Growing Pains

A Ross School Perspective on the Evolution of the Aravind Eye Care System

DRAFT - December, 2005

Paul Clyde
William Davidson Institute at the
Ross School of Business
University of Michigan
pclyde@umich.edu

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Health care issues facing emerging markets are well documented and pervasive with few obvious solutions.[1] The Aravind Eye Care System is a welcome light in such a gloomy picture. And a bright one at that. Aravind Eye Care System, a network of hospitals in India, is the largest provider of eye care in the world. Aravind performs approximately 225,000 surgeries per year and serves about 1.4 million patients. Aravind is a self funding organization that provides free service to 70% of its patients. Its mission is to "Eradicate Needless Blindness". Given its track record, it should come as no surprise that its method of operation has been studied by institutions ranging from universities to the World Health Organization.[2]

Since 1999, the Ross School of Business at the University of Michigan, often through The William Davidson Institute, has provided teams of students to study Aravind and provide recommendations for further growth. In all, fourteen projects have been completed. This body of work, taken as a whole, is focused on the growth of Aravind's reach. That growth can take place through extending Aravind's own internal growth, or it can take place via a transfer of Aravind's learnings (e.g. training, consulting or other contractual arrangements with independent hospitals). Either way, the reports are focused on the ever-evolving Aravind Model. The present paper summarizes some of the findings and conclusions of those papers through the lens of the Aravind Model. The first section presents a brief description of Aravind and its history. The second section explores the Aravind Model at a high level. The third section explores some recurring themes from the reports which may provide some insights into the future challenges of the Aravind Model.

I. Background

In 1976, Dr. G. Venkataswamy (known as Dr. V) retired from government service. His retirement was required as a government employee; his service to the people of India was far from complete. He began treating patients in his brother's house in Madurai. He tried to raise money for a larger facility. This effort failed. Twenty five years later, he would point to this as teaching him to be self reliant.[3] 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 the free patients was available for 100 patients; and in 1980, they moved into what was to become the permanent location. Theni, the first hospital outside of Madurai opened in 1985. In 1988, Aravind opened a hospital in Tirunelveli.

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[1] See, for instance, the World Health Organization's *World Health Report 2005*.

[2] See, for example, Munson, et al. (2005) which is 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

[3] Venkataswamy (2001)

By the early 1990s, intraocular lenses, 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 Aravind's patients (about $100 per lens). So in 1992, Dr V and his family established Aurolab, a laboratory that produces IOLs and other medical supplies at affordable prices. Aurolab was able to produce the lens at a cost below $10 per lens. All of this success brought numerous requests for assistance from other hospitals attempting to establish similar models. Aravind formalized its method of delivering assistance in 1996 with the establishment of LAICO, a training and research facility jointly funded by Lions International and Aravind.

Two more hospitals were opened in 1997 (Coimbatore) and 2003 (Pondicherry) bringing the total hospital beds to nearly 3600 in the five hospitals. By 2004, the combined Aravind Hospitals cared for about 1.4 million patients per year and conducted 225,000 surgeries. Cataract surgeries account for approximately 75% of the revenue, but Aravind offers a complete array of surgical services for the eye including laser, lasik, cornea, retina and glaucoma.

Dr. V's vision is driven by a need he saw first hand in India, but that need is prevalent around the world. The World Health Organization (WHO) estimates that 161 million people were visually impaired in 2002; 37 million of them were blind.[4] 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 Western Pacific region and almost 20% from Africa. Cataracts are the leading cause of visual impairment accounting for almost half. Glaucoma is a distant second accounting for a little over 12%. The WHO estimates that 75% of the blindness is avoidable. A disproportionately large number of those are in the areas of India and elsewhere in the world that have the least access to healthcare.

The mission to eradicate needless blindness, therefore, requires reaching out to the most remote communities. Dr. V understood that Aravind would need to educate individuals in those communities and villages, individuals who have no familiarity with surgical procedures and are therefore reluctant to use them. Aravind approached the task using mobile eye camps. Eye camps are run in partnership with local volunteers who market and organize the eye camp. Aravind then sends a team of doctors and paramedicals to screen patients, serve those that do not need surgery right there at the eye camp, and identify those that do need surgery to be sent back to the base hospital. Aravind discovered early on that one of the barriers to people coming for the surgery was transportation. Thus Aravind provides transportation and food to anyone requiring surgery. The surgical patients are transported to the base hospital where they are treated, counseled and then sent home within a day or two. Recently, alternative mechanisms to reach out to local communities have been used, but eye camps remain the principal method.

[4] http://www.who.int/mediacentre/factsheets/fs282/en/

II. The Aravind Model

The Aravind Model is laid out in one of the two of the first Ross School projects (Ross 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.[5] This is the model as understood by those within Aravind.

[5] 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 in the report which indicates that this table is based on a paper coauthored by R.D. Thulasiraj, who was a member of the Senior Leadership team at the time (and still is).

Table 1		
	High Volume	High Quality
Demand Generation	• Community outreach and community involvement • Using satisfied patients as motivators • Counseling • Building an institutional image	• Case Selection • Uniform demand • Forecasting and planning • Base hospital approach
Building and Infrastructure	• Bed strength, outpatient department and operation theater capacity • Accessibility • Working days/time	• Layout • Maintenance • Sanitation and hygiene
Manpower	• Number of staff • Staff mix • Working hours • Job Allocation	• Trained staff • Technical skills • Task-skill matching • Continuing medical education
Instruments, Equipment and Supplies	• Number and balance of operating tables, microscopes and surgical instrument sets • Availability in required quantity • Available when required	• Good maintenance • Spare parts planning • Calibration • Quality of instruments • Reliability • Selection of brand and vendor

Systems and Procedures	• Procedures that ensure good:
	  • Patient flow
	  • Work flow
	  • Cash flow
	  • Flow of supplies
	  • Resource utilization
		• Standardization
		• Clinical effectiveness
		• Medical records
		• Quality assurance systems
		• Review meetings
		• Management information systems
		• Patient centered systems

Attitude	• Commitment to address the magnitude of the problem • Willingness to do large volume • Team work • Discipline	• Patient centered behavior • Desire to be perfect • Willingness to continually learn • Willingness to change

It is difficult to argue with many of the items above. In fact, almost any hospital might well subscribe to the items on these lists. But what uniquely defines the Aravind Model? There are two items in Table 1 that distinguish Aravind from other hospitals and are arguably the source of its strength. The first is the scale of the organization. While other hospitals may have target numbers of surgeries, it is hard to imagine another hospital with Aravind's singular focus on volume. Aravind currently treats more patients than any other eye care facility in the world and its goal is to quadruple that number. At this scale, Aravind is able to enjoy economies that other hospitals cannot. The second is not explicitly stated in the above depiction of the Aravind Model; however, it is implicit in the Demand Generation description. It is the Aravind Vision to "Eradicate Needless Blindness".

These two characteristics, combined with a dedication to quality (presumably not a characteristic that distinguishes it from other hospitals), provide the foundation for the Aravind Model. This description parallels Dr. V's description of the model as focused on demand generation (vision), production efficiency (scale) and quality.[6] In this paper, these three characteristics are viewed as the set of non-negotiable guidelines that define the Aravind Model. These guidelines provide the foundation for everything that Aravind does including its efforts to improve and expand its role in the world.

A. Vision

The vision of Aravind – to eradicate needless blindness – permeates the workforce at Aravind in a way that any corporation would envy. It is difficult to overemphasize the impact of this vision on the Aravind leadership, staff and wider Aravind community. It is the single largest motivating factor among the doctors.[7] Any organization strives to develop a vision that its employees can buy into and commit to. Few if any are as successful at accomplishing this goal as Aravind. Aravind's chosen method of realizing that vision is a system in which 70% of the patients pay nothing for the services. The funding for these patients derives from the other 30% of the patients whose price is still low by western standards. However, this oversimplifies the vision of Aravind and why it is so important. The Aravind Vision really addresses two sets of questions: 1) Is this the right thing to do, and 2) is it done the right way. Aravind's success in accomplishing the first part of this Vision is evident in the response of the doctors to a survey conducted in 2003 (Ross, 2003a). In that survey, doctors ranked "Working for an organization with a mission that is personally and professionally motivated" the single most important motivating factor.

The second set of questions asks if this is likely to be successful. Believing in the cause is only half the battle. The Aravind employees must also believe that the way the vision is being accomplished is effective. Is the system sustainable? Is it carried out competently? Employees may believe in what is being accomplished, but if they don't have confidence in the way the organization is being run, the organization is unlikely to succeed. A basic level of confidence is essential. Many of the projects carried out by Ross School students have been aimed at doing things better – improving the processes. The very fact that these issues are considered is likely to give the employees working at Aravind the confidence that the process will ultimately work. This part of the vision is often overlooked in reports and other assessments. However, two studies offer some evidence that Aravind is accomplishing this goal. Seventy percent of the respondents in a study of the Aravind retention program indicated they were confident that Aravind would use the ideas from the study to make a change (Ross 2003a). Ninety five percent of the doctors believed metrics that were being developed in another study would prove to be effective in helping them to improve their work (Ross 2004a). Thus, while every study found a number of areas for significant improvement, that just makes Aravind like any other organization. What distinguishes Aravind is the fact that it is willing to critically

[6] Venkataswamy (2001)
[7] Ross 2003a.

assess its operations, learn from its mistakes and, when necessary, change. This willingness is likely to feed the confidence that the Aravind employees have in the model.

It is also interesting to note what the vision does not say. It does not say anything about the geographic market. Eradicate needless blindness where? Tamil Nadu? Southern India? India? Asia? The world? The absence of details on this arguably gives the vision more impact. Its power derives, in part, from its simplicity. However, this also causes some confusion in some cases. A lack of clarity on the vision, accounts for observed differences in interpretations of where Aravind needs to go over the coming five or ten years.[8] As Aravind continues to expand, it will have the opportunity to address wider audiences. The answers to questions about whether to reach out to those audiences, and if so, how, depend on the geographic market included in Aravind's vision.

B. Scale Economies in Paying and Non-Paying Patients

Aravind is a self funding organization. As mentioned above, Aravind targets serving 70% of its patients for free. How do you provide such a large percentage of free services and remain financially independent? A large part of the answer is scale economies. Aravind focuses on realizing scale economies in almost all that they do, including clinical procedures, administrative procedures and human resources. The sheer volume of patients that come through the Aravind Hospitals, allows them to develop systems that other hospitals would never consider trying (and that wouldn't be profitable for the other hospitals to try). Some idea of the extent of scale economies comes from the report considering the possibility of deploying the Aravind model in South Africa.[9] There are 300,000 blind in South Africa, eighty percent of which are curable. However, the report concludes that the Aravind Model is not warranted because of the lack of volume.

Large numbers by themselves are not enough – the composition also matters. From the beginning, Aravind recognized the importance of a paying population to support the free services. The demographics of a location are therefore important. Kenya, for instance, presents some concerns because there may not be a sufficiently large paying population (Ross, 2001a). However, a large paying population is not necessarily ideal for the Aravind model either. One of the concerns with Coimbatore is that the paying population in the area is large enough to generate considerable competition for paying customers, thereby undermining Aravind's ability to tap into this group to subsidize the free patients (Ross 2003b). It is not clear that the Aravind Model can thrive in an area that is too poor, or in an area that has too many with the ability to pay.

While many of the scale economies realized in the Aravind Model are similar to those of other businesses, one warrants special mention. The hiring of doctors benefits from scale economies but in a slightly different way than nurses or support staff. Doctors come to work to Aravind from around the world, sometimes at no cost to Aravind, because of the experience they can gain while there. The number of cases that a doctor

[8] See Ross 2001c
[9] Ross 2000a

can see in one month at Aravind can equal a year's worth or more at other institutions. Compensation to doctors, therefore, comes in two forms -- pecuniary and experience – with the former often being the less important to the doctor.

C. Quality

Scale economies also assist Aravind in developing quality. Aravind has been able to develop metrics that are replicable across the organization in creating and ensuring a high quality product. The attention to quality shows in their close tracking of complications and intense pride in a rate that compares favorably with any western hospital (which is subject to considerably more regulatory requirements designed, ostensibly, to improve the safety of the procedures). Aravind has also increased the focus on research which has the effect of keeping Aravind clinicians up to date on the latest knowledge in the field.

III. The Aravind Model and the Ross Reports

The remainder of this paper focuses on the analysis, conclusions and recommendations of the reports completed by the series of teams from the University of Michigan's Ross School of Business. A dependence on Ross reports is subject to the criticism that it reflects the understandings of the teams which may or may not comport with the realities Aravind faces. There are reasons to believe that this concern is not as great as it may at first appear. First, with one exception, the subject of each report was at the request of Aravind's leadership.[10] Aravind leadership, which generally included R.D. Thulasiraj (one of the five original members of the Senior Leadership Team), played an active role in determining the initial description and then worked closely with the Ross team once it arrived in India to refine or slightly adjust the focus of the project. In the case of the first and third reports, Dr. Aravind, a current member of the senior leadership team and a practicing doctor with Aravind at the time (in addition to being a student at the Ross School), was one of the team members from Ross working on the report. Dr. Aravind has played a significant role in defining projects since his return to Aravind. Second, for each report, much of the data gathered were interviews of Aravind staff. In all projects, the specifics of the outcome were in part driven by these interviews. In a few cases, some fairly major turns in the scope of the project were a direct result of concerns expressed by the medical staff at Aravind. Thus, while the works of the teams of students are independent products, they almost always were a direct reflection of the concerns expressed by Aravind's leadership and staff.

Viewing these reports as a reflection of the challenges Aravind faces is suggestive of two conclusions. First, there are three recurring and interrelated themes that are common to all of the reports: human resource development, information, and the organizational structure. Their pervasiveness over time and across different report topics suggests they are likely to continue to be of importance. Indeed, experiences with other organizations whether private or public, small or large, indicates these themes are of

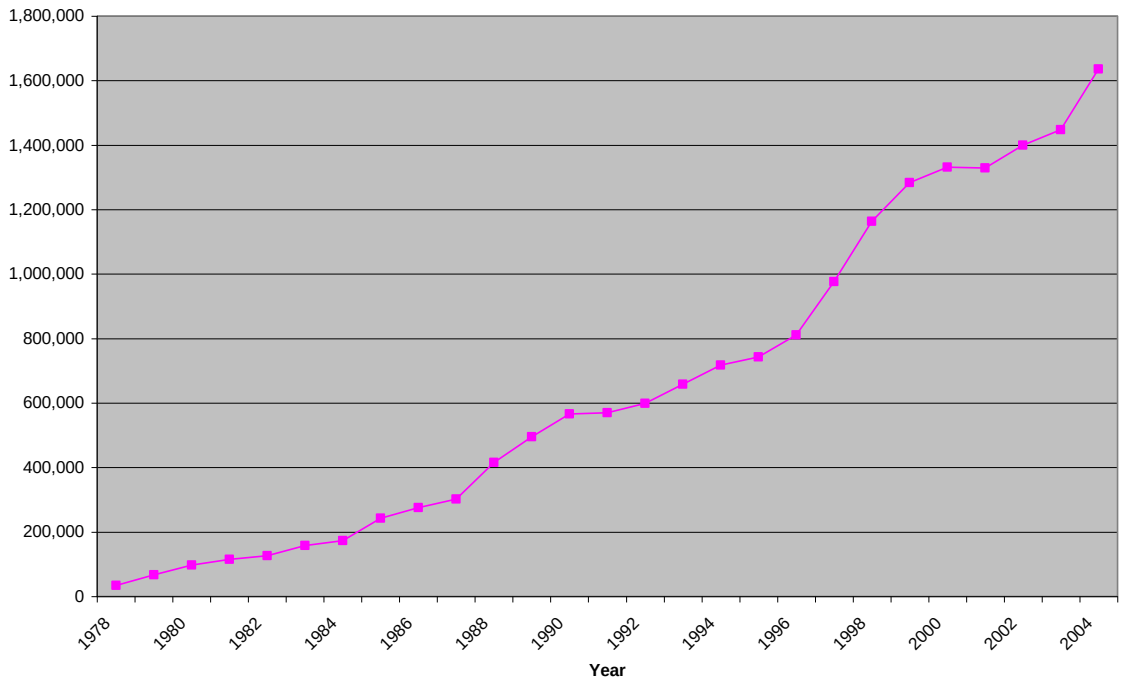
[10] The one exception is the independent study which came a few years later (2003c) and was focused on extending the Aravind model outside of eye care.

universal importance. These three themes are explored in part B of this section. Second, the sequence of reports suggests that the challenges facing Aravind evolve as the organization develops. Specifically, a cycle is observable: a focus on expansion leads to a need to develop the support systems more effectively which leads to a focus on one particular support system – human resource development – which leads back to a focus on expansion.

A. The Cycle of the Aravind Model

An overview of the reports shows an interest in 1999 and 2000 in methods of expanding the Aravind Model within Aravind (Ross 1999) and outside of Aravind (Ross 2000a, 2001a). The focus then turned to internal processes including materials management (Ross 2000b), data sharing (Ross 2001b, 2002b) and the allocation of decision making processes (Ross 2001c). The internal focus led to a series of reports that detailed the human resource processes and the needs for change (Ross 2002a, 2003a, and 2004a). The most recent reports are focused again on how to extend the Aravind reach both through internal organizational change (Ross 2004b, 2005) and through contracting with external parties (Ross 2006). If this is indicative of the challenges facing Aravind, a cycle is observable: expansion leads to system improvements which leads to human resource development which leads back to expansion.

Figure 1: Aravind Outpatient Visits by Year



Source: Aravind Eye Care System

An historical context lends some support to this reading of the data too. Figure 1 shows that the growth rate as measured by number of outpatient visits was growing in

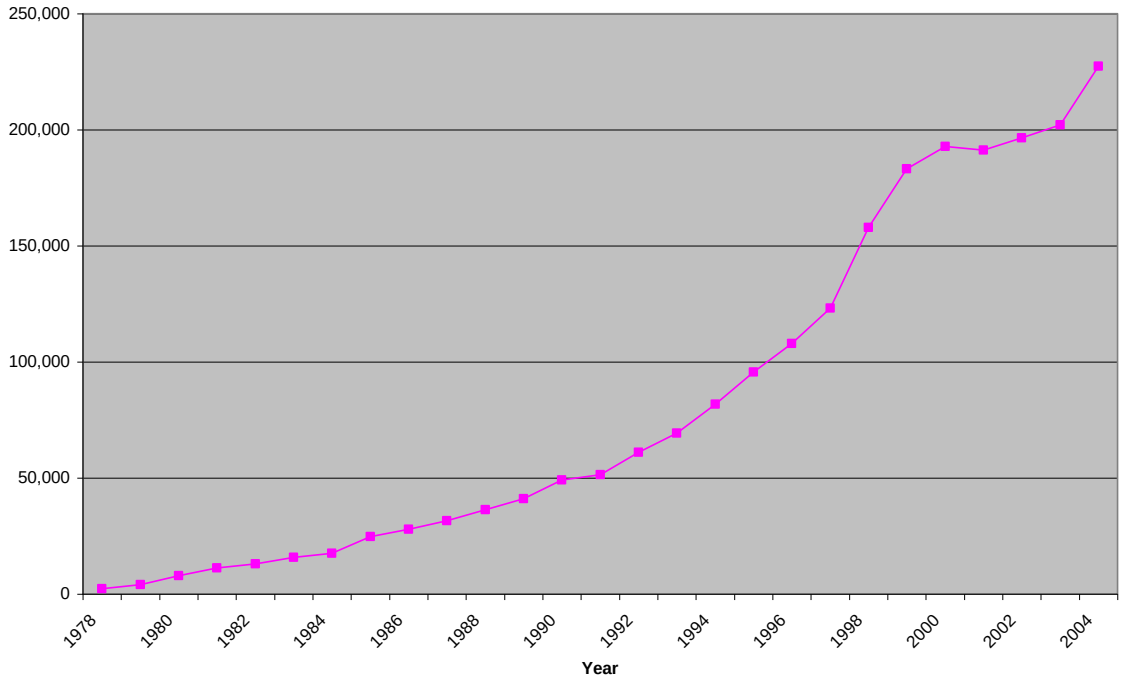
cycles: periods of significant growth followed by more modest growth followed by more significant growth and so on. The first Ross report was in 1999 and was focused on growth: the protocol for opening a new hospital. This report came at the end of a significant growth cycle. Figure 2 shows this more clearly. The growth at Aravind as measured by number of surgeries had been growing at an accelerated rate until 1999. Not surprisingly, this accelerated growth rate could not be maintained forever and from 1999 until 2003, for the first time in Aravind's history, the number of surgeries performed remained basically constant. There are at least two potential reasons for this.

First, from the demand side, as Aravind grows in its existing community, the percent of the population that is unserved drops and accessing the remaining unserved becomes increasingly difficult. This lead to an expansion of the geographic market through the opening of hospitals outside of Madurai. However, the expansion has been somewhat limited by the availability of family members who have almost always served in the leadership posts at the hospitals.

The second reason that the growth level could not be maintained is the need for internal systems to adjust. Growth placed greater stress on existing systems and organizational structures. Internal change requires the focused attention of the leadership. If the leadership is focused on internal changes, it is not focused on growth. The Ross reports during the 2000-2004 time period focused on systems such as materials management and communication. The ability to execute these systems depends on having the right people in place and a mechanism to develop them. The right people for such an organization are likely to be ambitious. Those ambitions will need to be fed, often by further expansion.[11] Thus, as comfort is gained with the new systems, the attention again turns to growth.

[11] Growth was one of the top motivating factors among doctors. (2003a)

Figure 2: Number of Surgeries



Source: Aravind Eye Care System

This characterization of the cycle of issues facing Aravind undoubtedly oversimplifies the issue. Aravind is constantly dealing with all three – growth, internal systems and human capital development – at the same time. Human capital development, for instance, was the subject of a two year project being completed by a volunteer at Aravind in 2000. And Aravind has constantly been extending its influence and lessons to other regions in India and around the world through LAICO. However, the emphasis on the different issues is likely to shift at each stage in the cycle.

B. Human Resource Development, Organizational Challenges and Information Flows

The basic building blocks that underlie the growth and internal system development are 1) people, 2) information flows between those people, and 3) the organizational framework in which the people and information interact.[12] These three themes can be seen in each of the Ross reports. This section develops a partial list of topics within each theme which are discussed to varying degrees in the Ross reports. The only goal of this paper is to identify the factors that appear with some frequency across the array of different projects conducted. In some cases, an entire project was devoted to the topic; however to be included, the factor had to appear with some frequency across the different papers. Where relevant, the evolution of the treatment of the topic is also highlighted.

[12] These themes can be found in other studies of growth such as Greiner (2003) and Emery (2000) as well.

1. Human Resource Development

Aravind leadership overwhelmingly identified human resources as the principal challenge facing Aravind in 2001 and in the future.[13] Organizational issues, the second most common response received less than half as many votes. Every single report by the Ross teams cited human resource needs and three were explicitly devoted to this topic. An interest in human resource development clearly predates the Ross School relationship with Aravind. A two year report on human resource improvements was being completed in 2000.[14] The Ross reports develop a number of conclusions related to human resource development. The conclusions and the progression of the conclusions through the reports are divided into the following four categories:

1) Human capital productivity
2) Human capital needs
3) Retention
4) Teamwork.

a) Human Capital Productivity

The value of increasing employee productivity through training has been emphasized from the first report in 1999. The emphasis in the first reports was on medical training. Medical training is cited as having value due to the inevitability of unexpected crises and the ability of non-physician clinical staff to take on some of the more routine clinical needs as the volume grows (Ross 1999). The value of trained staff was also explicitly recognized in the reports on South Africa (Ross 2000a) and Kenya (Ross 2001a); in the case of the latter the lack of well-trained staff was deemed a serious drawback. An office – the central HR office – is recommended in the Centralization report in part to coordinate training (Ross 2001c). That report is also the first to explicitly recognize management training in its reference to apprenticeships for individuals who will be groomed to take on the leadership of Aravind. A series of reports that targeted human resource development followed, beginning with the report on Institution Builders and Key Staff (Ross 2002a). As part of developing the Institution Builders at Aravind, a management and leadership development program was recommended. Subsequent reports (Ross 2003a, 2003b, 2004a and 2005) further developed the idea that leadership training is important.

An individual's productivity also depends on having access to the necessary information. For example, lack of information on consumption of materials across all hospitals as well as at the material manager's own hospital precludes monitoring of usage. Inventory management could be improved through gathering the information and developing automated thresholds (Ross 2000b). Increased information could also improve clinical performance. Doctor's performance could be enhanced by exposure to other hospitals and their best practices (Ross 2002a). Ninety five percent of the Aravind doctors interviewed expected feedback on their performance, both quantitative and

[13] See Ross (2001c)
[14] Maxine Harrington was a volunteer working with Aravind still in the spring of 2000.

qualitative, to be effective at helping them to improve their performance (Ross 2004a). The lack of information on the effectiveness of different outreach mechanisms precluded the team focused on growth strategy from arriving at a conclusion about which method was best (Ross 2005).

A sense empowerment could also improve performance. Whether it is responsibility for and control over materials management or over an entire hospital, allocating authority to other members of the Aravind leadership can increase the firm performance in a number of ways. Empowerment increases individual accountability, it increases the generation of new ideas, it can improve employee attitude, and it increases the number of people thinking about solutions to problems and identifying problems in the first place.

b) Identifying Human Capital Needs

Increasing productivity is not always sufficient – sometimes there are human capital needs that cannot be met with the existing workforce. This may mean new positions need to be created or it may mean new systems for hiring need to be developed. Examples of new positions include the need to have backup capacity in materials management and support for new processes such as telemedicine. In some cases, the new positions are quite senior such as a new head of HR or a CIO. New systems are required for developing new leaders on a larger scale or establishing new hospitals which, according to one report, require at least two doctors. The demands of the newer outreach methods also require new systems. The Vision Centers and Community Centers have been staffed from existing staff at the base hospital; however, as the number of centers increase, a greater ability to increase the workforce will be needed.

c) Human Capital Retention

When asked what the number one challenge was today and in the future, the top response among doctors was staff retention and commitment (Ross 2001c). Retention, recognized in the first report as an important success factor for any new hospital, was the sole focus of a report in 2003. Two factors already discussed – training and empowerment – not only increase the productivity of human capital, they also increase the retention of human capital. Increasing training increases the ability to retain individuals because it increases growth opportunities. Empowerment of the individuals increases individuals' sense of responsibility, one of the motivating factors identified by Herzberg (1968). Recommended methods of increasing empowerment, as found in the Ross reports, include participative goal setting, increased responsibility for problem resolution or increased financial responsibility.

The 2003 Ross report on Becoming the Employer of Choice breaks factors down along the lines recommended by Herzberg: motivating and hygiene. The report divides doctors into 4 categories: Senior, Mid-level, Junior and Resident.[15] Salary was the

[15] These delineations were given by the members of the Senior Leadership Team at Aravind. While there is no clear definition of the categories, to the extent that the different categories are related to tenure at

principal concern of Mid-level doctors, but not of the doctors as a whole. Working conditions were a principal concern for Junior doctors. In Herzberg's terms these are hygiene factors – factors that that can reduce the value of a job, but once a minimum threshold is met, factors that will not increase the value of the job. If a salary is too low or working conditions are poor, an employee will not be content; however, if salary or working conditions are improved beyond a minimum threshold, the level of satisfaction will not rise above a neutral level; instead, motivating factors must be improved to increase job satisfaction beyond that level.

For Aravind doctors as a whole, three of Herzberg's motivating factors were of principal importance: growth, recognition and connection to mission. Growth is a constant goal of Aravind and as Figures 1 and 2 show, Aravind has been quite successful at achieving this goal. As discussed above, those growth opportunities generate a need for new leadership. The professional growth opportunities, both clinical and managerial, that accompany the growth of the organization are valued by the Aravind doctors. Public recognition was the single most cited reward recommended by doctors for rewarding improvement (2004a), and was identified as the most important motivating factor among both senior doctors and the junior doctors and residents where retention is most difficult (2003a). Connection to mission is going to be particularly important at an organization like Aravind where the mission pervades everything that is done. This highlights the value of hiring according to fit with mission. The degree to which Aravind's mission complements the individual's personal goals is likely to play a significant role in determining the longevity of individual's commitment to Aravind.

A number of reports also highlighted the importance of a clearly articulated professional growth path. While growth in the institution presents opportunities for professional growth, the lack of a plan can be perceived as severely truncating those opportunities. This has caused some to depart the organization in the past. A clear career path ranked moderately high among junior level physicians in terms of importance.

d) Teamwork

A final aspect related to human resources is the importance of teamwork. While more subtle and somewhat less prevalent, teamwork arguably underlies all of the discussion on human capital. Training, particularly management training, depends heavily on teamwork and imparts the importance of teamwork in productivity. A sense of team will also increase the likelihood of retention. Explicit references to teamwork can also be found in the Ross reports. The initial report on starting a new hospital emphasizes the importance of developing the clinical and administrative team, with an emphasis on team cohesion, prior to opening the hospital (Ross 1999). Ad hoc teams to address specified problems within Aravind are recommended as a means of developing people and solutions (Ross 2002a). The lack of a leadership team at Coimbatore is identified as a challenge for that hospital and the report on expansion of the outreach

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Aravind, retention of Senior doctors is presumably not a problem. Consequently, the other three categories are arguably of more interest.

program culminates with the recommendation of a strategic growth team which would direct the strategic growth of the organization (Ross 2005).

2. Information Flows

In surveys of employers about the skills most valued in managers, executives and other leadership positions, the most valued skill is often communication.[16] But communication of what? The high value placed on communication skills presupposes that there is information worth communicating. The accumulation, storage and use (including communication) of information is also a common thread that ties the Aravind reports together.

Entire industries exist that are wholly devoted to information. Information gathering, maintenance and use provide significant value added for a variety of customers (e.g., stock market analysts, consulting firms, etc.) However, individual firms often overlook the value of information that they have readily available. Part of the reason for this is that information creation, storage and use is not costless. In many cases, the costs are subtle but significant. Systems for developing reports, for instance, are often inflexible, leaving the user a prisoner of his or her own system. One organization was unable to gather the relevant survey data from its customers because the software tool for gathering the data couldn't be altered in time – not because the customers wouldn't provide it. These costs must be weighed against perceived benefits of information accumulation and use. The conclusions of the Ross reports can be divided into three areas:

1) Identify the ways in which information can be used.
2) What does that imply about which information to gather?
3) Who should receive the information?

How information can be used and communicated depends, in part, on the type of information being considered. Three different types of information are discernable in the Ross reports: facts, information about systems and information about how to think.[17] Facts convey information about a state of being. How much inventory is left is a fact. Information about facts can help in planning and assessing. Information about systems explains how things work. Some forms of training fit this description. For instance, training on the use of a new piece of medical equipment is an information flow about a system. Information about thinking is the most difficult type of information to transfer. Training courses about concepts that are to be applied in a variety of settings, efforts to

[16] Examples include "30% Of Managers & Executives Lack Necessary Management Skills, According to Survey by Right Management Consultants" Business Wire. New York: Sep 14, 2004. pg. 1; National Association of Colleges and Employers Job Outlook, 2002; and, http://www.unsw.edu.au/currentStudents/undergrad/ced/csugworkingatuni.html ;

[17] This can be thought of as a simplification of Bloom's (1956) taxonomy. The first two categories parallel the first two levels of Bloom's taxonomy. The third, here described simply as thinking, is a combination of Bloom's higher levels: Application, Analysis, Synthesis and Evaluation.

develop critical assessments in employees and leadership development programs fit in this category.

a) How information flows can be used.

Information flows about facts include data on what is needed to start a new hospital, data on what inventory is available, and who is responsible for what activities. All of these information flows are used to plan. If I know that we are starting a new hospital, I can get information about what equipment, personnel, etc. are needed and when they are needed to develop a plan for opening a new hospital (Ross 1999). If I know that inventory is running low, I can order more. If I know that every 1000 patients use up all of a given order, I can plan when I need to place an order based on patient flows (Ross 2000b). If I know which functions are my responsibility and which are the responsibility of others, I can plan my schedule for the week. Financial data help in developing financial plans and budgets. Data on the different outreach methods help determine which method is best under what circumstances. The facts that assist in planning include raw data, data in the form of organizational goals that are developed by management, and facts about other organizations' performances (benchmarking).

Facts can also be used to resolve conflicts and generally help communication. Misunderstandings about how time is spent by staff, for instance, can lead to a sense of overload for the staff while the management believes there is too much staff (Ross 2001c). Transparent work schedules will help to resolve this problem. Readily available contact information enables more efficient communication between individuals (Ross 2001b).

Information flows about systems help increase the productivity of a given function. Understanding how a system works can help with the development of standards and protocols. Knowing what standards to set requires information about facts, but without understanding how the system works and therefore how the standards are going to be used, it is difficult to know what standards to set. For instance, standards for product assessment in purchasing decisions are recommended in the report on materials management (2000b). However, the way in which the purchased product is used and stored will affect the importance of standards related to durability and sterility. A container designed to store used needles will require different properties than a container that will be used to store surgical masks.

Information flows about how to develop solutions and anticipate needs require training on how to think. This training cannot be a simple download of facts or an explanation of how a system works. Instead, this training must teach concepts that are then to be applied in ways that cannot be anticipated. Persons successfully trained how to think will not leave the training with the right answer; they will leave the training with the right approach. This training need not be formal. Development through informal mentoring is such training (Ross 2001c). Visits to similar practices to see how things are done can be a form of such training (Ross 2002a). Any thing that establishes *or challenges* a framework for approaching a problem is an information flow on how to think. If a person is being trained to manage a hospital (Ross 1999), that person will need to be trained in how to think about issues that arise, how to develop people, how to

motivate people and so on. Training that is limited to explaining how systems work is not sufficient. The training must include approaches and tools that can be applied to a variety of different situations. Similarly, information flows that challenge the accepted practices such as idea generation and generation of solutions also require higher levels of thinking. The thinking may be informed by data and understanding of systems, but it will not be limited to (or by) that information.

b) What information should be gathered?

Ross reports make numerous references to data needs. Data on consumption of materials within hospitals, financial data, contact information for employee and other members of the Aravind community, physician performance metrics, and metrics on the different outreach mechanisms are some examples. As the reports point out, much if not all of these data can be gathered and stored electronically. The ability to gather these data and store them is a question of devoting the resources to it. The desirability of gathering and storing these data is a function of the costs and benefits. The benefits of the data are fairly clearly laid out in these reports; a concern with reports such as these, which are not burdened with implementation, is that the cost may be underestimated.

Information on the procedures of different systems such as materials management, human resources and Aravind's interface with the internet are also explored. The establishment of controls in materials management, for instance, requires informing the relevant employees about processes that they are to follow. The creation of a searchable database of contacts is useful only if participants understand how the system works that enables them to access these contacts. Best practices are often going to be processes and systems that need to be understood. Some of this information can also be kept in a computerized file. Raw or filtered data are obvious examples, but asynchronous telemedicine is also an example of that. Loading a lecture to be viewed whenever the student chooses is nothing more than a standard transmittal of information using newer technologies. However, much of the information on procedures may need to be transferred through human interaction. That human interaction can be formalized training, reviews of qualitative performance data, shadowing of other practitioners or informal on the job work.

Information on the higher orders of thinking showed up in a few different ways. Leadership development was a principal component of a number of reports (Ross 2001c, 2002a, 2004a and 2005). Much of the work on leadership development emphasizes the importance of the ability to learn from others, observe others and generally interact with others. Information kept on sheets or on a computer is going to be of limited value. A second, even more difficult to teach, form of information that falls in this category is ideas (Ross 2000b, 2001c, 2002a and 2005). Idea generation is not entirely separate from leadership. Arguably, Aravind would benefit from efforts to develop leadership at every level of the organization precisely because a sense of leadership within the organization will generate ideas that address and anticipate challenges facing Aravind. Participative goal setting (Ross 2002a) develops a sense of ownership, increases idea generation, and encourages analysis and evaluation of the current state. Empowering individual units and holding them responsible for their own performance requires higher levels of thinking

and rewards innovative thinking. Even the simple creation of an idea box (2000b) or an entrepreneurship fund (Ross 2005) would send a strong signal that the Aravind leadership is interested in all ideas and that those that prove useful will be measured and rewarded.

c) Who should receive the information?

One Ross team discovered that very few people within Aravind understood all of the places that depended on their work and all of the places that they depended on to do their work. If one doesn't know who would benefit from information, one is not likely to communicate the information to the right people. Spending some time thinking about who would benefit from what information will pay off.

As discussed above, the accumulation, storage and transfer of information is not costless. If it was costless, there would be no reason to limit the information that anyone receives. One benefit of forming a team to address a problem is that all of the information that team has to deal with in order to solve the problem can stay within that team. Participants outside of the team only need to know what the conclusion was – they don't need to know what went in to developing the conclusion. The focus on teams is often on the benefits that can be gathered by combining the talents of the different team members. However, a significant benefit of teams is that the information needed to make a decision or develop a solution can be limited to those on the team.[18] Thus an important point, albeit one not emphasized in the reports, is that the information flows need to be targeted to specific individuals. It may be as important to determine who will not receive the information as it is to determine who will receive the information.

A number of the reports laid out specifically who did need to know about certain types of information. The first report delineating the steps for opening a new hospital argues that staff must be able to communicate with the leadership of the hospital. The materials management report points out that the administration must communicate the goals with the other levels within materials management while the data that are gathered by operators must be communicated with the administration in order to revise goals. Notably absent in this report is any discussion of involving operators in the goal setting. That would not be absent in later reports where employees involvement in goal setting was seen as an important element of involving all levels of the organization in developing the strategy needed to achieve the vision. Other audiences identified were central office staff, physicians, and alumni.

One audience worth separate attention is the focus on paying customers. Aravind's mission, focused on needless blindness, is really focused on the poorest part of the population who cannot afford treatment from traditional hospitals. Paying patients have always been recognized as necessary to maintain sustainability, but a marketing focus on them almost antithetical to the original Aravind model. Marketing (i.e., transferring information to customers) at Aravind almost always refers to outreach to the non-paying population. A few of the later reports reflect a growing concern that the

[18] Ad hoc teams comprised of Institution Builders were recommended to deal with specified problems (Ross 2002b). One interpretation of their recommendation is that information related to the method of dealing with the problem was to be kept within the team.

percentage of paying patients is dropping to an unsustainable level. Coimbatore, for example, lists as one of its threats the decrease in the number of paying patients. The principal recommendation in that report is on segmentation of the paying customer market in order to address the competition for this market segment in Coimbatore.

3. Organizational issues

Dr. V's emphasis on the McDonald's model offers some insight into the potential alternatives to achieve Aravind's vision of Eradicating Needless Blindness. McDonald's owns some of its outlets and contracts with franchisees in some. Similarly, Aravind could serve as an owner/operator of facilities around India or it could take on more of a role of a franchisor. Indeed the options for Aravind are more extensive than that. Aravind could also accomplish its goal by limiting its role to that of a training facility. Alternatively, it could be the outsourced operator for other organizations. The only one of these not currently in place (or at least being considered) by Aravind is that of franchisor.

While many of these options are under consideration today, this was not so in 1999. The initial project on new hospital development is interesting both because of its approach and because of its team composition. While one can argue, as I have, that each report is a reflection of the perceptions within Aravind, nowhere is that more true than in the first report which had Dr. Aravind as a team member. The 1999 report begins with language suggesting that any organizational role for Aravind is possible: "an organization may operate as an advisory resource or as a solution-oriented task force." (p 11) However, the broad approach is quickly narrowed to the existing Aravind model: "The model we outline assumes a stationary hospital with diagnostic eye camps to reach remote areas." (p 11) There is no pretense to consider a franchise relationship or anything other than a hub and spoke system a la Aravind (i.e., eye camps).

Gradually, later reports began to make reference to the need to understand the organizational goals. This began at the system level in the report on management reporting and control systems. The decentralization project began to consider organizational issues more generally. The call for a central office with significant levels of authority and separate, accountable hospitals with the authority and responsibility for success is a significant departure from existing system. Madurai had been, since its inception, the de facto central office. Internal surveys indicated a strong desire to move the central office out of the Madurai hospital, albeit not out of Madurai (in fact, just across the street from the hospital – Ross 2001c). Nonetheless, this move allows for a more diverse approach along the lines of franchising or outsourcing management services. The upcoming 2006 report will, in part, address some of these issues by focusing on challenges facing Aravind when it is the outsourced management for an independently owned hospital.

The organizational structure within a given hospital such as the hub and spoke system is also open to change. Should the hospital be a single facility completely contained in a single location? Or should it adopt more of a hub and spoke system, with the hub providing tertiary care and the spokes providing patients after some level of

screening? If the hub and spoke option is chosen, what level of service should be provided by the spokes (Ross 2005)? Should each hub specialize in a particular medical area?

The Telemedicine project began considering alternative organizational approaches within the hospital such as e-kiosk outreach and specialization of services within hospitals. The HR series of Ross reports focused on organizational issues to the extent that they affected the career paths of key employees. In the most recent project, the whole structure is under consideration: the 2005 report reviews the costs and benefits of the existing outreach mechanisms including a few – Vision Centers and Community Centers – that are quite new and therefore difficult to assess.

IV. Conclusions

This paper is focused on Aravind Eye Hospital. However, the attention devoted to information flows, human resources and organizational issues is hardly unique to Aravind. It is not even limited to health care. Consider, for example, multinational automobile companies (OEMs and suppliers) which are grappling with the relatively recent phenomenon of engineering departments in Europe, North America, South America, India and China. What design work is more efficiently left to engineers in North America, and what design work should be sent to India? How much guidance should an engineering team in a different region be given and how much autonomy? When is a team comprised of engineers from different parts of the world more efficient than a team all in one location? How is the output of a team maintained and made available to engineers in other parts of the world? These and a host of other questions that firms face today are really questions about human resource needs and interactions, information flows, and the organizational design. Similarly, the cycle of growth, internal systems improvements, assessment of human capital needs and then a return to growth, is also more broadly applicable. Aravind, in this light, is really a case study about the issues facing today's corporation.

Nonetheless, the greatest or at least most direct benefit of an in-depth understanding of Aravind is the ability that gives other eye care (or, more generally, health care) organizations to replicate Aravind's success. Effective low-cost health care in developed economies is a challenge. The ability to successfully offer it in emerging markets is truly remarkable. Spreading Aravind's successes is clearly a worthwhile venture. That requires understanding the factors that lead to Aravind's success; but it also requires understanding the challenges that Aravind has faced and how it has met them. The Ross reports shed some light on all of these factors.

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