

Aravind: A Profile in Growing a Health Care Facility

As of 2006, Aravind Eye Care System (AECS), a network of hospitals in India, was the largest provider of eye care in the world. AECS was performing approximately 270,000 surgeries per year and serving over 2 million patients. AECS was a self-funding organization that provided free service to 70% of its patients. Its mission was to “Eradicate Needless Blindness.” Its method of operation had been studied by institutions ranging from universities to the World Health Organization.¹

One million surgeries and 100 hospitals by 2015. This was the goal set by AECS’s leadership. Reaching that goal posed a number of challenges. What are the financial metrics to be tracked and how should Aravind gather the relevant data? What are the steps for professional development of doctors and how could the organization measure when particular steps are completed? What is the optimal business model for the future growth, or are there multiple models that will work under different circumstances?

Background

In 1976, Dr. G. Venkataswamy (known as Dr. V) retired from government service; however, he did not believe his service to the people of India was complete. He began treating patients in his brother’s house in Madurai. He tried to raise money for a larger facility, but his efforts were useless. Twenty five years later, he would point to this as teaching him to be self-reliant.² Shortly after he started, he talked his sister, brother-in-law and other family doctors into joining the practice. In 1977, a new building housing 30 patients was built (financed by family savings and retained earnings). In 1978, a low cost hospital designed for free patients was available for 100 patients, and in 1980, they moved into what was to become the permanent location. Then, the first hospital outside of Madurai opened in 1985. In 1988, AECS opened a hospital in Tirunelveli.

By the early 1990s, intraocular lenses (IOLs), first used in 1949, had become the common method of treating cataracts. These foldable, acrylic lenses were designed to replace the natural human lens in cataract patients. They were, however, too expensive for most of AECS’s patients (about US\$100 per lens). That is why in 1992, Dr. V and his family established Aurolab, a laboratory that produced IOLs and other medical supplies at affordable prices. Aurolab was able to produce the lens at a cost below US\$10 per lens.

With success came numerous requests for assistance from other hospitals that were attempting to establish similar models. AECS formalized its method of delivering assistance in 1996 with the establishment of LAICO, a training and research facility jointly funded by Lions International and AECS.

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In 1997, the hospital was opened in Coimbatore and in 2003 the Pondicherry hospital was opened. In 2005, Aravind began experimenting with a new business model in which it provided the training, systems and management, while the funding and oversight was provided by an outside trust. Two of these managed facilities opened in northern India: Kolkatta, with the Birla Trust and Amethi, with the Ghandi family trust. By 2006, the combined AECS Hospitals cared for over 2 million patients per year and conducted over 270,000 surgeries. Cataract surgeries accounted for approximately 70% of these surgeries, but AECS offered a complete array of surgical services for the eye including laser, lasik, cornea, retina and glaucoma.

Dr. V's vision had been driven by a need he had seen first-hand in India, but that need is prevalent around the world. In 2002, The World Health Organization (WHO) estimated that 161 million people were visually impaired; 37 million of them were blind.³ More than 90% of the visually impaired live in developing economies with about one-third of the blind coming from Southeast Asia, another quarter coming from the Western Pacific region and almost 20% from Africa. For approximately half of this population, cataracts are the leading cause of visual impairment. Glaucoma is a distant second, accounting for a little over 12%. The WHO estimates that 75% of all cases of blindness can be prevented. A disproportionately large number of blind people are found in the Indian region and elsewhere in the world with the least access to healthcare.

The mission to eradicate needless blindness therefore required reaching out to the most remote communities. Dr. V understood that AECS would need to educate individuals in those communities and villages, individuals who had no familiarity with surgical procedures and were, therefore, reluctant to use them. AECS approached the task using mobile eye camps. Eye camps were run in partnership with local volunteers who marketed and organized the eye camp. AECS then sent a team of doctors and paramedics to screen patients, serve those that did not need surgery right there at the eye camp, and identify those that did need surgery back at the base hospital. AECS discovered early on that one of the barriers to people coming for the surgery was transportation. Thus, AECS began to provide transportation and food to anyone who required surgery. The surgical patients were transported to the base hospital where they were treated, counseled and then sent home within a day or two. Although alternative mechanisms to reach out to local communities had been used, eye camps remained the principal method.

The AECS Model

Dr. V described the Aravind Model as focused on demand generation, production efficiency and quality.⁴ Others within the organization produced a more detailed opinion of the model, as shown in **Table 1**.⁵

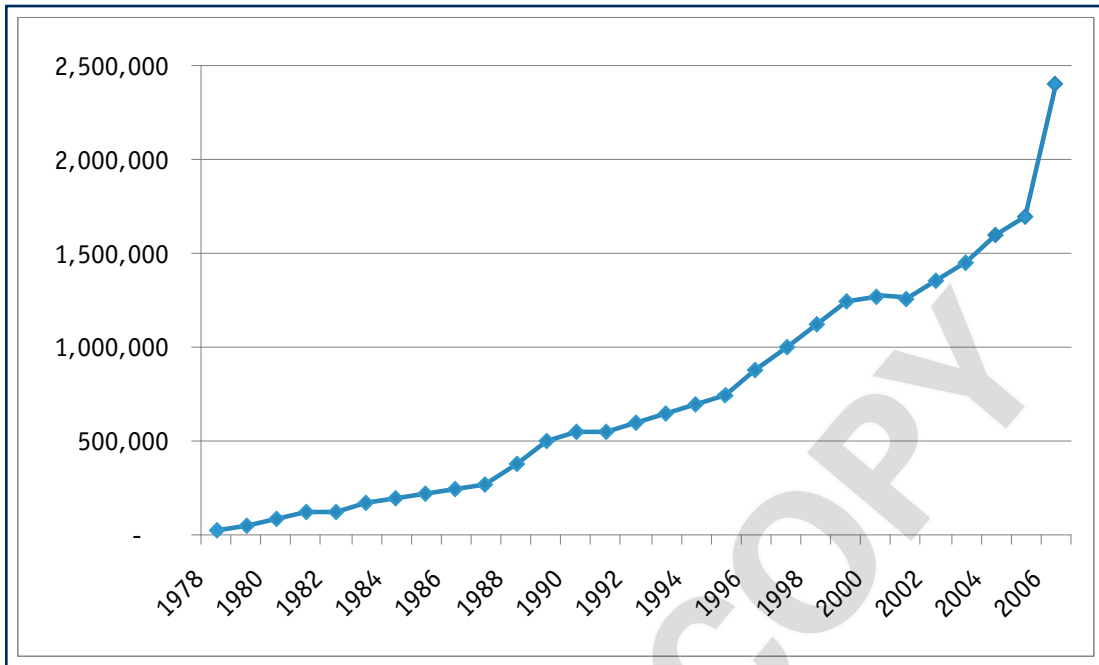
The three components Dr. V described are included in **Table 1**, though one – production efficiency – is narrowed down to a focus on volume (or scale) economies. The entire model and organization was driven by the vision to “eradicate needless blindness.” It was difficult to overstate the importance of this vision. Anyone whom you would meet at AECS would be familiar with the vision and many, if not most, were driven by it. In a 2003 survey, AECS doctors ranked “Working for an organization with a mission that is personally and professionally motivated” as the single most important motivating factor.⁶

AECS's chosen method of realizing that vision was a system in which approximately 70% of the patients paid nothing for the services. The funding for these patients came from the other 30% of the patients whose price was still low by western standards. **Figure 1** shows the growth in Aravind's outpatient visits and **Figure 2** frames the growth in terms of surgeries.

Table 1
AECS Model

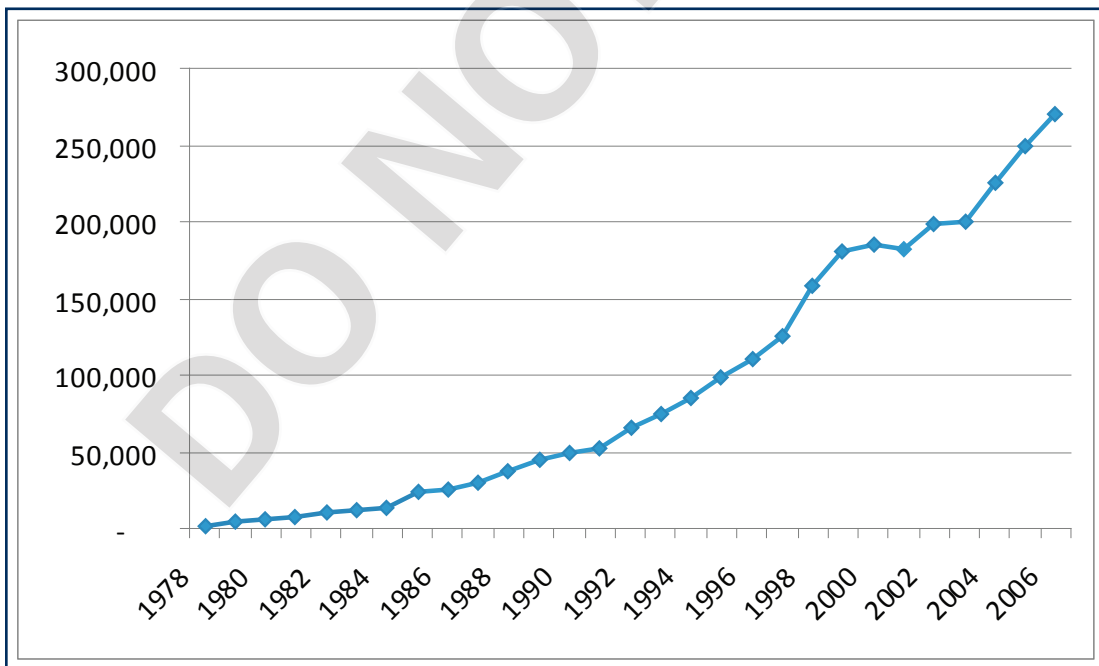
	High Volume	High Quality
Demand Generation	<ul style="list-style-type: none"> • Community outreach and community involvement • Using satisfied patients as motivators • Counseling • Building an institutional image 	<ul style="list-style-type: none"> • Case Selection • Uniform demand • Forecasting and planning • Base hospital approach
Building and Infrastructure	<ul style="list-style-type: none"> • Bed strength, outpatient department and operation theater capacity • Accessibility • Working days/time 	<ul style="list-style-type: none"> • Layout • Maintenance • Sanitation and hygiene
Manpower	<ul style="list-style-type: none"> • Number of staff • Staff mix • Working hours • Job allocation 	<ul style="list-style-type: none"> • Trained staff • Technical skills • Task-skill matching • Continuing medical education
Instruments, Equipment and Supplies	<ul style="list-style-type: none"> • Number and balance of operating tables, microscopes and surgical instrument sets • Availability in required quantity • Available when required 	<ul style="list-style-type: none"> • Good maintenance • Spare parts planning • Calibration • Quality of instrument • Reliability • Selection of brand and vendor
Systems and Procedures	<ul style="list-style-type: none"> • Procedures that ensure good: <ul style="list-style-type: none"> • Patient flow • Work flow • Cash flow • Flow of supplies • Resource utilization 	<ul style="list-style-type: none"> • Standardization • Clinical effectiveness • Medical records • Quality assurance systems • Review meetings • Management information systems • Patient-centered systems
Attitude	<ul style="list-style-type: none"> • Commitment to address the magnitude of the problem • Willingness to do large volume • Team work • Discipline 	<ul style="list-style-type: none"> • Patient-centered behavior • Desire to be perfect • Willingness to continually learn • Willingness to change

Figure 1
Aravind Outpatient Visits by Year



Source: Aravind Eye Care System
*2006 data are from April 2006 to March 2007; all other data are calendar year

Figure 2
Number of Surgeries per Year



Source: Aravind Eye Care System
*2006 data are from April 2006 to March 2007; all other data are calendar year

Systems

Dr. V's ability to realize the volume he did was closely tied to his development of systems. An initial meeting with him was likely to include a question as to how you could help him become more like McDonald's in offering eye care. He believed, and went on to prove, that large volumes of patients could be effectively served at a very low cost if the appropriate systems were established. Patients arrived at AECS and entered a detailed screening process, which included numerous stations – each capable of handling numerous patients daily. The system of putting patients through the operating theater allowed a single doctor to handle twenty or more operations in a day. Systems were developed to handle the considerable paperwork generated by this volume of patients. All of this was done while maintaining a quality of service, as measured by a complication rate, that was comparable to, and often better than, western standards.

When problems arose, systems were developed to deal with the challenges posed by those problems. Patient discomfort and uncertainty led to the offering of counseling services at multiple stages in the screening and operating process to ensure that the patient understood and was comfortable with the process. When eye camp patients for whom surgery was recommended were reluctant or unable to travel to the hospital for the surgery, a transportation system transported the patient and a family member to the hospital for the surgery, fed them and transported them back home.

As a result of the 100 hospitals/one million surgeries goal, the need for more systems had become apparent. AECS began to consider financial metrics that could be used to monitor hospital performance; process flows within units were examined more carefully; and in the summer of 2006, the leadership developed a step by step process for the professional development of clinical staff into positions of leadership within the hospital.

The systems that were developed by AECS could also be a limiting factor: they required a certain scale and could be limited by the demographics of the community. The screening process, for instance, required a number of different stages that were costly to establish in the first place but which, once established, could handle a much larger volume than more conventional screening methods. The magnitude of the scale required was so large that in a report on applying the AECS Model to South Africa, a country with 300,000 blind, eighty percent of which were deemed curable, the conclusion was that the AECS Model was not warranted because of lack of volume.⁷ Large numbers by themselves would not be enough – the composition also mattered. The AECS Model relied on a paying population to support the free services. The demographics of a location were, therefore, important. One concern with applying the AECS Model in Kenya, for instance, was the lack of a sufficiently large paying population.⁸ However, a large paying population was not necessarily ideal for the AECS Model either. One of the challenges at the hospital in Coimbatore was the competition AECS faced because of the large paying population in the area. The competition targeted the paying population, which undermined AECS's ability to tap into this group to subsidize the free patients.⁹

Outreach Methods

Dr. V developed eye camps as a way to reach out to the rural communities while on the faculty at the Madurai Medical College. He continued to develop the idea after retiring from the College and founding AECS. Eye camps were mobile units that traveled to rural locations that were anywhere from 20 km to 200 km from the main hospital that they fed. Eye camps were planned as much as a year in advance and required close work with community leaders and sponsors. Locations with populations of at least 5,000 were chosen and the local community volunteers were responsible for helping with the operation and the marketing of the camp. When Dr. V talked about marketing, he spoke of encouraging patients to take advantage of this free service.

Each eye camp team had at least two doctors and seven paramedics. The team provided eye exams, refraction, eye glasses and medications on site. Patients in need of surgery were offered transportation back to the main hospital with the medical team. Eye camps treated 250-3,000 patients at a time, about 20% of which were recommended for surgery. Since transportation was offered, close to 100% of those recommended would follow through with the surgery.

In 2004, AECS began experimenting with Vision Centers and Community Centers as a feeder system to the main hospitals. Vision Centers differed from eye camps in that they were stationary, and were not staffed by a doctor. They did, however, have a high speed communication link to the main hospital. Staffed by paramedics, these centers could provide eye exams and identify refractive errors. If glasses were needed, the paramedic at the center determined the prescription and sent it in to the main hospital to be filled. All other eye care had to be diagnosed and treated at the main hospital. Unlike the free services provided at eye camps, patients were charged a nominal fee for services provided at the Vision Center.¹⁰

Community Centers were initially designed to be staffed with one doctor and serve larger populations than Vision Centers or eye camps. Glasses could be manufactured on site and, because there was a doctor available, more services could be provided on site. Operations and more complicated cases would continue to be referred to the main hospital. Some consideration was given to using optometrists instead of ophthalmologists and in 2006 AECS started a 2-year Optometry degree program in Madurai.

Human Resource Development

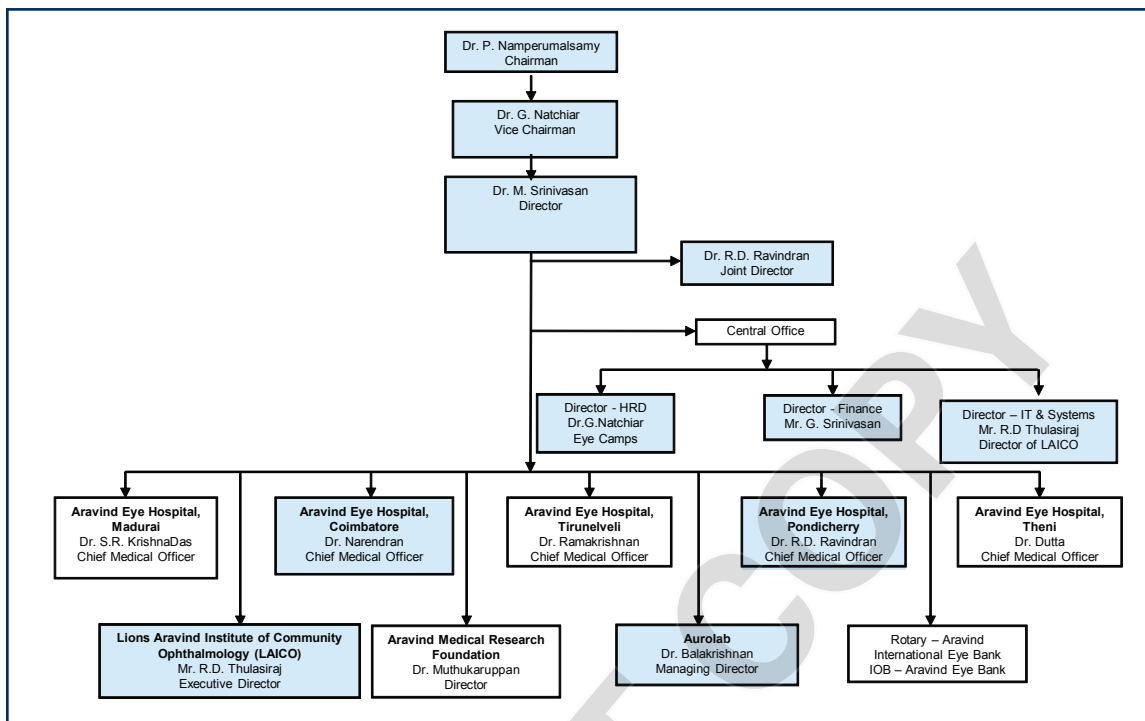
To date, much of the leadership within AECS was part of Dr. V's extended family (see **Table 2**). Over the years the strength of the commitment to the mission and quality of the clinical care had been largely a result of this relationship. However, expansion to 100 hospitals would require developing clinical and managerial leadership and staff outside of the family.

AECS recruited sisters, or nurses, from local communities. Girls in their mid- to late teens were offered the opportunity to work at AECS after going through a careful screening process in which both the girls and their parents were interviewed. It was understood that many of the girls would want to leave after a few years to be married, while others would opt to stay longer. In 2007 there were over 1300 sisters working at the five main hospitals in Tamil Nadu (excluding the managed facilities in northern India). The turnover rate at these hospitals was about 3%.¹¹

Sisters performed a wide range of roles such as assisting in the operating theater, processing admissions and maintaining facilities. The extensive experience of some of the surgical nurses enabled them to detect problems with their bare eyes that the doctors, looking through microscope, may not see as quickly. The operating theater was effectively run by a sister in many cases, with the doctors taking directions in terms of timing and procedures from the sister in charge.

Cultural differences in the northern part of India presented some problems for transferring the AECS model. Sisters were often described as the backbone of the AECS model, but the dedication of the sisters in the original five hospitals was not observed in all of the sisters hired for the managed hospitals in the north. To facilitate the initial development of these hospitals, sisters were transferred from Madurai to manage and develop the nursing staff. Over time, the number of nurses transferred gradually decreased.

Table 2
Aravind Eye Hospital System - Organizational Chart
 (shaded positions are members of Dr. V's family)



AECS attracted doctors from around the world by offering them the possibility to gain, in one month, experience that could take years to obtain at other eye hospitals. However, AECS faced the challenge of identifying and retaining enough doctors to sustain their targeted growth rate. AECS performed numerous studies that addressed this issue over the years.¹² The results of these studies suggest some important points:

1. Staff was interested in improvement and believed the organization was capable of change. Seventy percent of the respondents in a study of the AECS retention program indicated they were confident that AECS would use the ideas from the study to make a change.¹³ Ninety five percent of the doctors believed that the metrics being developed in another study would prove to be effective in helping them improve their work.¹⁴
2. Human resource development in general, and leadership development in particular, were widely recognized as the most significant challenges. A 2001 survey of the AECS leadership identified staff retention and commitment as the principal challenges faced by AECS. In a summer 2006 leadership workshop, leadership development was identified as the principal challenge to meeting the goal of 100 hospitals by 2015, a sense echoed in the request by AECS leadership for a 2007 project titled "Creating Leaders with a Vision."
3. Despite the challenges that had been acknowledged, AECS continued to lack a well-defined career path for doctors entering the organization, although it has begun to develop one.
4. While some of the less senior doctors viewed working conditions and salary concerns as a potential problem, all doctors viewed growth, public recognition and connection to mission as the most important motivating factors.¹⁵

As of 2007, there were about 130 full-time doctors in the five AECS hospitals in Tamil Nadu (not including the managed hospitals) and an additional 170 post-grads or fellows. The average full-time doctor performed about 620 surgeries per year and the median turnover rate was 7.2%.¹⁶

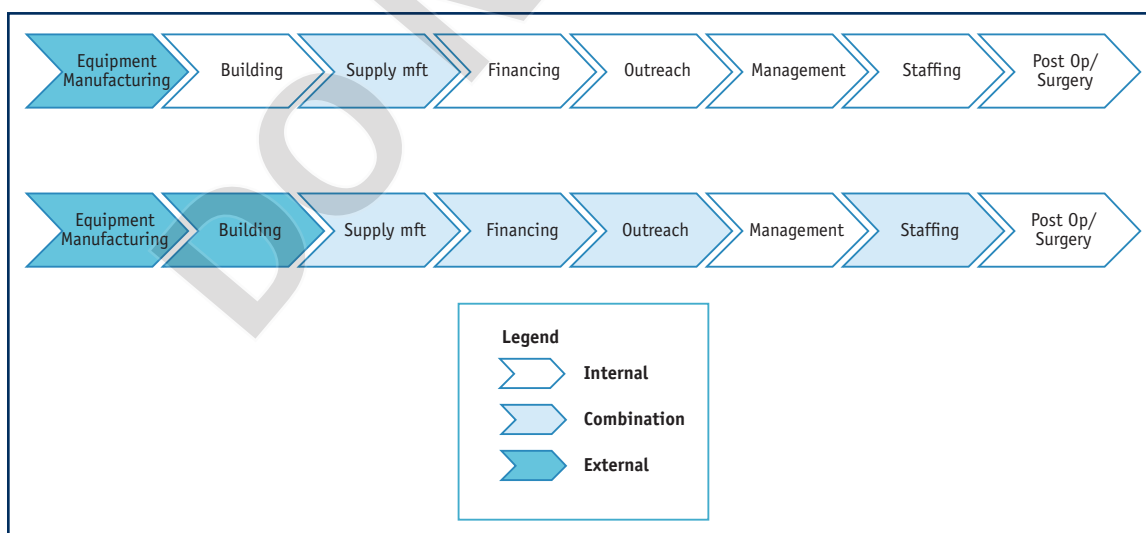
Business Model

In addition to the different methods of reaching out to the rural communities, AECS tried two different business models for the hospitals themselves. The first and most tested was a vertically integrated model in which AECS directly controlled everything from designing and building the physical hospital, to training staff, to manufacturing some of the key supplies (intraocular lenses and sutures). This original model was in place in all of the hospitals in southern India (Tamil Nadu). The extent of the integration had even increased over the years at these hospitals. Manufacturing of certain supplies, for instance, was added after more than ten years of operation. Training in optometry was added in 2006.

Managed care options had been in place since 2004 in Kolkatta and Amethi in northern India. The Indira Gandhi Eye Hospital and Research Center in Amethi was funded by the Rajiv Gandhi Charitable Trust and connected to its full-service hospital. The Kolkatta operation was funded by the MP Birla group, which was also involved in some oversight of the hospital. These facilities were a plane ride away from Madurai and relatively independent from the five hospitals in Tamil Nadu. Indeed, in some respects the staff at these hospitals saw themselves as separate from AECS. When asked how long they had worked at Aravind Hospital, some of them replied that they had never been to Aravind. Dr. Aravind, one of Dr. V's nephews, took on most of the responsibilities for these operations and much of the leadership within AECS did not see these operations as central.

In addition to the issues regarding the sisters described above, these hospitals differed from the rest of the AECS hospitals in that they were not lead by an AECS-trained doctor. AECS's on site representation was headed by a manager trained at LAICO (AECS's training institute founded in Madurai to conduct research and offer training to other hospitals interested in applying the AECS Model).

Figure 3
Business Model



There was also a significant difference in the degree of vertical integration. **Figure 3** shows a simplified vertical chain for the two operations. Using the hospital in Madurai as an example of the southern India model, with the exception of the manufacturing of equipment and some commodity supplies, AECS was involved in almost every aspect of the hospital operation. The northern hospitals, on the other hand, controlled only the management and the surgery. They had little to no involvement in the building, financing or outreach. They provided the training in almost all cases, but did not necessarily hire the employees or perform that process.

Other models were being considered for future development. The leadership recognized that some model other than the completely vertically integrated model would have to be employed for some of the hospitals if they were to reach the goal of 100 hospitals. Exactly which models would be used was open to discussion.

Moving forward, the leadership at Aravind needed to address a number of questions. What should be the role for managed care hospitals in the growth of AECS? What should be the role of the partnering institutions in these operations? What would be the most effective method of outreach: eye camps, Vision Centers, or Community Centers? Uttar Pradesh, where the Amethi operation was located, has a population of almost 180 million people, almost three times that of Tamil Nadu, where the wholly-owned Aravind Hospitals were located. How many hospitals would be needed to serve Uttar Pradesh? Would all of the hospitals be full-service hospitals? What would be the relationship between those hospitals? What would be the relationship between those hospitals and the hospitals in Tamil Nadu? What would the organizational relationship look like as Aravind continued to expand throughout India?

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Endnotes

- ¹ See, for example, Munson, et al. (2005), an evaluation of an International Eye Foundation program started in 1999 designed to extend sustainable eye care operations outside of Aravind. In addition to the International Eye Foundation, funding for the program was provided by the United States Agency for International Development, the Bureau for Humanitarian Response, and Private and Voluntary Cooperation.
- ² Venkataswamy, Govindappa. 2001.
- ³ "Magnitude and Causes of Visual Impairment." *World Health Organization*. 1 Nov. 2004. 25 Mar. 2008. <<http://www.who.int/mediacentre/factsheets/fs282/en/>> 25 Mar. 2008.
- ⁴ Venkataswamy, Govindappa, 2001.
- ⁵ This can be found in one of the two first Ross School projects (Ross School Report 2000a) completed by a team of Ross School students that included Dr. Aravind Srinivasan, nephew of Dr. V. Dr. Aravind is now the Administrator of the Madurai Hospital and a member of the Senior Leadership Team at the Aravind Eye Hospitals. The Senior Leadership Team acts in much the same way a Senior Executive Team/Board of Directors does at a corporation. It is the ruling body within Aravind. Further evidence that the Aravind organization views this as the Aravind Model can be found in the footnote of the report which indicates that this table is based on a paper coauthored by R.D. Thulasiraj, who has been a member of the Senior Leadership team since that time.
- ⁶ Ross School Report. 2003a.
- ⁷ Ross School Report. 2000a.
- ⁸ Ross School Report. 2001a.
- ⁹ Ross School Report. 2003b.
- ¹⁰ Ross School Report. 2005.
- ¹¹ Turnover rate is the percentage of sisters with less than 5 years experience who leave the organization (see Ross 2007a).
- ¹² Even though every single Ross School project states human resource needs, four have been explicitly devoted to this topic, the most recent being the 2007 report. Maxine Harrington completed a two-year report on human resource development in 2000.
- ¹³ Ross School Report. 2003a.
- ¹⁴ Ross School Report.2004a.
- ¹⁵ Based on Herzberg's 1968 model. See Ross School Report 2004a and Ross School Report 2003c.
- ¹⁶ Turnover rate is the percentage of doctors with less than 5 years experience who leave the organization (see Ross School Report 2007a).



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