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Strategic Outsourcing at Bharti Airtel Limited

Budgeting for capital expenditures was a nightmare. Every time we had a change in the network plan we were forced to go back to the vendor and start over. . . . We would have three or four reviews per year. . . . It showed a real conflict of interest between the operator and the vendor.

— Akhil Gupta, June 2005

Akhil Gupta, joint managing director of Bharti Airtel Limited (the Indian telecommunications firm formerly known as Bharti Tele-Ventures Limited), dropped a newly penned purchase agreement with network suppliers into his inbox, but Gupta did not feel like celebrating. It was early 2004, and the deal had taken three months and a quarter of his time to finalize. Bharti's customer base was growing 100% per year, and it was a huge challenge to keep pace with network expansion. Very soon Bharti Airtel would be back at the negotiating table for the fourth time in 12 months. "Budgeting and the tendering[1] process for network expansion is taking up a tremendous amount of management time and bandwidth—bandwidth that is needed elsewhere," said Gupta.

Managing the firm's IT capital expenditures was another challenge. As Gupta explained:

Our CIO would come to me with a budget, reflecting that the equipment we bought in the last couple of years was no longer of much use; the new software wouldn't run on it. This was painful because we realized that we spent $15 to $20 million and there was already talk of throwing it away because its only use was as a mail server. That's a heck of an expensive mail server!

In the midst of these wildly unpredictable expenditures, Gupta felt that Bharti badly needed a lean and predictable cost model:

We want to exploit the potential of 300–400 million Indian phone customers. Their purchasing power is relatively low compared to the U.S. and Europe—there is no way our average customer will pay $10 a month for this service. We need a lot of customers with $4 and $5 revenues per month. If we had a reliable, predictable usage-linked cost structure then we could become the lowest-cost producer of minutes not only in India but perhaps in the world.

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[1] Soliciting vendors' bids for contracts.

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Professors F. Asís Martínez-Jerez and V. G. Narayanan and Research Associate Michele Jurgens prepared this case. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

From the inbox, Gupta's eye strayed over to the opposite side of his desk. There in the corner was the plan that he and his team hoped, would solve his capital expenditures nightmares. This plan consisted of two outsourcing proposals: one to Bharti's key telecom network equipment vendors, Ericsson, Nokia, and Siemens; and the other to its IT equipment vendor, IBM. The documents proposed completely handing over the buildup and management of Bharti's telecom and IT network to these vendors. Gupta explained:

> For the first time in telecom history, perhaps anywhere in the world, the network equipment vendor and the operator would be on the same side of the table. Right now, the equipment vendors make more money when they sell more boxes to us, whereas we needed to ensure that we buy fewer boxes but get maximum capacity and coverage to stay competitive. This [caused] an inherent conflict of interest between the two of us. I felt that we needed a completely different equation.

Although Sunil Mittal, the company's chairman and managing director, had given Gupta free rein to investigate the idea with his colleagues and vendors, thus far he had encountered either stunned silence or outright resistance. "They reacted as if I had suggested giving the family jewels to outsiders," said Gupta. The vendors, on the other hand, were worried about taking on additional risk. He wondered whether he would be able to overcome the objections of his colleagues and the vendors and make this idea work.

Bharti History and Background

Mittal founded Bharti in 1995 with $900 in start-up capital.[2] Mittal was an entrepreneur who had created and successfully managed several businesses, including a bicycle components business, a portable generator import business, and a venture with Siemens to produce telephone equipment. His goal in creating Bharti Airtel Limited was to take advantage of the liberalization of the Indian telecom market and to bid for a government license to operate the first private mobile telecom service in the Delhi area. Bharti won the government tender and immediately launched its service, known as "Airtel," using the GSM (Global System for Mobile communications technology).

In the first eight years of its existence, Bharti grew by having what Mittal called "a single-minded devotion to the project and the industry." As he also put it, "Our business is telecom and nothing else."[3] Bharti was the first private provider on the market in Delhi and, in 1998, was India's first private provider to turn a profit.[4]

As part of its drive for continuous expansion, Bharti aggressively pursued the acquisition of licenses for mobile operations in other geographic regions, or "circles."[5] This strategy required ever-greater capital inflows. In 1999, Bharti sold a 20% equity interest to the private equity firm Warburg Pincus. Soon after, New York Life Insurance Fund, the Asian Infrastructure Group, the International Finance Corporation (IFC), and SingTel[6] all acquired equity interests in Bharti. In 2002, Bharti went public on the Indian National Stock Exchange, the Mumbai (Bombay) Exchange, and the Delhi Stock

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[2] IBM website, www.ibm.com/news/us/en/2005/05/Business_Leadership_Forum.html, accessed May 10, 2006.

[3] Krishna Palepu, Tarun Khanna, and Ingrid Vargas, "Bharti Tele-Ventures," HBS No. 704-426 (Boston: Harvard Business School Publishing, 2003). Original source: Sunil Mittal quoted in Chakravarti, "Tour de Telecom."

[4] Ibid.

[5] Telecom service in India was divided into geographical areas, called circles, for the purpose of awarding mobile and fixed-line telephone licenses.

[6] SingTel: Singapore Telecommunications Limited, a large Singapore-based telecommunications group.

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Exchange, raising $172 million in its initial public offering (IPO). In total, Bharti raised over $1 billion through foreign direct investments by the end of 2002.[7]

The capital inflow allowed Bharti to finance its next stage of growth. In 2001–2002, it obtained mobile licenses for 15 out of India's 23 total circles and also obtained fixed-line licenses for six of them. In addition, leveraging its arrangements with SingTel, Bharti subsequently obtained licenses to become the first private telecommunications service provider in India to launch national and international long-distance service.

 By 2003, Bharti was present in all of the major economic and industrial centers—representing 91% of all mobile users in India (see **Exhibit 9**). It was also targeting growth in the remaining eight circles, even those in the most remote regions. Mittal and his team anticipated achieving full coverage of India by 2005.

 From a financial perspective, Bharti's position had significantly improved. March 2004 year-end results showed revenues of $1,113.4 million, a 100% increase over 2003. Able to take advantage of the economies of scale due to its larger network, Bharti improved its operating margins from negative (–2.25%) in 2003 to 16.9% in 2004. And while it had suffered a net loss in 2003, the next year saw a net income of $117 million. Return on equity in 2004 was nearly 12%. (Highlights of Bharti's year-end financial statements in March 2004 are shown in **Exhibits 1** and **2**.)

Bharti Management and Organization

Bharti, like many of the large Indian industrials, was a family- or close to family-run business. Sunil Mittal was chairman and group managing director of Bharti Airtel Limited. His brother Rakesh Mittal was a board director; Rajan Mittal, another brother, was the joint managing director, overseeing the functional directors of marketing, business development, corporate affairs, and corporate development.

Gupta had known the Mittals for many years and was with Bharti Airtel from its inception. A chartered accountant with a degree from Delhi University, he was CFO from 1995 to 2000, becoming joint managing director in 2001. As joint managing director and CFO, Gupta had responsibility for overseeing the functional directors of finance, information technology, special projects, and regulatory and secretarial concerns. (Bharti's organization chart as of February 2004 is shown in **Exhibit 3**.)

Indian Market for Telecommunications

Prior to the 1990s, the Indian telecommunications environment showed very little change from the 1950s. It took several months, sometimes years, to install a telephone in a home or business, and mobile phones were a foreign luxury. "Even up to 1995, the biggest favor anyone could do for you in India was to get you a phone," said Gupta.[8]

In 1991, India embarked on a policy of economic liberalization, opening up the sector to private competition and foreign investment. Private telecom firms could tender for licenses to operate in each of 23 designated circles. In 1989, before liberalization, there were 4.2 million telephone subscribers; by

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[7] The equity funds received by Bharti were classified as foreign direct investment and required approval from the Foreign Investment Promotion Board (FIPB) and the Reserve Bank of India (RBI), two of the bodies governing the inflow and outflow of funds in India.

[8] Interviews with Ahkil Gupta, June 2005.

2003, telephone subscriptions numbered 54 million, and India's telecom network had become the eighth largest in the world.[9] Total Indian telecom revenue for 2003 was $8.5 billion and was growing at 17% per annum.[10]

Wireless services contributed about 18% of the $8.5 billion in telecom revenues (see **Exhibit 4** for breakdown).[11] Estimates for the wireless market through 2008 showed the market growing from US$1.5 billion to US$10.9 billion.[12]

Most Indian mobile operators had adopted one of the 2G (2nd generation) technologies—either GSM or CDMA. By 2003, it appeared that India would soon jump to 3G technologies, or at least to 2.5G technologies.[13] Value-added services—including data transmission, short message service (SMS), games, ring tones, and ring-back tones (different kinds of music that the caller would hear)—were already being offered in urban areas.

Aside from the growth in 3G, huge potential remained in the development of basic phone services. The number of telephone connections (fixed and mobile) per 100 inhabitants in India in 2003 was fewer than six, whereas among all but four OECD countries it was over 100.[14] Customer demand for telecom connections increased daily, and many were bypassing fixed lines and going straight to cell phones. In 2003, over 1.5 million people were signing up for cell phones every month.[15]

Unlike European and American operators, Indian operators chose to sell mobile phones and mobile telephone services separately. As a result, there was no handset subsidies burden on the operator. Mobile services were sold either on a postpaid or prepaid basis. About 60% of the business was prepaid—cards allowing the customer to recharge his telephone with telephone time were sold in kiosks, drugstores, and small convenience stores. The remaining 40% of the business was postpaid, for businesspeople or business customers who were billed for their telephone use on a monthly basis.[16]

Market Competition

By 2002–2003, the Indian market had grown highly competitive. Mobile rates were as low as three to four U.S. cents per minute, and ARPU—the average monthly revenue per customer unit—had fallen by 50% in three years as telecom providers fought to capture new subscribers. [17] The top

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[9] PricewaterhouseCoopers, "Telecommunication," India Brand Equity Foundation, 2004, www.ibef.org. "Current Issue and Trend in Indian Mobile Market," Report # 04025.

[10] JM Morgan Stanley Equity Research Asia-Pacific, Bharti Tele-Ventures Ltd., June 9, 2005.

[11] Ibid.

[12] Ibid.

[13] 3G mobile technology for mobile telephony is analogous to broadband technology for fixed line in that it provides a similar level of enhanced service—rapid data transfer and the capacity to manage all manner of communication (video, voice, data, multimedia). 2.5G technologies are improvements to 2G technologies that provide many of the same advantages as the 3G technologies.

[14] OECD Factbook 2006—Economic, Environmental and Social Statistics. Published by Source OECD, http://caliban.sourceoecd.org/vl=4373012/cl=20/nw=1/rpsv/factbook/06-03-02.htm, accessed August 2, 2006.

[15] "Current Issue and Trend in Indian Mobile Market," Report # 04025. Research on Asia Group 2003.

[16] Ibid.

[17] Ibid.

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competitors were able to lower their unit costs as their market shares increased through acquisitions or bankruptcy of smaller competitors.

By 2003, there were seven major operators in the Indian telecommunications market: Bharti, BSNL, Hutchinson, Reliance, Tata, Idea Cellular, and MTNL. Bharti and three others had operations in both the fixed and mobile segments. The others operated only in the mobile segment. There were also several strong regional mobile operators, such as Spice and BPL.

With industry consolidation, the focus was switching from having a national footprint to having the ability to provide value-added services. Operators needed 2.5G or 3G technologies to provide those services, and the transition upward from 2G represented a major capital investment challenge for any telecom operator. It was thought by some observers that the strong capital resources of players such as Reliance or Tata might give them a competitive advantage over the other operators.

Exhibit 6 describes each of Bharti's top competitors. **Exhibit 7** breaks down market share by competitor.

Bharti's Telecommunications Network

By 2003, Bharti had obtained licenses for mobile operations in 15 out of the total 23 circles. It had a 25% market share of the total Indian mobile market and 6 million mobile subscribers. In fixed-line services, it had 1 million customers and licenses for six circles. Upcoming regulatory changes would also allow Bharti to expand wire-line services into any of the circles in which it held a wireless license. Growth in both sectors—wire line and wireless—was expected to be exponential over the coming 18 months as Bharti obtained licenses and built up operations to achieve nationwide coverage.

Operations and Service

Bharti's operations were structured into three strategic business units (see **Exhibit 8** for a detailed breakdown):

- Mobile Services: Providing 64% of Bharti revenues, this unit was where Bharti had achieved the most in terms of market dominance and customer service. In six out of 15 regions, Bharti had over 40% market share. It focused on providing excellent customer service through "error-free" service (low call drop rates, broad coverage, etc.), cost efficiency, and innovation in new products and services. Bharti offered postpaid or prepaid billing options, Blackberry^{TM} service, conferencing, fax and data transmission, and other services such as jokes, games, news, and even astrology via the mobile phone.

- Long-Distance, Group Data, and Enterprise: Providing 30% of revenues, these services allowed Bharti to leverage its recently completed high-speed fiber-optic network. This network spanned 24,000 kilometers (kms) and connected almost all the major cities in the country. Bharti could now provide "end-to-end service," broadband, long-distance, videoconferencing, and dedicated data and voice line services to business customers.

- Broadband and Telephone Services: Providing 16% of revenues, this unit provided wire-line-based telephone services in six circles and broadband services in all major economic centers. Broadband-related services included DSL to homes and businesses, WiFi, virtual private network (VPN), and video surveillance.

Ten percent of revenues pertained to intersegment eliminations.

Technology and Development

By March 2004, Bharti's mobile network connected 1,400 towns using GSM technology. By the end of 2007, Bharti expected to have GSM service up and running in all the 5,161 census towns. To meet this objective, 100 towns per month on average were to be brought into the system.

Bharti had roughly 5,000 base stations at the end of March 2004. In order to accommodate the required demand for service by March 2007, that number would need to jump to 40,000 and would require the hiring of over 2,000 to 3,000 people to build and maintain them.[18]

Bharti had also begun deploying EDGE, a 2.5G GSM-compatible technology that allowed it to upgrade its services to 3G performance levels. This was first done in Mumbai and would later be introduced elsewhere in the network. (See **Exhibit 9** for Bharti's mobile footprint as of mid-2003.)

Bharti's long-distance network used fiber-optic cables around India. It was present in the international carrier business through the group's participation in the i2i undersea cable system—a joint venture with SingTel. Its international capacity had been further enhanced by a joint venture it had entered into with SingTel and 13 other telecom groups for the construction of SEA-ME-WE4, the Singapore-France submarine cable.

Bharti's Relationships with Its Vendors

As Bharti's presence in the Indian market grew, so did the number of relationships Bharti had with network suppliers. Its initial GSM network was set up with the help of Ericsson. By early 2003, Bharti was also working with Nokia and Siemens, among others. Bharti purchased equipment, installation, and maintenance services from each of these suppliers in one or more of the regional circles in which it was present.

Because the GSM technology was a very open standard, Bharti was comfortable working with several suppliers and could change suppliers if the services offered by one proved unsatisfactory. "In today's telecom world, it's very easy, because everything is 'plug and play,'" said Gupta. This also meant that the environment was very competitive between telecom vendors. As Sunil Mittal explained, "Every six months there was a fresh tender for network expansion. There used to be a parade with one vendor playing against another."[19]

Along with the operations teams, Gupta managed the process of tendering, negotiating, and working with the vendors to install the expanded capacity, but he was uncomfortable with the results. "Typically in the industry, these vendors will sell you a list of components, 'boxes'—an MSC [a switching station], a BSC [a base station], etc.," said Gupta. There was an inherent conflict of interest in this approach since the vendors always tried to sell more equipment, while the operator wanted maximum coverage and capacity with as little equipment as possible. A typical network used only 60% to 70% of its installed capacity at any point of time. "What we needed was capacity—erlangs," Gupta said. Erlangs were a measure of telecom traffic. One erlang equaled a circuit that was occupied for 60 minutes in a busy hour.

Industry practice was to purchase about 30% to 40% excess capacity in order to keep one step ahead of customer demand and to compensate for the estimation error of models used to predict capacity of different network configurations. For the telecom operator, that also meant purchasing

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[18] Shelley Singh and Rajeev Dubey, "The man who gave away his network," by *Business World India*, October 4, 2004, www.businessworldindia.com/oct0404/coverstory01.asp., accessed May 12, 2005.

[19] Company source.

more sites, installing electricity in those sites (generators and air conditioners, if necessary), hiring staff to maintain the sites and, of course, installing the telecom equipment required. For Bharti, in terms of capital assets on its balance sheet, the 30% excess capacity through 2007 would represent something in the range of $300 million to $400 million.[20] Financial requirements were not Bharti's only concern; there was also the delay, which the firm could ill afford given its rapid growth, between the time that the need for additional capacity was identified and the time that the additional capacity could be up and running. The process of planning, tendering, financing, purchasing, and installing could take anywhere from six months to a year.

IT Requirements

Bharti needed an IT network that could scale up to match the size of the organization it projected to become in a few years. "There was the problem of scalability in our system. With the very rapid growth, we would soon be making decisions that could not be altered later on and for which we might be sorry," Dr. Jai Menon, group CIO for Bharti, explained.

Bharti looked increasingly to its vendors to provide expertise in integrated systems design. "Our core competency was in operations, not IT design, and thus we could not do much of the architecture software and hardware design we required," said Menon.

Generally speaking, Bharti's IT requirements fell into one of three categories:

1. The telecom network systems and software. These specifically related to the basic functioning of the telecom connection and switching system.

2. Customer management information systems that allowed for the collection of data on customer use, service quality, and network reliability, and programs that gave customers access to value-added services such as ring tones or Java games.

3. Business-support software and hardware architectures, including internal programs such as billing, security, user programs, Internet access, and human resources or financial databases and systems.

Bharti contracted with IBM, Sun Microsystems, HP, and Oracle for business-support software and hardware architectures and customer management systems. Bharti's IT infrastructure was further complicated by the fact that it had inherited other IT systems—frequently incompatible with existing ones—through acquisitions of telecom operators. The company had also been forced to look outside of its established vendors for certain applications they did not offer, such as fraud management. Unfortunately, many of these arrangements could be described as "fragmented bubbles of outsourcing," as Menon put it. Many were incompatible and could not be built upon to meet Bharti's anticipated requirements. As a result, Bharti knew that it was facing huge up-front investments in IT in order to get the right architecture in place and ready to support its growth over the next 10 years.

Human Resources Issue

Related to both IT and network development requirements was the question of human resource scarcity. With constant growth in the market, Bharti was finding it more and more difficult to hire and retain the best and the brightest. In network development alone, Bharti would need to hire 2,000–3,000 people to accompany network development in 2004. As Gupta put it: "Think of it from the

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[20] Ibid.

perspective of a talented IT or telecom guy. Would you rather go work for one of the world's top multinational firms, large in size and reputation, or for a local upcoming operator like us?"

Bharti's Proposed Deal

In the folder on the corner of his desk, Gupta had the proposed outlines of a two-pronged outsourcing structure for Bharti with its vendors. Gupta's strategy included handing over responsibility for the buildup, maintenance, and servicing of the telecom network to equipment vendors. Gupta and his people were talking with Nokia, Siemens, and Ericsson as potential partners. In addition, Gupta was planning to outsource the buildup, maintenance, and servicing of Bharti's core IT infrastructure to IBM. Other vendors besides IBM had been considered, but discussions had gone the farthest with IBM since few IT vendors had experience handling all of the aspects of the proposed deal.

Below are excerpts from each proposal:

Ericsson, Nokia, and Siemens:

- The vendor will provide Bharti with network capacity—erlangs—in accordance with Bharti's projected erlang requirements in each of the circles in which Bharti operates and for which they are responsible according to this agreement. In exchange, Bharti agrees to pay the vendor a fee according to the amount of erlang capacity installed. The actual payment for network capacity will be made only when the capacity is up and running and *has been used* by Bharti customers, thereby excluding payment for unused capacity at any point in time.

- Once erlang capacity is installed, ownership of the assets responsible for producing that capacity belongs to Bharti. The responsibility for maintaining the network in good working order, however, rests with the equipment supplier under an operations and management (O & M) agreement.

- In order to ensure the quality of Bharti's service to its end customers, network capacity provided by equipment suppliers will be subject to a number of quality controls specified in service level agreements (SLAs). These are measures of network quality, such as the number of dropped calls and the number of incomplete calls, that will be determined jointly by Bharti and the equipment supplier. [*Penalties and rewards linked to quality achieved were provided.*]

- This agreement is to be for an initial period of three years, subject to renewal by mutual agreement.

IBM:

- IBM will provide Bharti with complete and comprehensive end-to-end management service for supplying, installing, and managing all of its hardware and software requirements as concerns the basic IT architecture of the company and all of the applications needed to operate it. The outsourcing includes everything from the computer on the desktop all the way up to the mainframe, but excludes all telecom network-specific structures and networks. It includes all internal customer service and all negotiations with external software and hardware suppliers. It also includes the maintenance of all hardware and software, including those provided by other vendors such as security, data warehousing, fraud management, business intelligence, human resource management, financial, and enterprise management systems and software, among various others.

- In order to ensure the quality of Bharti's service to its employees and end customers, IBM services will be subject to a number of quality controls specified in the SLAs, such as hotline customer satisfaction and new application implementation delays. [*In the network proposal, a penalty and reward mechanism was provided for*.]

- In exchange for these services, Bharti agrees to pay IBM a share of its revenues. This agreement is to last for a period of five years, renewable for another five years, for a total of 10 years. The percentage of revenue shared will progressively decline as overall revenue increases.

In discussing the proposals with his vendors, Gupta made it understood that the Bharti personnel presently carrying out tasks that would be taken over by the vendors would be transferred to the vendor in question. A network manager at Bharti today, for example, would become an Ericsson, Nokia, or Siemens employee tomorrow. Should the proposal be accepted by the vendors, around 270 IT staff and 800 network staff could be transferred out of Bharti.

Reactions at Bharti

Don Price, the CTO of Bharti's Mobile Services, was one of the first with whom the new idea was discussed. He had been in the mobile telecommunications business from its inception in the U.S. with McCaw Communications and was one of the most experienced CTOs in the world. He had never seen such an arrangement before and had expressed serious reservations about handing over network management and operations to the vendors. "The vendors may have access to the world's best technology, but we have the operating expertise," said Price. He grumbled, wondering whether "the financial 'eggs' with no network operations experience thought this one up. Operations . . . it's our bread and butter."

The IT and marketing departments were concerned that software or hardware applications not supported by IBM would no longer be available. Would IBM be willing to work fairly with other vendors, or would the agreement mean that Bharti would no longer have access to certain creative new applications? They were also concerned about the implications the deal would have on the time to market of new IT-based services for customers. "OK, give the large fundamental innovation to IBM . . . but keep the quick shots in-house!" was what one senior marketing manager had to say.

Meanwhile, the human resources department was wondering how they would manage the transfer of nearly 1,000 staff members. Some staff might not want to be transferred, or perhaps the vendors might not want to take them. One manager worried: "Bharti is a much smaller company, an Indian company. We have a different way of working with people—India is not a hire-and-fire country. The vendors are much bigger, and they're worldwide companies. The cultures are different. Our staff identifies itself closely with Bharti. How are they going to take being transferred elsewhere?"

Reactions within the company ranks were mild when compared with comments Gupta received after presenting the project to the board of directors. Many were longtime telecom industry practitioners, and to them it was difficult to justify changing from the accepted practices. Gupta had heard one board member comment, "What makes you think that Bharti, an upstart in this industry, could teach the world what to do?" The main concern expressed by all of the board members was the risk of excessive dependence upon the vendors. Gupta recalled the prevailing sentiment of the board: "You will become their slaves." In response to their concerns, SingTel—which was represented on the board—sent a group of experts in to evaluate the project. "Needless to say, the initial reaction of the board was not highly supportive—in fact, the general feeling was negative," explained Gupta.

Vendor Reactions

Initial reactions from vendors were mixed. They liked the opportunity to do more business with a major player—Bharti—but they were concerned with the risks and the need to get "buy-in" from the top levels in their organization. A major concern was that they might be stuck with important investments in network equipment that they made on behalf of Bharti in the event that Bharti did not use the equipment. If Bharti was transferring the equipment investment risk to the vendors, what was the upside in the deal for them? It was unlikely that they would be able to increase equipment prices to cover all the increased risk.

They were also concerned with absorbing hundreds of Bharti employees. Some of the vendors had very light organizations that would be overwhelmed with such a sudden expansion in the number of employees. Besides the sheer numbers, there was a question of managing the corporate cultural mix. "Our cultures, values, and systems are somewhat different," they fretted.

Of course, there were dangers in *not* signing with Bharti. Bharti would be growing very fast over the next few years. If the vendors turned down this business now, making it look as if they were unwilling to take risks in India, they might later be locked out of lucrative deals not only with Bharti, but perhaps with other operators as well. With the impressive growth projected for the market, most vendors were looking to increase their operations and their market share in India. Nokia, for example, had very little business with Bharti and was behind Ericcson in terms of market share in India. Ericcson, on the other hand, was anxious to lock in its position with Bharti, with which it had been dealing since 1995.

IBM also had concerns about the deal. Although it was keen to develop worldwide partnerships with major clients per its international "on-demand" strategy, it had until now not even envisaged a revenue share arrangement with a client. If IBM were to take a percentage of Bharti's revenues in exchange for its equipment and services, it would have to forecast Bharti's revenue growth in order to estimate how much it would get paid over the next five to 10 years. Yet the investments in IT hardware, software, and people on behalf of Bharti would have to be made by IBM today. To them, it represented a major and unfamiliar risk.

Overall, this meant that IBM needed to be fairly sure of Bharti's future success. Although it knew from experience that there was a strong association between a company's success and the quality of its IT network, IBM could not be certain that its investment in this project today would improve Bharti's chances for success in the future. In fact, IBM's deal with Bharti felt more like betting on a horse in a horse race. IBM was hoping that the signs were right and that Bharti would be a winning horse.

Exhibit 1   Highlights—Bharti's Financial Situation at Year-end 2003 and 2004

Key Indicators	Year-end March 31, 2004		Year-end March 31, 2003	
	Rupees Million	US$ Millions	Rupees Million	US$ Millions
Sales	48,320	$1,113.4	24,170	509
Net income	5,076	$ 116.9	(2,018)	(42)
Earnings per share	INR 2.76	$0.06	(INR 1.10)	($0.02)
Total assets	119,021	$2,742.4	88,659	1,865
Total liabilities	73,105	$1,684.5	47,981	1,009
Long-term debt (net of current portion)	36,965	$ 851.7	22,736	478
Operating margin	16.9%	16.9%	–2.3%	–2.3%
Profit margin	10.5%	10.5%	-8.3%	–8.3%

Source: Audited consolidated financial statements as per U.S. GAAP for the years ended March 31, 2003, 2004, 2005, Excel file available on the company's website, www.bhartiairtel.in. Note US$ to INR exchange rate of 47.53 for the year ended March 31, 2003 and 43.40 for the yyear ended March 31, 2004.

Exhibit 2   Bharti's Balance Sheet and Income Statements for 2004

Bharti's Balance Sheet at Year-end March 31, 2004, in US$ 000s

ASSETS	
Total current assets	$ 371,960
Property and equipment, net	1,465,050
Other assets	905,422
Total assets	$2,742,432
LIABILITIES & EQUITY	
Total current liabilities	682,561
Long-term debt, net of current portion	851,717
Other liabilities	150,177
Total liabilities	$1,684,455
Common stock, par value Rs. 10 per share	427,043
Additional paid-in-capital	1,108,659
Deferred stock-based compensation	(3,238)
Treasury stock	(12,879)
Retained earnings/(deficit)	(461,608)
Total Liabilities and Shareholders' Equity	$2,742,432

Source: Audited consolidated financial statements as per U.S. GAAP for the years ended March 31, 2003, 2004, 2005, Excel file available on the company's website, www.bhartiairtel.in. Note US$ to INR exchange rate of 43.40 for the year ended March 31, 2004.

Bharti's Income Statement for the Year Ending March 31, 2004, in US$ 000s

Revenues	$ 1,113,363
Operating Expenses	925,611
Cost of goods and services[a]	(743,607)
Selling, general and administrative expenses[b]	(182,004)
Operating Income	**187,752**
Interest expense (net)	(54,833)
Other income (loss)[c]	4,782
Income before income taxes	137,701
Income tax expense	(20,751)
Net Income	116,950

Source: Audited consolidated financial statements as per U.S. GAAP for the years ended March 31, 2003, 2004, 2005, Excel file available on the company's website, www.bhartiairtel.in.

[a]Including cost of equipment sales.

[b]Including share of profits/ (losses) in joint ventures and non-operating expenses.

[c]Including pre-operating costs.

Exhibit 3   Bharti's Organization Chart
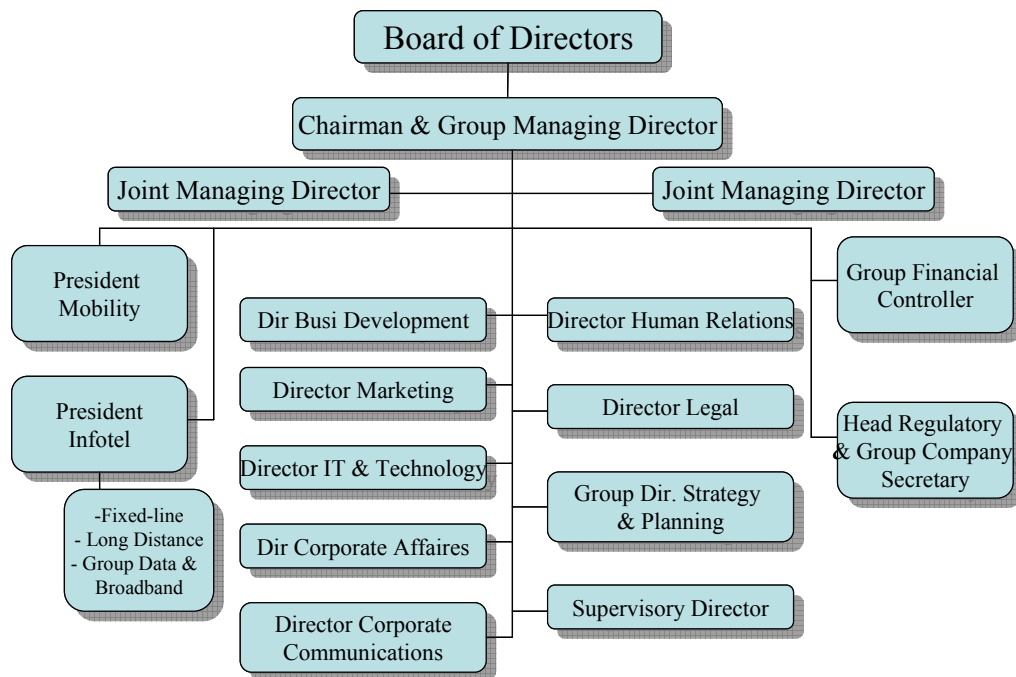
Source: Company documents.

Exhibit 4 Percent Contribution to Indian Telecom Service Revenue, Fiscal Year 2003
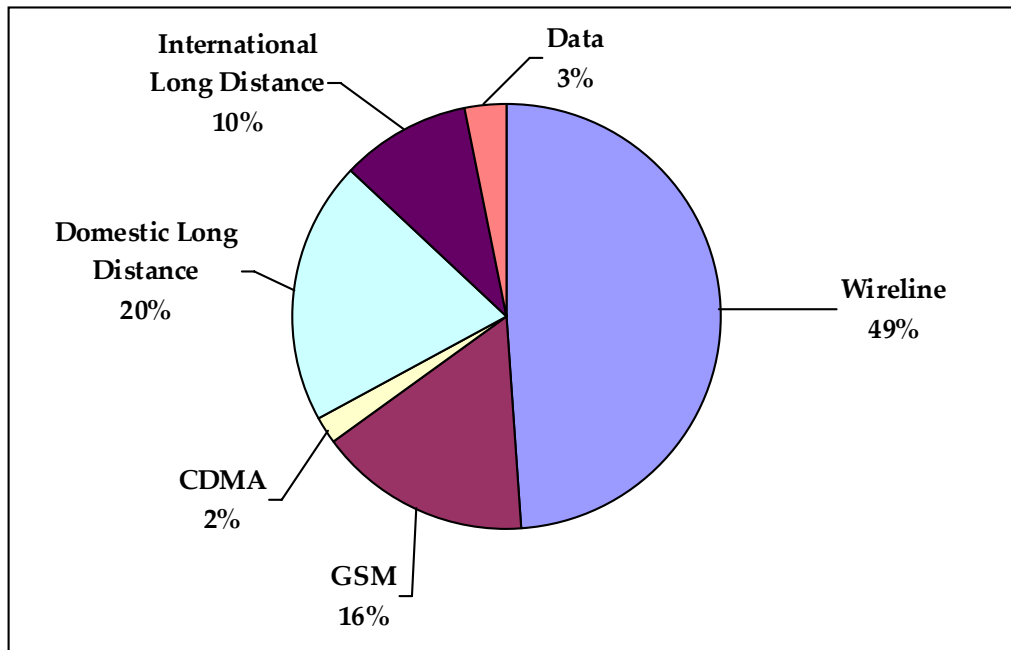
International Long Distance 10%
Data 3%
Domestic Long Distance 20%
Wireline 49%
CDMA 2%
GSM 16%

Source: Compiled by casewriter based on data from JM Morgan Stanley Equity Research Asia-Pacific, Bharti Tele-Ventures Ltd., June 9, 2005.

Exhibit 5   Typical Mobile Network Architecture

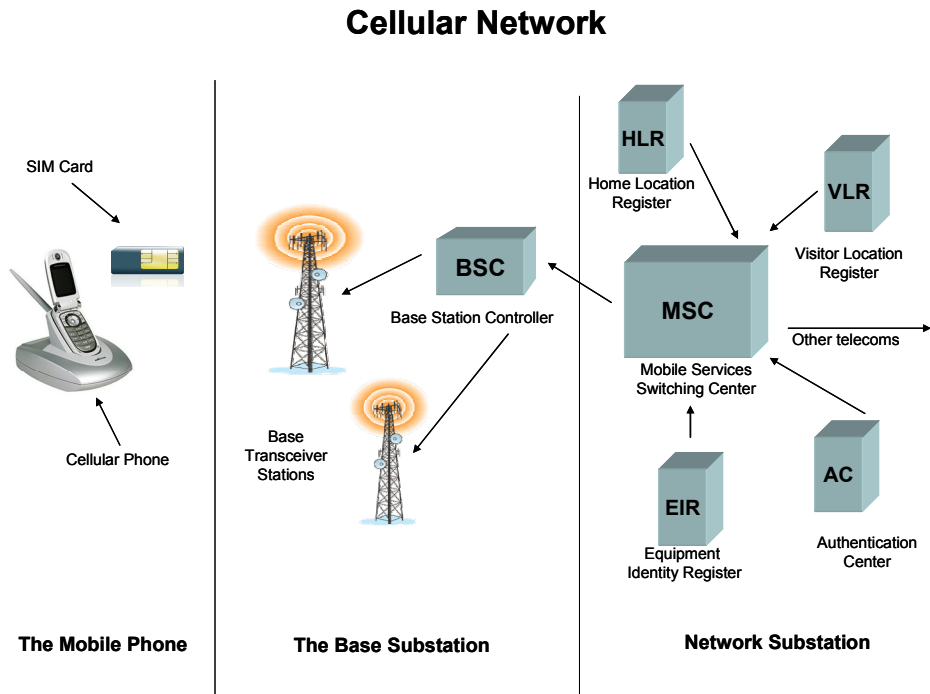Below is a diagram of a typical GSM network. There are three major parts to the system: the mobile handset, the base substation, and the network subsystem.[a]
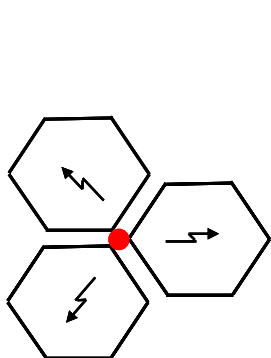

Cellular Network

- **The mobile phone**: The mobile phone consists of two parts, the phone itself and the SIM card. SIM stands for subscriber identity module. The SIM card is inserted into the phone and is basically a memory chip or a "smart card" with the user's identity codes and some specific user information such as frequently called numbers or ring tones. The SIM card also allows the user to switch phones without completely reprogramming his handset.

- **The base substation**: This is the first link in the connection between the mobile set and the telephone network. There are two parts to the base substation. The first, the base transceiver station, is really just a big tower with antennas on top. There are always at least two towers— one for inbound and one for outbound transmission.

   The second part to the base substation, the base station controller, manages communication and transmissions between the base transceiver stations and the rest of the network, notably the switching station. One base station can manage up to several hundred base transceiver stations. A base transceiver station can cover an area of 30 to 40 square kms, but if it is located in a congested area, the coverage is much smaller.

   Cellular networks get their name for the pattern in which base transceiver stations are distributed around the base controller station and the pattern by which the network is added to as the user requirements increase. Cellular networks take the form of a honeycomb. As can be seen from the diagram below, the transceiver stations are arranged around the controller station with the controller station at three of the points in the honeycomb. If additional coverage is needed, additional antennas are added on the transceiver station. An antenna that

previously operated on a 120-degree basis would now only operate on 60 degrees; the new antennas would take over the remaining 60 degrees.[b]

Transceiver in the middle of transmission cells   Three transceivers within a cellular network
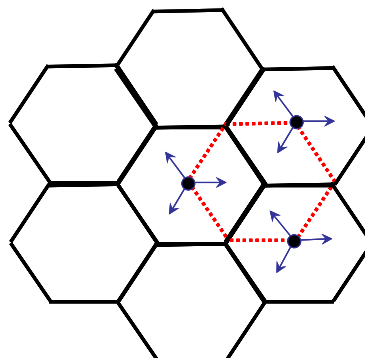
- **The network substation**: Data from the base substation comes into the network substation through the mobile services switching center (MSC). From the switching center information is communicated either to other base substations in the network, to other mobile systems, or to a fixed-line system for connection to the intended party.

  The mobile services switching center has several databases at its disposal that provide information and validate identities of the caller before passing the communication on. They include:

  - Home location register (HLR)—a database with information about subscribers including their identity and service profile

  - Visitor location register (VLR)—a database also containing information about subscribers, but with more specific data concerning their whereabouts. During a call it provides information on where to find a subscriber.

  - Authentication center (AC)—acts as an interface between the switching center and the HLR and the VLR, allowing the process of user verification and location to be carried out

  - Equipment identity register (EIR)—a database containing the list of all valid mobile equipment in the network[c]

Source: Various websites as noted.

[a]Compiled by casewriter based on information from www.coai.in/aboutus-technology.htm, accessed May 20, 2005.

[b]Compiled by casewriter based on information from www.privateline.com/Cellbasics/Cellbasics02.html., accessed January 5, 2006.

[c]Compiled by casewriter based on information from www.privateline.com/PCS/GSMNetworkstructure.html, accessed May 20, 2005.

Exhibit 6 Indian Telecom Competitors

Bharti competed with six major operators in the Indian market, as follows:

BSNL:

Former monopoly and still a state-owned business. The oldest telecom operator in the country, its fixed-line operations were omnipresent. In 2003, BSNL still had a subscription base representing 86% of the fixed-line market. It was expected that its market share in fixed-line operations would decline to 58% by 2008 but that its market share in mobiles would rise from 16% in 2003 to 22% by 2008. Overall, it would remain a strong player.[a]

MTNL:

Set up in 1986 to facilitate the upgrading of telecom services to the metropolitan centers of Delhi and Mumbai (Bombay), this operator was partially state owned (52.25%) and ran a fairly modern network in those cities and the surrounding regions with fixed-line services to 4.4 million subscribers, or 12% of the Indian market, and mobile services to 500,000 customers, or 1.3% of the Indian market. Broadband services were to be introduced in 2003.[b]

Hutch-Essar:

Hutchinson's Indian operations represented a joint venture between Hutchinson Whampoa, the Hong Kong-based conglomerate, and the Essar Group, one of India's largest corporate houses. Hutchinson's investment in the Indian telecom market began in 1992; its cooperation with Essar dated back to 1999.

Hutch India had limited itself to the mobile sector of the telecom market—it had no fixed-line operations. Its mobile strategy was to target the premium segment. In 2003, it was present in 13 of the 23 circles and had 4.1 million customers, or 12% of the mobile market.

Tata:

Tata Teleservices was the telecom arm of the Tata Group. Partnering with Motorola, Lucent, Ericsson, and ECI Telecom, Tata had 600,000 wireless customers, or just under 2% of the mobile market in 2003. Tata also had a one-third stake in the wireless provider Idea Cellular (see below).

Idea Cellular:

A three-way joint venture between Tata, Birla (another large Indian industrial group), and AT&T, the company adopted the name of Idea Cellular in 2002. It was present in seven circles, four of which represented some of the largest economic and industrial centers. With this concentration, it was able to capture a customer base of 3.7 million customers, or 11% of the entire mobile market in 2003.[c]

Reliance:

Reliance Infocomm was a subsidiary of the Reliance Group, an Indian, family-run $22.6 billion conglomerate. Reliance entered the market in 2002 with both wireless and wire-line services.

Reliance's key strengths lay in its brand new installed fiberglass network with over 60,000 kms of optical cable stretching throughout India; it was integrated (wireless and wire line) and convergent (voice, data, and video). Reliance had introduced broadband applications including Java applications for the Internet, VPN connections for business clients, and global positioning for vehicle tracking.

In wire line, Reliance had 500,000 customers in 2003 but was expected to increase its customer base to over 8 million by 2008. In wireless, Reliance had a 19.5% market share, representing 6.6 million customers. It was expected to reach 21% market share and 31 million customers by 2008.[d]

Source: Various websites as noted.

[a]Compiled by casewriter based on data from JM Morgan Stanley Equity Research Asia-Pacific, Bharti Tele-Ventures Ltd., June 9, 2005.

[b]Data from MTNL website, www.mtnl.net.in/about.htm, accessed January 4, 2006.

[c]Cellular Operators Association of India, www.coai.in/archives_statistics_2004_q1.htm, accessed August 3, 2005.

[d]Compiled by casewriter based on data from JM Morgan Stanley Equity Research Asia-Pacific, Bharti Tele-Ventures Ltd., June 9, 2005.

Exhibit 7   Indian Market Share for the Top Seven Telecom Operators

Operator	Wireless Market	Wire-Line Market
Bharti	25%	1%
BSNL	16%	86%
MTNL	1.5%	4.6%
Hutch-Essar	12%	--
Tata	2%	--
Idea	11%	--
Reliance	19.5%	1%
Others	13%	--

Source: Compiled by casewriter based on data from JM Morgan Stanley Equity Research Asia-Pacific, Bharti Tele-Ventures Ltd., June 9, 2005.

Exhibit 8   Breakdown of Bharti's 2003 Revenues by Activity

	Full Year Ending March 31, 2004	
	Rs. Million	% of Total Revenues
Mobile Services	30,927	64%
B & T Services	7,692	16%
Long Distance	12,050	25%
Enterprise Services	2,620	5%
Others	(39)	0%
Sub Total	53,250	110%
Eliminations	(4,930)	-10%
TOTAL	48,320	100%

Source: Audited consolidated financial statements as per U.S. GAAP for the years ended March 31, 2003, 2004, 2005, Excel file available on the company's website, www.bhartiairtel.in.

Exhibit 9   Bharti's Cellular Operations in 2003

Himachal Pradesh

Population[1]	6 million
Mobile Market Size[2]	94,737
Our Market Share[2]	48%

Punjab

Population[1]	25 million
Mobile Market Size[2]	1,246,254
Our Market Share[2]	41%

Delhi and NCR[4]

Population[1]	22 million
Mobile Market Size[2]	2,299,372
Our Market Share[2]	48%

Haryana[4]

Population[1]	17 million
Mobile Market Size[2]	326,541
Our Market Share[2]	27%

Uttar Pradesh (West) & Uttaranchal[4]

Population[1]	57 million
Mobile Market Size[2]	617,515
Our Market Share[2]	21%

Gujarat

Population[1]	51 million
Mobile Market Size[2]	1,339,905
Our Market Share[2]	6%

Maharashtra & Goa[3]

Population[1]	82 million
Mobile Market Size[2]	1,363,014
Our Market Share[2]	13%

Kolkata

Population[1]	15 million
Mobile Market Size[2]	628,429
Our Market Share[2]	39%

Mumbai

Population[1]	16 million
Mobile Market Size[2]	2,022,212
Our Market Share[2]	16%

Madhya Pradesh & Chattisgarh

Population[1]	81 million
Mobile Market Size[2]	549,687
Our Market Share[2]	10%

Karnataka

Population[1]	53 million
Mobile Market Size[2]	1,062,416
Our Market Share[2]	46%

Andhra Pradesh

Population[1]	76 million
Mobile Market Size[2]	1,114,796
Our Market Share[2]	34%

Kerala

Population[1]	32 million
Mobile Market Size[2]	762,443
Our Market Share[2]	10%

Chennai

Population[1]	6 million
Mobile Market Size[2]	573,974
Our Market Share[2]	41%

Tamil Nadu & Pondicherry[3]

Population[1]	57 million
Mobile Market Size[2]	828,906
Our Market Share[2]	9%

■ Our Operational Mobile Circles

Source: Krishna Palepu, Tarun Khanna, and Ingrid Vargas, "Bharti Tele-Ventures," HBS No. 704-426 (Boston: Harvard Business School Publishing, 2003). Original source: company documents.

[1]Population estimates are as per National Census, 2001 and are as of March 1, 2001. The population for Uttar Pradesh (West) circle is approximately 37% of the total population for the state of Uttar Pradesh.

[2]Mobile subscriber statistics are as of July 31, 2003 and are based on data released by COAI. Mobile market size comprises the total number of mobile subscribers of all the service providers in a circle.

[3]Demographics of Maharashtra and Tamil Nadu do not include demographics of state capitals (metros) Mumbai and Chennai respectively.

[4]Demographics of Haryana do not include Faridabad & Gurgaon as they are included in Delhi & NCR. Similarly demographics of Uttar Pradesh (West) & Uttaranchal do not include Noida & Ghaziabad as they are included in Delhi NCR.

Exhibit 10   An Advertisement for Bharti's Lifetime Service Plan

Source: Company.