety Agency.[[27]](#endnote-27) A company spokesperson from Rockwell highlighted the importance of the company’s association with Boeing as part of the Dreamliner project; she emphasized that the project was considered to be a landmark, given that none of Rockwell’s customers had previously entrusted the company with a project of such scale and scope.[[28]](#endnote-28) The project was commissioned in 2004, and valued at $3.5 billion over its lifetime.[[29]](#endnote-29)

Rockwell subcontracted a part of the project involving verification, design, and development to HCL following Boeing’s approval in 2004. Specifically, HCL was entrusted with developing the cabin software for the Dreamliner. This association with Rockwell represented HCL’s first aerospace engagement, a fact that underscored the strategic importance of the project. Rockwell’s decision to subcontract was primarily driven by cost considerations. Other strategic and operational concerns involved access to good engineering talent, and Rockwell’s motivation to expand its global footprint. Apart from HCL, Rockwell partnered with firms like the Aeronautical Computing Technique Research Institute from Xi’an, China, and the China Aeronautical Radio Electronics Research Institute Company in Shanghai.[[30]](#endnote-30)Rockwell outsourced project components mainly to India and China. Rockwell’s principal engineering manager for Commercial Systems Engineering (Design Support), Roger French, explained:

Our overall strategy is to increase our customer value. For instance, our systems engineering and development skills are highly valued by our customers, but there are other things that we don’t necessarily have to do in-house, and those are the things we’re asking our subcontractors to assist us with.[[31]](#endnote-31)

Similarly, the vice president of Commercial Systems Engineering at Rockwell, Steve Nieuwsma, also emphasized the benefits of outsourcing:

We save about 50 cents on the dollar when we ship something offshore and have it done in India. Last year, we saved $17 million and we put that back into our organization, which enabled us to chase new programs. Doing so ultimately leads to increased sales and revenues. It’s really a self-feeding economic engine for us.[[32]](#endnote-32)

In 2008, Rockwell awarded its version of top performing supplier award to HCL in recognition of the services HCL had provided as part of the Dreamliner project. Moreover, in February 2009, HCL was awarded the gold standard (the highest level) Boeing “Performance Excellence” award for exceptional services rendered to Boeing for the Dreamliner project. HCL was the only company to receive this award from among the 86 suppliers that were recognized by Boeing.[[33]](#endnote-33) HCL achieved this standard by maintaining a gold-level performance composite rating for each 12-month performance monitoring and measurement period, starting from October 1, 2007.[[34]](#endnote-34) Ultimately, HCL went on to become the first Indian company to acquire the stringent, industry-specific AS9100 quality standard certification, awarded by the U.S.-based standards-developing organization, SAE International.[[35]](#endnote-35)

HCL, HAMILTON SUNDSTRAND, AND BOEING

Apart from Rockwell, HCL had close ties with Hamilton Sundstrand (Hamilton), a subsidiary of United Technologies Corporation (UTC), with headquarters in Windsor Locks, Connecticut. [[36]](#endnote-36) HCL had collaborated with Hamilton since 2002. Hamilton was a major contractor to the commercial aviation industry, as well as the defence and space sectors. The firm supplied electrical power generation and distribution systems, engine accessories and control systems, flight control systems and pilot controls, and auxiliary power units (among other important systems) to OEMs like Boeing and Airbus. Further, Hamilton had a history of successful engagements with the National Aeronautics and Space Administration (NASA) spanning the preceding five decades. In 2005, HCL strengthened its relationship with Hamilton by establishing a dedicated design centre in Bangalore, India, with the aim of supporting Hamilton in its civil aviation projects by providing high-quality product engineering services.[[37]](#endnote-37) The leadership of both the companies duly acknowledged this development, and the news was carried in most of the major national newspapers in India. In 2009, Hamilton had a total turnover of $6.5 billion,[[38]](#endnote-38) while UTC’s was $52.9 billion.[[39]](#endnote-39) Hamilton employed a total of 16,469 individuals, and earned an operating profit of $857 million in 2009.[[40]](#endnote-40)

As a tier-one supplier, Hamilton supplied nine major systems—including the crucial onboard electrical system (ES)—to Boeing as part of the Dreamliner project. Hamilton subcontracted a part of the software development work pertaining to the ES to HCL. The main functionality of the ES involved distributing power to all other systems and components running on electricity onboard the Dreamliner. The ES was a vital component for the Dreamliner, given that the Dreamliner represented a major change in aeronautical design, wherein the legacy pneumatic systems that were powered by compressed air from the aircraft’s jet engines (also known as “bleed air” in aerospace parlance) were replaced by electrical systems, guided by the overarching objectives of reducing fuel consumption and increasing operational efficiency. This no-bleed ES architecture resulted in almost 3 per cent savings in fuel consumption, efficient power distribution, significant reduction in maintenance costs, improved system reliability, and thus, greater operational efficacy and passenger safety.[[41]](#endnote-41) Due to its importance, the ES was designated as a “Level A” system, a system mandated for stringent testing before certification by the FAA.

However, in 2008, problems with the ES were reported: the FAA refused to certify the ES and instructed Hamilton to rewrite the software code relating to it. HCL’s role in developing the ES was also unfavourably highlighted in this context.[[42]](#endnote-42) Nevertheless, Boeing refuted claims of any such major issues with the Dreamliner’s ES at that time. Later in 2008, at Boeing’s Everett facilities, Hamilton announced the successful start-up of its APS 5000, the auxiliary power unit system (a major component of the ES), onboard the Boeing ZA001, a prototype of the Boeing 787 Dreamliner.[[43]](#endnote-43)

BUILDING TRUST AMONG PARTNERS AND MITIGATING RISK AT HCL

Trust constituted the essential basis of long-term partnerships, especially in the A&D industry, given the complexity, scale and scope, and duration of projects typical of the industry. As compared to its closest competitors (e.g., Infosys, Tata Consultancy Services (TCS), and Wipro), HCL laid greater emphasis on forging deep, long-term relationships with its partners; the company did this by looking beyond individual projects and consistently participating in larger projects that provided the scope for establishing long-term engagements. Though this practice carried greater risk, it also increased the chances for securing repeat business. Investments in building trust remained a continuous endeavour for vendors like HCL, given the inherent apprehension among tier-one suppliers about outsourcing larger and more complex work to their outsourcing partners. The suppliers’ concerns were mainly driven by quality concerns and the increased difficulty in monitoring outsourced projects. In order to alleviate these particular concerns, HCL came up with a pricing and joint investment model: the Global Risk and Reward Partnership model (GRRP).[[44]](#endnote-44) As part of this initiative, HCL agreed to share the financial risk associated with a given project by developing solutions on its balance sheet without having its customers pay anything upfront.[[45]](#endnote-45) Further, HCL agreed to link its rewards to the final sales of products and services, thereby sharing the demand-side risk with its customers as well.

For OEMs, GRRP presented additional benefits over and above risk mitigation and confidence building*—*the model enabled them to substantially reduce, or even avoid, the fixed and sunk costs associated with design and development. Avoiding these costs, in turn, allowed the OEMs to allocate their financial and managerial resources towards strengthening their core competencies. At the same time, deciding what part of the development effort to outsource was not a trivial decision for the OEMs; such decisions were often a matter of extensive deliberations, requiring foresight and a deep understanding of the OEM’s specific business. In such circumstances, protection of intellectual property became a major concern for these companies. Unless otherwise stated, the clients owned the intellectual property pertaining to any project thus commissioned; the vendors were bound by tight non-disclosure agreements.[[46]](#endnote-46) HCL was not an exception in this regard.

THE GLOBAL ENGINEERING SERVICES OUTSOURCING INDUSTRY

The global engineering services outsourcing (ESO) industry was valued at approximately $1.8 billion in 2009 and was expected to grow to about $50 billion by 2020. Global engineering R&D spending grew from $980 billion in 2008 to $1.1 trillion in 2009, and was expected to reach approximately $1.4 trillion by 2020.[[47]](#endnote-47)

There was a steady change in the portfolio of services and processes being outsourced: while in 2006, simpler and standardized services constituted almost 70 per cent of the portfolio of business for companies like HCL, the share of such services dropped to 50 per cent in 2009. This share was expected to drop even further to 40 per cent by 2020.[[48]](#endnote-48) Specifically, the commercial aviation industry witnessed a slow but steady value migration from OEMs like Boeing and Airbus to their suppliers (see Exhibit 3).

In 2009, HCL was second only to Wipro, but ahead of TCS and Infosys, in terms of revenues. In the last quarter of 2009, HCL ERS had a turnover of approximately $121 million, while Wipro achieved revenue of $163 million from its ESO business; during the same period, the corresponding figures for TCS and Infosys were $76 million and $25 million, respectively. Wipro and HCL dominated the ESO market with 72 per cent market share between them (Wipro: 42 per cent; HCL: 30 per cent); TCS and Infosys retained a market share of 20 per cent and 8 per cent, respectively. While the ESO market grew by a compound annual growth rate of 10.7 per cent from 2007 to 2009, HCL ERS grew by approximately 14 per cent year-over-year since 2007.[[49]](#endnote-49) Though affected by the 2008 financial crisis, the global ESO industry was expected to revive in the near future according to NASSCOM, the trade association representing the Indian IT and business process outsourcing industries.[[50]](#endnote-50)

THE GLOBAL COMMERCIAL AVIATION INDUSTRY

The Boeing 787 Dreamliner was the fastest-selling aircraft in the history of civil aviation.[[51]](#endnote-51) With a list price of $162 million per aircraft, and the number of orders on book at 671 aircrafts, Boeing had almost $109 billion worth of business in the pipeline in 2009.[[52]](#endnote-52) However, sluggish market conditions in 2008 and 2009 saw net orders of aircraft dipping sharply from the pre-crisis level due to cancellations or deferrals (see Exhibits 4A and 4B). In addition, the economic crisis resulted in a dramatic decline in industry profitability and put increased pressure on manufacturers as well as airliners to optimize costs and focus on higher-growth emerging markets (see Exhibit 5). The industry also witnessed concomitant decline in air travel during the same period though the long-term projections were positive (see Exhibit 5). Production of aircraft was relatively unaffected, given the characteristically long lead times in this industry (see Exhibit 4A). Overall, analysts remained positive about a quick recovery, given the industry’s historical resilience against economic crises.[[53]](#endnote-53)

Further, labour cost as a percentage of the total operating cost of an aircraft continued to decline, and fuel costs as a percentage of the same continued to increase (see Exhibit 6). At the 2008 average price level of crude oil in the international market, fuel expenses represented almost 34.2 per cent of the total operating cost of a passenger airline. In comparison, labour costs represented 21.5 per cent of the same.[[54]](#endnote-54) On the one hand, industry profitability was highly sensitive to fuel costs, and airlines tried to actively hedge against the risk of fluctuating international crude prices (see Exhibit 7). After the terrorist attacks in the United States on September 11, 2001, crude price volatility increased manifold due to subsequent geopolitical developments.[[55]](#endnote-55) On the other hand, climate change activism, spearheaded by notable personalities like Al Gore, continued to put significant pressure on airliners and manufacturers to reduce their carbon footprints. Partly because of this environmental pressure, aircraft manufacturers began to gravitate towards cleaner and efficient propulsion technologies, as well as electrification of flight control systems and actuators.

Overall R&D spending by major A&D contractors was expected to rise, despite a decline of 3.7 per cent in 2009.[[56]](#endnote-56) This decrement was supplemented by a sharp increase in investments in manufacturing in 2009 (see Exhibit 8). Boeing continued to make technological advancements with the Dreamliner and other next-generation aircraft as part of its ambitious “Yellowstone” project, which was aimed at replacing all Boeing commercial aircraft with technologically advanced, fuel-efficient next-generation ones over time.[[57]](#endnote-57) Public investment in R&D played a crucial role in achieving technological advancement and leadership in this industry. While the Government of India planned to invest heavily in upgrading and developing infrastructure pertaining to the A&D sector, public spending in R&D in science and technology continued to dwindle below 1 per cent of the national gross domestic product.[[58]](#endnote-58) Naturally, this was a matter of concern for both scientists as well as industry veterans like Rao.

FIRST FLIGHT INTO THE FUTURE

In the technology-intensive engineering R&D services industry, change represented both opportunity and risk, and there remained a high premium on preparedness and quick response. Rao and his ERS division had been tasked with navigating HCL through some difficult and important decisions. Was HCL prepared for what lay ahead? Following the Dreamliner project, what should HCL ERS’s next steps be? What implications could these steps have for the long-term profitability of the firm? More specifically, should HCL continue to improve upon its existing capabilities, or should it venture into building stronger R&D capabilities? The answers to these questions could determine the company’s future.

EXHIBIT 1: HCL TECHNOLOGIES LTD. FINANCIAL STATEMENTS

HCL Technologies Ltd. and Subsidiaries Consolidated Balance Sheets, June 30, 2008 and 2009 (in US$ '000)

|  |  |  |
| --- | --- | --- |
| **ASSETS** | **2008** | **2009** |
| **Current Assets** |  |  |
| Cash and Cash Equivalents | 108,154 | 87,741 |
| Short-Term Deposits with Banks | 125,505 | 303,949 |
| Account Receivables, Net of Allowances | 364,303 | 449,746 |
| Unbilled Revenue | 72,994 | 113,620 |
| Investment Securities, Available for Sale | 335,564 | 4,841 |
| Due from Related Parties | 2,815 | 2,039 |
| Inventories | 17,668 | 36,156 |
| Employee Receivables | 13,958 | 8,210 |
| Deferred Income Taxes | 13,384 | 44,049 |
| Other Current Assets | 60,732 | 134,944 |
| **Total Current Assets** | **1,115,077** | **1,185,295** |
| Employee Receivables | 304 | 292 |
| Deferred Income Taxes | 70,027 | 79,635 |
| Investment Securities, Held to Maturity | 2,788 | 4,175 |
| Investments in Affiliates | 2,354 | 3,520 |
| Property and Equipment, Net | 309,453 | 331,145 |
| Intangible Assets, Net | 8,472 | 125,043 |
| Goodwill | 214,246 | 821,191 |
| Other Assets | 47,323 | 99,788 |
| **Total Assets** | **1,770,044** | **2,650,084** |

|  |  |  |
| --- | --- | --- |
| **LIABILITIES** | **2008** | **2009** |
| **Current Liabilities** |  |  |
| Current Portion of Capital Lease Obligations | 2,393 | 3,135 |
| Accounts Payable | 43,607 | 96,710 |
| Due to Related Parties | 1,446 | 2,120 |
| Short-Term Loans | 4,962 | 610,642 |
| Accrued Employee Costs | 63,953 | 106,307 |
| Deferred Revenue | 45,074 | 88,453 |
| Deferred Income Taxes | 1,255 | 10,649 |
| Income Tax Payable | 31,463 | 48,097 |
| Other Current Liabilities | 222,318 | 326,672 |
| **Total Current Liabilities** | **416,471** | **1,292,785** |
| Long-Term Debt | 1,390 | 10,885 |
| Capital Lease Obligations, Excluding Current Portion | 4,040 | 5,029 |
| Deferred Income Taxes | 3,272 | 34,518 |
| Other Liabilities | 131,138 | 119,829 |
| **Total Liabilities** | **556,311** | **1,463,046** |
| Minority Interest | 1,313 | 343 |
| Total Stockholders' Equity | 1,212,420 | 1,186,695 |
| **Total Liabilities, Minority Interest, and Stockholders’ Equity** | **1,770,044** | **2,650,084** |

Exhibit 1 (continued)

HCL Technologies Ltd. and Subsidiaries Statements of Income Years Ended June 30, 2008, and 2009 (in $'000)

|  |  |  |
| --- | --- | --- |
|  | **2008** | **2009** |
| **Revenues** | 1,860,873 | 2,179,540 |
| Cost Expenses and Other Income |  |  |
| Cost of Revenues | 1,163,144 | 13,53,762 |
| Selling, General, and Administrative Expenses | 323,573 | 367,225 |
| Depreciation and Amortization | 74,612 | 92,245 |
| **Income from Operations** | 299,544 | 366,308 |
| Other (Income) Expenses, Net | 11,331 | 66,172 |
| **Income Before Income Taxes, Share of Equity in Earnings of Affiliates and Minority Interest** | **288,213** | **300,136** |
| Income Taxes | 29,453 | 51,848 |
| **Income Before Share of Equity in Earnings of Affiliates and Minority Interest** | **258,760** | **248,288** |
| Equity in (Losses) Earnings of Affiliates | 130 | 506 |
| Minority Interest | −647 | 36 |
| **Net Income** | **258,243** | **248,830** |

Source: Created by the case author based on HCL: Financials, *Annual Report 2008–09,* 2–4,August 25, 2009, accessed March 21, 2017, <https://www.hcltech.com/investors/results-reports?year=2008-09>.

EXHIBIT 2: INDUSTRY VERTICALS AND HORIZONTALS

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Industry** | FPGA, ASIC & SOC Design | Embedded Systems | Hardware & System Design | Mechanical Design | Software Product & Platform Engineering | Product Q&A and V&V |
| Aerospace & Defence |  |  |  |  |  |  |
| Automotive |  |  |  |  |  |  |
| Consumer Electronics |  |  |  |  |  |  |
| Industrial Manufacturing |  |  |  |  |  |  |
| Medical Devices |  |  |  |  |  |  |
| Networking & Telecom. |  |  |  |  |  |  |
| Semiconductors |  |  |  |  |  |  |
| Servers & Storage |  |  |  |  |  |  |
| Office Automation |  |  |  |  |  |  |
| ISV & Online |  |  |  |  |  |  |

Note: ISV = Independent Software Vendors; FPGA = Field Programmable Gate Array; ASIC = Application Specific Integrated Circuit; SOC = System on Chip; Q&A = Question and Answer; V&V = Validation and Verification

Source: Created by the case author based on “Resource Library: Business Impact through Product Engineering,” HCL, accessed March 16, 2017, https://www.hcltech.com/brochures/engineering-services/business-impact-through-product-engineering.

EXHIBIT 3: PROFIT TRENDS FOR AEROSPACE ORIGINAL EQUIPMENT MANUFACTURERS AND THEIR SUPPLIERS

Operating Profit Margin

Economic Profit Margin

Note: Airframers included firms like Boeing and Airbus, among others; Economic Profit = Accounting Profit—(Assets x WACC); Assets include: property, plant, and equipment, financial assets, and other assets on the balance sheet; WACC: Weighted Average Cost of Capital.

Source: Created by the case author based on Strategy and PwC, *Recapturing Value in Aerospace: Know Your Suppliers’ Costs and Collaborate to Lower Them*, 2013, accessed January 30, 2017, https://www.strategyand.pwc.com/media/file/Strategyand\_Recapturing-Value-in-Aerospace.pdf.pdf.

EXHIBIT 4A: HISTORICAL LARGE COMMERCIAL AIRCRAFT ORDERS AND PRODUCTION

Source: Created by the case author based on Deloitte, *2015 Global Aerospace and Defense Industry Outlook*, 6, 2015, accessed February 3, 2017, https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Manufacturing/gx-mnfg-2015-global-a-and-d-outlook.pdf.

EXHIBIT 4B: BOEING AND AIRBUS ORDERS

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Boeing** | **Airbus** | **Dreamliner** |
| 2003 | 248 | 284 | 0 |
| 2004 | 272 | 370 | 52 |
| 2005 | 1,010 | 1,111 | 179 |
| 2006 | 1,007 | 824 | 99 |
| 2007 | 1,279 | 1,458 | 269 |
| 2008 | 600 | 900 | 59 |
| 2009 | 263 | 310 | 13 |
| **Total** | 4,679 | 5,257 | 671 |

Source: Created by the case author based on **“**Number of Aircraft Ordered from Airbus and Boeing from 2003 to 2016,” Statista: The Statistics Portal, accessed February 3, 2017, https://www.statista.com/statistics/264492/aircraft-orders-from-airbus-and-boeing/; and “Orders and Deliveries,” Boeing, accessed February 3, 2017, www.boeing.com/commercial/#/orders-deliveries.

EXHIBIT 5: GLOBAL AIRLINE PASSENGER TRAFFIC AND INDUSTRY PROFITABILITY

Source: Created by the case author based on Deloitte, *2015 Global Aerospace and Defense Industry Outlook*, 2015, accessed February 3, 2017, <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Manufacturing/gx-mnfg-2015-global-a-and-d-outlook.pdf>.

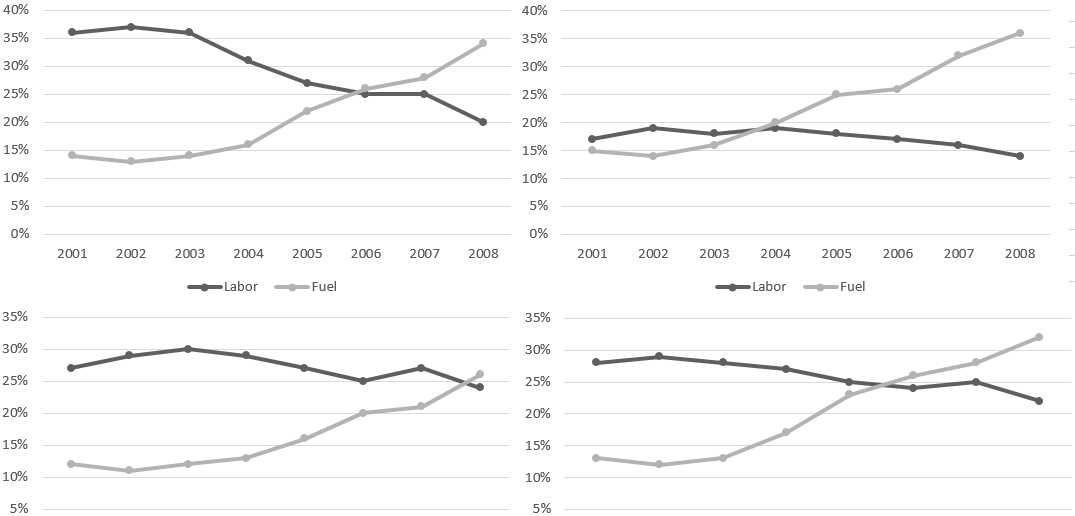
EXHIBIT 6: FUEL AND LABOuR COST SHARE OF TOTAL OPERATING EXPENSES ACROSS MARKETS

European Airlines

All Major Airlines

North American Airlines

Asia Pacific Airlines

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Source: IATA, *IATA Economic Briefing: Airline Fuel and Labour Cost Share*,February 2010, accessed February 3, 2017, https://www.iata.org/whatwedo/Documents/economics/Airline\_Labour\_Cost\_Share\_Feb2010.pdf.

EXHIBIT 7: RELATIONSHIP OF AIRLINE NET PROFIT TO FUEL COST

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Net Profit (in US$ billions)** | **Operating Cost (%)** | **Average Crude Prices ($/barrel)** |
| 2003 | −7.5 | 13.6 | 28.8 |
| 2004 | −5.6 | 17.3 | 38.3 |
| 2005 | −4.1 | 22.2 | 54.5 |
| 2006 | 5.0 | 28.1 | 65.1 |
| 2007 | 14.7 | 29.8 | 73.0 |
| 2008 | −26.1 | 35.7 | 99.0 |
| 2009 | −4.6 | 28.3 | 62.0 |

Source: Created by the case author based on IATA, *Fact Sheet – Fuel*, June 2016, accessed February 3, 2017, [www.iata.org/pressroom/facts\_figures/fact\_sheets/Documents/fact-sheet-fuel.pdf](http://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-fuel.pdf).

EXHIBIT 8: NUMBER OF INVESTMENTS BY THE TOP 50 GLOBAL AEROSPACE AND DEFENCE COMPANIES IN INTERNATIONAL MARKETS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Region/Country** | **R&D** |  | **Region/Country** | **Manufacturing** |
| India | 10 |  | China | 21 |
| United States | 7 |  | India | 18 |
| Russia | 5 |  | United States | 13 |
| Western Europe | 4 |  | Mexico | 8 |
| United Kingdom | 4 |  | Russia | 7 |
| Central and Eastern Europe | 3 |  | Middle East | 6 |
| China | 2 |  | United Kingdom | 4 |
| Mexico | 2 |  | Western Europe | 4 |
| Middle East | 2 |  | Central and Eastern Europe | 3 |
| South Korea | 2 |  | North Africa | 3 |
| North Africa | 1 |  | South Korea | 2 |
| Others | 2 |  | Other | 4 |
| **Total** | **44** |  | **Total** | **93** |

Source: PwC, *Gaining Technological Advantage: A&D Insights*, 2011, accessed on February 3, 2017, https://www.pwc.com/im/en/publications/assets/shipping-aircraft-space/aerospace-defence-insights.pdf.

Endnotes

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