

PGDM (International Business) 2019-21
International Strategic Management
IB- 305
Trimester – III, End-Term Examination: June 2020

Time allowed: 90 minutes
Max Marks: 30

Roll No: _____

Instruction: Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means**. All other instructions on the reverse of Admit Card should be followed meticulously.

CASE – EMBRACE (B) – OPPORTUNITY ASSESSEMENT

Read the case carefully and debate following issues.

1. Is the Embrace infant warmer a business opportunity or social philanthropy? How would you evaluate it strategically?
2. Jane Chen and her team believe that they can make Embrace a profitable social business. What is the value proposition of Embrace? Can the company capture any part of that value as rents (profits)?
3. What are strategic issues related to competition for a Start-up like Embrace? How will you design Strategy for Embrace?

EMBRACE (B): OPPORTUNITY ASSESSMENT

Mridula Anand, Anand Nandkumar and Charles Dhanaraj wrote this case solely to provide material for class discussion. The authors do 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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With 6 million premature and underweight babies in India alone, the national government sees the problem and is committed to reducing it. It could be valuable in the short term, allowing a baby to be born at a rural home then transported to a specialty care facility or larger hospital. The government [in India] is trying to ensure all babies are delivered in hospitals versus in homes. It has increased by 40 percent over the last three years, but they have a long way to go.¹

Dr. Vinod Bhutani, professor in neonatology
at Lucile Packard Children's and Stanford hospitals

Over the Christmas break of 2007, Jane Chen, the CEO of Embrace, and the co-founders Rahul Panicker, Naganand Murty, Razmig Hovaghimian and Linus Liang (see Exhibit 1) decided to further flesh out the idea of a low- cost infant incubator. Consisting of a phase-change material that would retain heat in a pouch that held a baby, the infant warmer had ease of use and low cost of manufacture, which might prove critical to rural health centers in the developing world. They realized that they would have to make a case for the viability of the venture in order to raise precious capital. Moreover, they were still deliberating on whether it was personally worthwhile to pursue this opportunity, notwithstanding their passionate commitment to tackling the problem of infant mortality head on. First, they wanted to come up with a ballpark figure that would give them an accurate sense of the size of the addressable market opportunity.

NEONATAL CARE: A BACKGROUND

Although the problem of premature and congenitally ill infants had not been new, it was not until 1922 that hospitals in the United States started grouping newborn infants into one area, now called the neonatal intensive care unit (NICU).² The highest recorded infant mortality in the United States, of more than 230/1,000 births in 1870, was due to factors such as industrialization in the 19th century — which led to

¹ "Stanford startup's \$25 'sleeping bag' could save newborns," *Silicon Valley Business Journal*, April 20, 2008.

² Richard C. Lussky, Raul F. Cifuentes and Ashajyothi M. Siddappa, "A History of Neonatal Medicine — Past Accomplishments, Lessons Learned and Future Challenges. Part 1 — The First Century," *The Journal of Pediatric Pharmacology and Therapeutics*, April to June 2005.

the employment of women in factories — and the associated increase in the use of artificial feeding (i.e., dry nursing), as well as the high rate of child abandonment.³

THE INDIAN MARKET

“Every seven minutes, a woman in India dies due to pregnancy-related complications. India has the single highest share of neonatal deaths in the world.”

UNICEF’s India representative, Gianni Murzi⁴

The vast population and high total fertility rate of India gave the founders of Embrace the hope that they might be pursuing a large enough market opportunity. However, inadequate transportation and infrastructure presented significant challenges in realizing the opportunity. In India, almost 45 per cent of neonatal deaths took place within 48 hours of birth. The major causes of neonatal death were birth asphyxia and trauma, problems related to low birth weight (such as hypothermia, respiratory problems, feeding problems, and peripartum infections), and malformations. One in 18 children died before the first year of life and one in 13 died before five years.⁵

Although a significant decline in infant mortality was noticed in the 1980s and 1990s, the progress slowed down eventually. Neonatal mortality rates in 2011 contributed substantially to the infant mortality rate. As of 2005, neonatal death rates were about 28.5 and 42.5 per 1000 births in urban and rural India, respectively⁶ (see Exhibit 2). The main problems with setting up qualitative neonatal care in India were distance from hospitals, space constraints, economic unviability and lack of appropriate equipment.⁷ As a result, India had the unfortunate distinction of accounting for more than a quarter of the total newborn deaths in the world. The majority of these deaths occurred in rural areas where poverty and lack of knowledge about proper maternal and child health care were prevalent.

The National Neonatology Forum, a representative body of neonatal pediatricians, realized the dire necessity of addressing the growing need for neonatal care in India. They realized that merely simplifying and optimizing the newborn care services currently available was not adequate to address the needs of parents with low resources.⁸ The conclusion they arrived at was that the available neonatal care products such as incubators, radiant warmers and hot water pouches were not enough to fill the void.

Hospital markets in India were classified into three categories: primary, secondary and tertiary markets. Tertiary hospital markets were typically situated in areas with populations greater than or equal to one million, which were mostly the metros, or Tier 1, cities. They were able to cater to highly specialized cases in patients. Secondary hospitals were typically located in areas with populations between 0.5 and one million and were found mostly in Tier 1 and 2 cities. Finally, primary hospitals typically represented hospitals in rural areas and smaller towns in India, where infant mortality was the highest. They could at best provide basic care until an infant was transported to a larger hospital center nearby.

³ C.F. Bolduan, “The public health of New York City: A retrospect,” *Bulletin of the New York Academy of Medicine*, 19:6, 1943, pp. 433-440.

⁴ “India accounts for highest newborn deaths: UNICEF,” *DNA: Daily News & Analysis*, January 22, 2008.

⁵ Baseline surveys of Multi-centric Home-based Intervention project of the Indian Council of Medical Research (ICMR).

⁶ “National Family Health Survey (NFHS-3) — Volume 1, 2005-2006,” *International Institute for Population Sciences, India*, p. 34.

⁷ A. Fernandez and J.A. Mondkar, “Status of neonatal intensive care units in India,” *Journal of Postgraduate Medicine*, 39:57, 1993.

⁸ National Neonatology Forum of India, <http://nnfi.org>.

An incubator was a medical device that was sold only to hospitals. In general, there were two broad sectors that sold to health care-related markets — the pharmaceutical and medical devices markets.

Pharmaceutical Market in India

Pharmaceutical markets in India were very fragmented, with no single player having a market share of 10 per cent or greater in most markets. Margins were typically low, and the ability to sell large volumes was necessary, both for success and survival. This, in turn, implied that the ability to penetrate Tier 3 markets was the key to success for Embrace. Large upfront investments that were required to distribute pharmaceutical products (especially in Tier 3 markets) presented a significant barrier to entry.

Medical Devices Market in India

The Indian medical devices market was a relatively smaller market that ranked 20th globally in terms of volume. Per capita spending on medical devices in 2010 was US\$2 and was disproportionately small in relation to the per capita spending on medicines.⁹ Medical devices were typically expensive. Given these dynamics, a few large hospitals in Tier 1 cities represented the bulk of demand. Success in these markets required the ability to sell to large private hospitals. Since physicians in such hospitals were more prone to medical malpractice litigation, they often insisted on clinical studies that showed efficacy before deciding to buy devices. Moreover, reuse of devices was very rampant in these hospitals and most device manufacturers found it extremely costly to prevent reuse (see Exhibit 3).

Infant Incubator Market in India

Incubators had come a long way since 1857, when Jean Louis Paul Denucé reported the first use of an incubator in the care of a premature infant.¹⁰ Stéphane Tarnier modified a warming chamber for the rearing of poultry to develop in 1878 the Tarnier-Martin Couveuse — an incubator that decreased the neonatal death rate from 66 per cent to 38 per cent among infants in Paris.¹¹

Infant incubators came in three forms: a majority of currently used neonatal incubators were double-walled, closed-type incubators. This type administered controlled oxygen, humidity, and air temperature to maintain an ambient temperature in the cabinet while providing the desired humidity and oxygenation. A sterile microclimate was maintained by a microprocessor-controlled system, which could be critical for a vulnerable newborn. It also provided an environment similar to the maternal womb, but required high maintenance to mitigate the risks of bacterial growth in the water reservoirs and fluctuation of temperatures when infant care was delivered.¹² In 2011, most primary hospitals in India had a few incubators and radiant warmers, which were scarce in secondary hospitals and nursing homes. An average incubator could cost anywhere between 500,000 and 1,000,000 Indian rupees (Rs). However, a hospital-grade incubator was too expensive for most hospitals, especially in a rural setting. Incubators catering to the economy segment cost anywhere from Rs75,000-150,000, while a mid-end incubator cost Rs200,000-300,000.

⁹ "The Outlook for Medical Devices in Brazil, Russia, India & China," *Espicom Business Intelligence*, January 2006.

¹⁰ P Denucé, "Berceau incubateur pour les enfants nés avant terme," *Journal de Médecine de Bordeaux*, 2, 1857, pp. 723-724.

¹¹ T.E. Cone, "Perspectives in neonatology," in G.F. Smith and D. Vidyasagar, eds., *Historical Review and Recent Advances in Neonatal and Perinatal Medicine*, Mead Johnson Nutritional Division, 1983, pp. 9-33.

¹² *NeoCrib Incubator*-Paul Lee and Fabio Raman, May 3, 2011, <http://be470group9.blogspot.ca/2011/05/final-project.html>, accessed March 26, 2013.

A second type of incubator was an open-bed radiant warmer. A simplified incubator, it was utilized for easy access. External heat delivery required a continuous source of power. Priced at a more modest Rs40,000-50,000, radiant warmers had been used frequently in neonatal intensive care units (NICUs). Many large hospitals in Tier 2 markets had an NICU and a majority had radiant warmers. A downside of open-bed radiant warmers was that they could potentially overexpose infants to radiation, which might result in hyperthermia and burns. Thus, NICUs that used open-bed warmers required higher overheads to closely monitor infants being treated.¹³

The third alternative was a low-cost but relatively risky one, typically used in Tier 3 markets. This involved the placing of a single light bulb over a bed to warm an infant. According to Esha Tiwary, vice-president of marketing and business development at Embrace:

It is basically a light bulb placed over a bed . . . seen in semi-urban and rural settings where neither the doctors nor patients can afford any of the existing warming devices. One often hears cases of light bulbs shattering over babies due to voltage fluctuations. Sometimes there are two or three bulbs together.

Although this treatment was effective in many cases, instances of bulbs shattering and babies getting burnt were not uncommon. Further, bulbs needed uninterrupted power sources to be effective, which were rare in a rural setting.

See Exhibit 4.

SELLING THE IDEA, MEETING AN UNMET NEED

At a coffee house at Tressider, in the middle of the sprawling Stanford University campus, Chen and Liang sat down to develop a compelling business case to present to hospitals, doctors and health care workers. They were joined by the rest of the team — Rahul Panicker, Razmig Hovaghimian, Fabio Tran and Naganand Murty. They wanted to ensure that they were answering an unmet need and actually creating a market niche for the infant warmer. The fundamental roadblock was to convince buyers of the ease of use and safety of the device. Liang had just travelled to a few hospitals in rural Karnataka with minimal power to get an idea of the need and to demonstrate the advantages they thought they could provide to neonatal care.

In particular, Liang brought up the issue of whether the team should position its product as a medical device or as a retail pharmaceutical product. Liang pointed out that these markets were vastly different in terms of what it took to be successful.

After Chen and Liang had gone through various consultant reports in the Hoover library, they realized that the addressable market opportunity could be significantly different, depending on how they conceived the product, and also that positioning would be extremely critical for success. They brought this up at the meeting. On the one hand, the entire team was so passionate about addressing the needs of poor parents that they were determined to make it work. But on the other hand, they were also concerned about whether the market opportunity in fact made sense.

¹³ A panel of consultants to the Bureau of Medical Devices in the Food and Drug Administration (FDA) had cautioned the FDA to obtain additional information to assist it in evaluating radiation warmer safety as mentioned by a Committee on Environmental Hazards on infant radiant warmers.

Exhibit 1

FOUNDERS RAHUL PANICKER AND NAGANAND MURTY WITH THE INFANT WARMER



Source: India Semiconductor Forum, www.indiasemiconductorforum.com/medical/2131-bangalore-based-startup-embrace-designs-affordable-incubators.html, accessed March 6, 2013.

Exhibit 2

NEONATAL URBAN AND RURAL DISTRIBUTION IN INDIA

Total Population (2011 provincial census) - 1,210,193,422	
Per Cent Rural (Tier 3)	69
Per Cent Women	60
Per Cent Urban (Tier 1, 2)	31
Per Cent Women	52
Hospitals (per 100,000)	
Rural (Tier 3)	0.36
Urban (Tier 1, 2)	3.6
Total Fertility Rate	
Rural	3
Urban	2.1
Average Child-bearing Span	30 years
Reuse of incubators/machines (by Hospitals)	
Rural	1 in 20
Urban	1 in 10
Reuse of incubators/machines (by Individuals)	
Rural	1 in 5
Urban	1 in 3
Neonatal Deaths (per 1000)	
Rural	42.5
Urban	28.5

Source: World Development Indicators 2008; NFHS 3, 2005-2006; "India at a Glance," World Bank; market research.

Exhibit 3
MEDICAL DEVICES MARKET IN INDIA

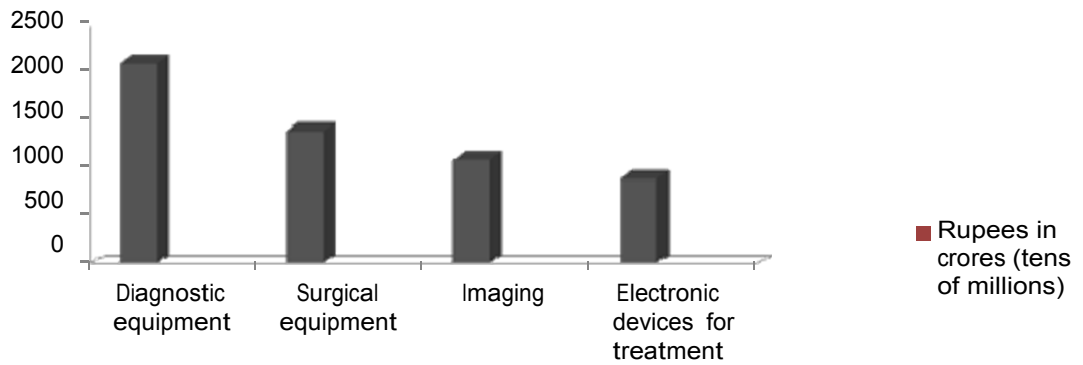
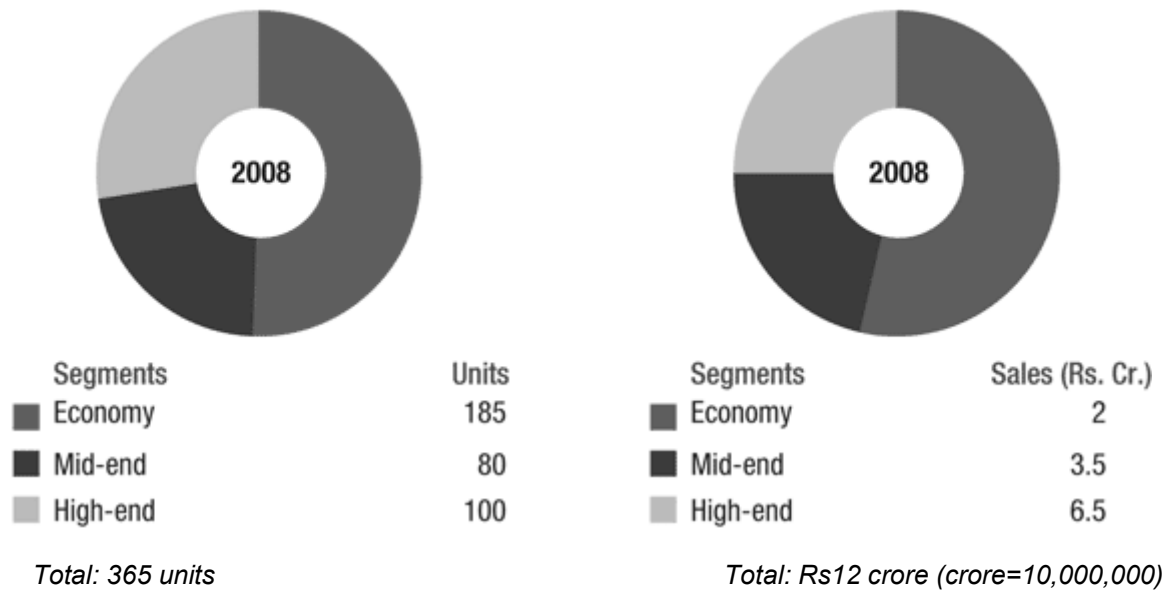


Exhibit 4
2008 INCUBATOR MARKET IN INDIA, BY UNITS SOLD AND REVENUE



Source: Adapted from "Neonatal and Infant Care Equipment: Technological Advancement Demands Awareness," November 2, 2009, www.medicalbuyer.co.in/index.php?option=com_content&task=view&id=2030, accessed March 6, 2013.