

# E-PARCC

COLLABORATIVE GOVERNANCE INITIATIVE

**Syracuse University**

Maxwell School of Citizenship and Public Affairs  
Program for the Advancement of Research on Conflict and Collaboration

## **DAVID GREEN – DELIVERING QUALITY EYE CARE IN THE DEVELOPING COUNTRIES THROUGH COLLABORATIVE SYSTEMS**

*“David’s first concern in any issue was with social justice and finding the most humane solution to a public health problem. He was also very creative, often coming up with answers and approaches that were not self-evident and highly innovative. I’m not at all surprised at his enormous contributions to global health.”<sup>1</sup>*

**Noreen Clark, Dean, School of Public Health, University of Michigan**

*“Life is short, and there’s only so much time that we have, and so the question is how do we choose to use that time, knowing that when we die we don’t take it with us. “The only thing that follows us is our good thoughts, our good words, our good actions or deeds.”<sup>2</sup>*

**David Green, Co-Founder, Aurolab**

This case was written by K.B.S. Kumar and Indu Perepu of IBS Center for Management Research (ICMR). It was the winning case in E-PARCC’s 2017-2018 **Glendal E. and Alice D. Wright Prize Fund for Conflict and Collaboration Case Studies in International Development**. The case is intended for classroom discussion and not to suggest either effective or ineffective responses to the situation depicted. It may be copied as many times as needed, provided that the authors and E-PARCC are given full credit. E-PARCC is a project of the Collaborative Governance Initiative, Program for the Advancement of Research on Conflict and Collaboration—a research, teaching and practice center within Syracuse University’s Maxwell School of Citizenship and Public Affairs. [https://www.maxwell.syr.edu/parcc\\_eparcc.aspx](https://www.maxwell.syr.edu/parcc_eparcc.aspx)

<sup>1</sup> “McArthur Foundation Recognizes Alum’s ‘Compassionate Capitalism’,” [www.sph.umich.edu](http://www.sph.umich.edu), Spring 2005

<sup>2</sup> “McArthur Foundation Recognizes Alum’s ‘Compassionate Capitalism’,” [www.sph.umich.edu](http://www.sph.umich.edu), Spring 2005

In 2009, American social entrepreneur David Green (Green) was honored by Helen Keller International with the ‘Spirit of Helen Keller Award’ for his devoted efforts toward prevention and cure of human blindness. Such accolades were not new to Green, who had been recognized by several international institutes of repute. **(Refer to Table I for some of the awards won by Green).**

Green, a University of Michigan alumnus, did his Master’s Degree in Public Health. Inspired by a lecture by the co-founder of Seva Foundation, Larry Brilliant<sup>3</sup>, while he was studying, Green joined the organization as a resource person. In 1983, as a part of the organization, he took up an assignment in Nepal where people with cataracts struggled to undergo the surgery they needed as it was beyond their financial capability. After working on the project, Green successfully built a socially driven self-sustainable eye care institute in Nepal.

Subsequently, he became actively involved with India-based Aravind Eyecare Institute (Aravind) in Madurai in the southern Indian state of Tamil Nadu. There, he took up the challenge of making surgical equipment in a sustainable manner. In 1992, Green directed the setting up of Aurolab in collaboration with Aravind in Madurai. This was the first indigenous not-for-profit Intraocular Lens<sup>4</sup> (IOL) manufacturing facility in India. Aurolab went on to capture 10% of the global IOL market, the largest in the sector. The economies and efficiencies achieved by Aurolab made it possible for the firm to sell the IOLs at \$10 per pair initially. This was further reduced to \$4, without compromising on quality. In comparison, manufacturers in the developed countries charged about \$ 150 per pair.

**Table I**

<b>Awards Won by David Green</b>		
<b>Year</b>	<b>Award</b>	<b>Recognition</b>
2009	University of Michigan Humanitarian Service Award	For unparalleled service toward creating a parallel paradigm of healthcare driven by compassion.
2004	MacArthur Fellowship	For his influential role in innovating, manufacturing, and distributing the advanced healthcare devices and products for under-privileged patients in more than 19 developing countries around the world
2002	Ashoka Fellow	For his instrumental role in building innovative, sustainable, and replicable models of affordable healthcare.

*Compiled from various sources*

<sup>3</sup> An American non-profit international health organization based in Berkeley, California, known for treating blindness with the mission of eradicating curable blindness from the world.

<sup>4</sup> An IOL lens is a synthetic implant that's placed inside the eye to replace the focusing power of a natural lens that is removed, usually as part of cataract surgery. Before the introduction of IOL, the cataract had to be ripe to be removed surgically. The person who underwent surgery had to use thick glasses. This procedure was known as Intra Capsular Cataract Extraction (ICCE)

By 2012, Aravind had recorded 32 million outpatients and 4 million cataract surgeries – i.e. one surgery for every 1.41 minutes – using IOLs from Aurolab. Millions of patients approached Aravind with the confidence and trust that they would not be denied treatment due to their economic condition. Of the surgeries performed at Aravind, 51% were done free of cost.

Green pioneered making healthcare affordable to the poor by deconstructing the prevailing economies and building a new healthcare market where anybody could access the products and services they needed regardless of their economic status. He was totally convinced that healthcare services, if pursued with more of a social orientation than a profit-making motive, could reach underprivileged patients, especially in the developing countries. Green's matchless efforts toward attaining scale, economy, sustainability, and efficiencies prompted him to replicate his model in several other places – in Magrabi Eye Hospital (Egypt), Grameen Eye Hospitals (Bangladesh), and Visualiza (Guatemala) – to name a few.

Green was enthusiastic about extending his experiments in solving healthcare problems through collaboration to address another major prevalent ailment i.e. hearing impairment. After his resounding success in building the model around the eye care segment, it remained to be seen whether he could successfully replicate a similar model for other pursuits.

## **THE MAKING OF A SOCIAL ENTREPRENEUR**

Green, born in 1956, was a native of Michigan, USA. He grew up into a curious, creative person with a social bent of mind, developing a sense of compassion toward fellow human beings early on. In 1980, Green joined the School of Public Health (SPH), Michigan University, where he studied health behavior and health education. In 1981, he attended a lecture by Larry Brilliant, an alumnus of SPH and co-founder of Seva Foundation. The lecture made a deep impact on him and prompted him to look for a career in the social sector. Green became associated with Seva as an intern and took up the role of a technical editing resource for the world blindness survey that the Foundation was conducting. He also became actively involved in fund raising activities in Seva. In 1982, soon after his graduation from SPH, Green joined the health department, Chicago, for a brief period, before joining Seva in 1983.

Green's initial assignment was in Nepal. As a part of its blindness prevention programs, Seva identified Nepal (one of the poorest countries in the world<sup>5</sup>) as one of the countries where eye-related health issues were rampant. Cataract was a major disorder and was the cause of 80% of blindness related issues in the country. Patient inflow into Nepal was also from the states of India with which the country shared borders, viz. Uttar Pradesh, Bihar, and Himachal Pradesh. However, most of the patients came from a poor economic background. Paying for the eye care treatment was a challenge for most of them.

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<sup>5</sup> In 2017, Nepal's per capita income was less than \$500 "Nepal GDP per capita," [tradingeconomics.com](http://tradingeconomics.com), 2017

In response to the challenge, in 1983, Seva in collaboration with an NGO, Nepal Netra Jyoti Sangh (NNJS), founded Lumbini Eye Institute (LEI) in the Lumbini region of Nepal. Green led the program in his capacity as the Technical Director for Blindness Prevention at Seva.

His team-mates in the mission included Vinaya Dhakhwa, Director, Seva, and Dr. S. P. Dhital, Program Director, Lumbini Eye Care.

## **ROLLING OUT INTERVENTION**

While the institute was established with the bona-fide intention of treating cataract in people across economic sections, sustaining the initiative without external assistance was a huge challenge. According to Green, “A balance had to be achieved in arriving at a pricing structure that would enable the program to recover its operating costs and still price its services low enough to be accessible to the majority of patients, who for the most part are poor<sup>6</sup>.” A host of factors had to be taken into consideration. These included getting the technical know-how on IOLs transferred, achieving economies, controlling costs, and strategic pricing in order to build a socially driven, sustainable model.

From 1985, Seva took care of the financial requirements of LEI. While Seva funded the costs of LEI, it was agreed that the funding would be at decreasing dollar amounts over a five-year period, assuming that by the end of the fifth year, LEI would have attained financial sustainability.

The intervention was an experiment in a new geography, with new people, in a new culture. And it proved highly challenging for Green’s team. The intervention started with training the doctors in the modern microsurgical technique using IOL.<sup>7</sup>

For LEI to become sustainable, Green led the roll-out of a host of managerial initiatives. He and his team ensured transparent communication and sincere teamwork between the Nepalese and outside consultants who were also assisting the intervention in various capacities. They also ensured that LEI’s team was trained in skills addressing financial management, cost control, and decision making. Seva had exclusive control over the revenues collected from the patient which were mobilized toward LEI’s operating and capital expenses. While Green assisted LEI in several strategic issues, LEI’s management team was made the principal decision-making body through the change process. LEI’s management apprised Seva and NNJS of the monthly patient service reports and financial statements.

Green’s team held discussions with LEI’s leaders at regular intervals. Three review meetings, *each lasting 10-15 days, were conducted within a span of six months between Seva and LEI.* The review meetings also invited experts from Aravind Eye Hospitals, India, and groups of consultants from Kathmandu.

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<sup>6</sup> “Financial Sustainability,” azslide.com

<sup>7</sup> As Green had stated in one of his interviews, the traditional cataract operation was tedious with about 56% of sight regained and the patient having to bear the burden of the cataract glasses. The microsurgical technique with IOL implantation was much better in terms of vision results and it was cheaper.

## BUILDING A SUSTAINABLE MODEL

To arrive at a model of sustainability, it was necessary to be aware of cost and revenue. The various cost components were fixed costs, variable costs, and depreciation. Adequate data relating to these components was gathered in spreadsheets, allowing the teams to predict future cost. The data was analyzed and the potential control points were identified and manipulated accordingly.

The unit cost for a surgery was determined using the following formula:

$$\text{Unit cost} = \text{total program cost} / \text{surgical volume.}$$

The sources of revenue included revenue from cataract surgery and from other surgical procedures, revenue from the out-patient department, and revenue from other sources (lab, optical shop, pharmacy, etc.). To understand the revenue patterns and arrive at estimations of the patients’ economic status and formulate the cash flow projections, the external consultants conducted a patient survey. The survey also reviewed the prices of similar services provided by other healthcare providers in Nepal. It indicated the following break-up of the patients’ economic status:

#	Percentage of patients	Payment capability
1	6%	Two or three times cost
2	70%	Around cost
3	11%	Only for surgery
4	3%	Only for the IOL
5	10%	Can’t pay at all

The survey proved immensely helpful. It provided a basis for Seva, in association with LEI and other external consultants, to come up with a Multiple Tier Pricing model which could make eye surgery economically affordable to all sections of society. The data offered information about the patient flow and volumes, the socio-economic status of the patients, and the demographic and economic breakup of the patients.

LEI then decided to charge the patients according to what they could afford and their economic status. Those who could not afford the treatment were offered free surgery. Excess revenues and donations were to be spent on the further development of LEI.

To put a monitoring and continuous improvement mechanism in place, the external consultants suggested a management structure which was implemented to bring LEI into the autopilot mode. The management structure was primarily about making minimal changes in terms of the administrative structure in the LEI, adding more tiers to the hierarchy, and creating a system with greater responsibility and accountability.

Seva also offered its suggestions on the issues of compensation and benefits for medical personnel and advised fixing a pay that would reinforce performance. Other developments in the intervention included creating departments and appointing competent people as their

heads, defining their roles and responsibilities, and assigning the reporting structures and the review periods.

## IMPACT

It took about 8 years for Green and his team to achieve the desired change and bring in the required capability maturity at LEI to change it into a self-sustainable model (**Refer to Table II for LEI's performance indicators before introducing Cost Recovery Mechanism**).

**Table II**

<b>LEI's Performance Indicators before Introducing Cost Recovery Mechanism</b>			
<b>LEI Staff</b>	<b>1993</b>	<b>Service Statistics</b>	<b>1993</b>
Ophthalmologists	3	Surgeries	6,000
Paramedical	34	Exams	90,000
Administrative Support	10	Rural Clinics	6
Cleaning / Security / Maintenance	7	Surgical Camps	6
Total	64	Screening Camps	20

Source: [www.aravind.org](http://www.aravind.org)

Under Green's guidance, Seva made a deep impact on the eye care scenario in Nepal and the adjoining states of India. Internally, the change affected LEI tremendously. Its efficiency improved and this was evident in the enthusiastic staff, productive performance, and participatory management process.

By 1997, LEI had emerged as a full-fledged financially self-sustaining organization. With all its efforts at efficient resource utilization, the cost of each surgery was brought down to \$24 from more than \$50. LEI had a total staff strength of 94 (**Refer to Table III for LEI's staff break-up**), and ran a 180-bed eye care hospital. In 1997 alone, LEI performed 0.94 million OPD examinations and 78,597 surgeries. Of the surgeries, about 10% were performed free of charge. Each surgeon performed about 2,700 surgeries with each bed registering 97 cases.

**Table III**

<b>LEI's Staff Break-Up (1997)</b>			
Ophthalmologists	6	Medical Officer	1
Manager / Ophthalmic Officer	1	Ophthalmic Officers	2
Ophthalmic Technicians	10	Ophthalmic Assistants	15
Lab Technicians	2	Nurses	11
Eye Workers	5	Admn/Accounts/MIS	9
House Keeping/Patient movers	15	Security Guards	8
Optical Shop	2	Outreach Coordinator	1
Pharmacy	2	Gardener	1
Electrician	1	Drivers	2
Total Staff	94		

Source: [www.aravind.org](http://www.aravind.org)

Between 1994 and 1998, the surgical volumes at LEI more than tripled and LEI was able to generate a 40% surplus over the costs. This was utilized for institutional development and for providing free service to those who could not afford the cost of surgery. Revenues surged 4.6 times between 1994 and 1998, while expenses increased only 3.07 times, indicating LEI's tight control over costs (**Refer to Exhibit I for LEI's Revenues, Expenses and Surplus statement**).

Though time taking, the intervention developed a robust system of financial control, cost control, efficient information management, and efficient operations. The real-time revenue breakup was almost in conformance with the survey-based projections, with just a little variance. Of the patients, 6% paid two to three times of the cost; 84% paid the cost price, and 10% could not pay.

While LEI did not carry out any exclusive branding and PR strategy, the financials were proof of the power of word-of-mouth marketing. The success of LEI prompted Green to test the replicability of the model at various places.

## **GREEN @ ARAVIND**

Dr. Govindappa Venkataswamy, popularly called Dr. V., an ophthalmologist by profession, was one of the co-founders of Seva Foundation. In 1976, he founded the Aravind Eye Care system in Madurai with 20 beds. The principal motive of this system was to treat cataracts, which were the biggest cause of blindness in the world. In the early 1980s, Green came across Aravind through the Seva Foundation. He became actively engaged in developing the hospital systems and in the numerous eye care programs undertaken by Aravind. By 1992, Aravind had grown to become a 1,400-bed state-of-the-art facility for eye care.

In the late 1980s, Aravind faced a major challenge. Cataracts, despite being the main cause of blindness globally, was not getting the attention it deserved. About 285 million people around the world were visually impaired. Of these, 39 million were blind and the remaining suffered from moderate to severe visual impairment due to cataracts. Cataracts are curable. However, the treatment was paralyzed more due to economic challenges than medical reasons.

Cataract operations were conducted using two techniques – Intra Capsular Cataract Extraction (ICCE), where the cataract was extracted and vision was corrected using glasses<sup>8</sup> and Extra Capsular Cataract Extraction (ECCE), where vision was corrected using IOLs<sup>9</sup>. ICCE was the widely prevalent procedure in developing countries, as the majority of patients found it affordable. IOL implantation through ECCE, on the other hand, could not be performed for everybody as it was a costly affair. Performing an ECCE surgery required clinical training in micro-surgical techniques, IOLs, surgical equipment, nylon sutures, and medicines that were

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<sup>8</sup> After an ICCE surgery, the patient had to be fitted with Aphakic (*Aphakia* is the absence of the lens of the eye, due to surgical removal, or a perforating wound) spectacles, which were thicker than the usual lenses, in order to attain vision of an acceptable level.

<sup>9</sup> ECCE surgery gave better clarity of vision and the IOL lens gave near-natural sight after the surgery

administered before and after surgery. Put together, these escalated the cost of the ECCE to over \$ 100<sup>10</sup>.

Until the late 1980s, Aravind managed to mobilize the IOLs with the help of charities, donations, and subsidized supplies from the IOL manufacturers. However, donations were uncertain and subsidies irregular. Green realized that this model of depending on subsidies and charities was not a sustainable one. Moreover, performing the ECCE for affluent patients and ICCE for the deprived conflicted with Aravind's core values (**Refer to Exhibit II for Aravind's Core Values**) and its mission, "Provide compassionate and quality eye care affordable to all."

Initially, Aravind tried to convince the commercial organizations that produced IOLs to share the technology on developing the IOL with it. However, driven by commercial motives, these companies conveniently ignored Aravind's social intentions. Its requests were declined several times. In his pursuit to understand the cost components that went into the making of the IOL, Green realized that largely, the pricing of the medical devices did not reflect the manufacturing cost of the device. According to him, most such medical devices had a significant proportion of what he referred to as 'NonValue-adding Margins'<sup>11</sup>, which eventually made these products inaccessible to the poor. Green was looking at the possibility of creating a sustainable model which would ensure equal treatment to all, regardless of the patients' economic status, without having to depend on external financial assistance.

Green teamed up with Dr. P. Balakrishnan, an Aravind collaborator and an engineer by profession, to address the challenge of access to the production technology for the IOLs. He proposed to the board of Aravind the idea of setting up a manufacturing unit to make their own IOLs, which would bring down the price significantly. Initially, the board resisted the idea as it involved capital expenditure. Also, it looked like a deviation from the hospital's primary responsibilities. Moreover, the technology behind making the IOLs was closely protected by the manufacturers around the world. However, Green managed to finally convince the board to pursue the idea of setting up Aurolab, Aravind's indigenous laboratory, to develop its own IOL.

## **AUROLAB**

The team at Aravind identified prospective technologies to make its own IOLs that would satisfy Aurolab's mission of providing eye care to all patients across economic strata. With the help of his team, Green identified some companies which were willing to share the technology at a friendly price. The options narrowed down to a manufacturer in Florida who had agreed to the technology transfer as it would help him in expanding his business. Technicians from Aurolab were put through intensive training under the supervision of experts from the Florida-based company. The training helped the staff to understand and familiarize themselves with the know-how of making the IOLs. Aravind recruited and trained

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<sup>10</sup> "Aurolab Genesis," [www.aurolab.org](http://www.aurolab.org), 2017

<sup>11</sup> Lessons in Innovation, David Green," [www.youtube.com](http://www.youtube.com), 2014



experienced nurses from its own hospital to serve as production staff. The training helped the staff quickly attain an acceptable level of accuracy in the production process.

In 1992, Aurolab officially began manufacturing the IOLs. Green started off with only 10 production staff to manufacture the first three-piece acrylic IOL in India. Aurolab emerged as the first non-profit manufacturing facility in a developing country to produce cost-effective and affordable IOLs.

Initially, Aurolab produced about 100-150 three-piece IOLs daily. It produced nearly 35,000 lenses in its first year. High quality IOLs, priced at about \$100 by most of the makers around the world, were made by Aurolab for about \$5 per lens (\$ 10 for a pair of lenses). According to Green, “Basically, we use the same equipment and manufacturing process and we fulfill the same regulatory requirements for quality as other companies do, whether they are in America or Europe or elsewhere ... but Aurolab sells the lenses for less, not only because their costs are lower but because they choose to price them lower—because our goal is maximizing service rather than maximizing profit.”<sup>12</sup>

The research and development carried on at Aurolab were on a par with the global medical equipment majors. In 1993, it invested in producing single-piece acrylic lenses and launched them in 1994. Aurolab kept investing money in improving the lenses and came up with various versions of IOLs – low power lenses, negative power lenses, capsular tension rings, scleral fixation lenses, and anterior chamber lenses – which were launched at regular intervals.

Quality was as important to Aurolab as the pricing. It became the first Indian IOL maker to secure the ISO certification (1998) and CE certification (1999) for its products. Nevertheless, Green did not consider that as the finish line. He and his team worked relentlessly to improve the safety and biocompatibility of the lenses.

An American survey revealed that hydrophobic acrylic IOL were the most preferred types of lenses as it offered the maximum capsular opacification and prevented any hindrance in vision. In 2002, Aurolab launched the hydrophilic acrylic IOL and in 2007, the hydrophobic acrylic IOL. Implementation of cutting edge technologies, operational efficiencies, and economies of scale allowed Aurolab to reduce the prices of IOL further from \$10 to about \$4 for a pair of lenses.

## **SPREADING THE REACH**

Initially, Aravind did not pay much attention to marketing its lenses, as the majority of Aurolab’s IOLs were used by Aravind itself. The units that were produced in excess were given to external consumers like not-for-profit hospitals and NGOs. Gradually, as word of mouth spread about the low price and high quality of the IOLs, the demand for them increased. By the late '90s, about 35% of the IOLs produced at Aurolab were being sold to outside customers, while 65% were being used for the surgeries at Aravind. Aurolab’s IOL

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<sup>12</sup> Kris Herbst, “Business with Humanitarian Goals,” [www.indiatogether.org](http://www.indiatogether.org), February 01, 2003.

had built up a reputation for its superior quality and low price and the company could have made greater profits by hiking the prices of the lenses. However, that was not Aurolab's priority as it had always stood firm in its social motive. Aurolab maintained its focus on volume and quality rather than on increasing profit margins.

By the early 2000s, as competition grew and the competitors also slashed their prices to compete, Aurolab started activities like hosting online seminars and talking to doctors to promote its products. Aurolab's promotional activities largely involved interactive sessions, videos, and books, rather than money being spent on making extravagant advertisements. Aurolab's low profile in advertising and promotion of its products was evident from its marketing budget which was only 5% to 10% of its revenue – among the lowest for Indian IOL manufacturers. Most of Aurolab's domestic and international growth in sales was attributed to word-of-mouth advertising.

It built its marketing team which comprised product managers, area development managers, and the sales teams who were in charge of the product, the sales performance in a particular region, and communication with the dealer network respectively. **(Refer to Exhibit III for more about the dealer network).**

By the early 2000s, Aurolab had expanded its manufacturing portfolio beyond IOLs. It started making surgical blades and sutures, slitlamps, digital vision charts, coagulators, etc. The demand for the products grew fast and production volumes increased. Aurolab built strong supply chain systems. It installed an automated ERP system for efficient scheduling and operational effectiveness and for managing SKUs and a prompt feedback mechanism.

Aurolab acknowledged that the supply chain infrastructure in the Indian health sector left a lot to be desired. A cataract surgery required a bunch of equipment like lenses, methylcellulose, nylon sutures, etc. If even one of these was not available, it was as good as having nothing, as the surgery could not be performed then. To cope with the supply chain challenges and make its products reach the patients, Aurolab came up with the idea of a 'Bundled Surgery Kit'. Each kit comprised all the supplies needed to perform five cataract surgeries. The simple innovation had a significant impact as it allowed the hospitals to purchase all the cataract-related products from a single supplier, removing the uncertainties involved in supply chains.

## **IMPACT@AUROLAB**

Aurolab emerged as a classic case of a product revolution. An article by Ashoka published in Forbes said, "Aurolab's low cost lenses and Aravind's revolutionary delivery model together led to a global surge in affordable eye surgery." Aurolab's affordable IOLs under the direction of Green brought to light the actual value-adding costs involved in making the lenses.

In one of his lectures on 'Lessons in Innovation' Green demonstrated the reason for the huge difference in the pricing of IOL between Aurolab and Alcon (A top manufacturer of IOL) **(Refer to Table IV for Alcon Vs Aurolab - A Pricing Comparison).**

**Table IV**

<b>IOL Financial Comparison</b>		
	<b>Aurolab</b>	<b>Alcon</b>
Price	\$4	\$130
Volume	1 Million	7 Million
Revenue	\$5 Million	\$ 920 Million
Cost of Goods	\$2.50	\$32
Manufacturing Cost	\$1	\$1

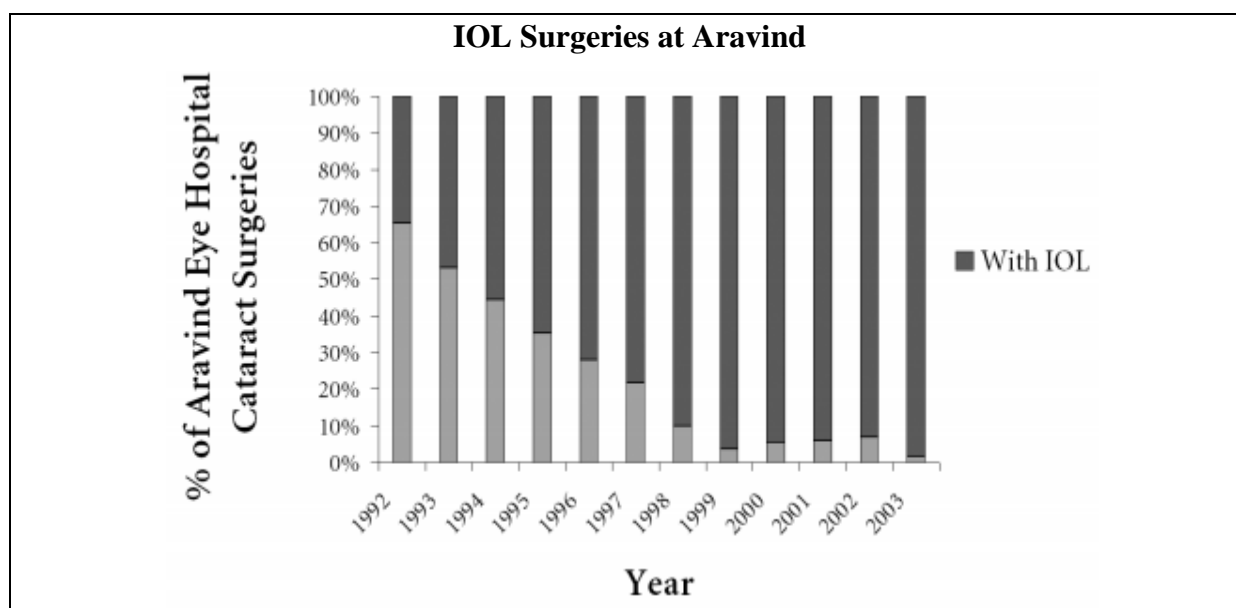
*Source: Lessons in Innovation, Lecture by David Green, Youtube.com; 2017*

While the manufacturing cost of the IOL for both the makers was \$1, non-value adding costs like advertisements, endorsements, and high margins of profits, etc., were responsible for the difference in prices. While Aurolab could control the cost of its goods to \$ 2.5, it was \$ 32 for Alcon. To Green, such high costs didn't make sense as they did not add any value to the product. He said "When you look at a medical device and the manufacturing process, the raw material, the regulatory process, everything is hidden, because that's how business works. And so you think everything is elaborate and complex, but if you can see the essence of something in terms of its cost structure or what's required to make it, then you can create a pathway."

Green's initiatives not only brought Aravind's cost of surgery down but it also created a competitive landscape in India and around the world. Commercial companies were compelled to compete with Aurolab and bring down their prices, which made the devices more accessible to patients from all sections of society. The number of IOL manufacturers in India had grown from 2 to 10 in the ten years between 1992 and 2002. The affordable pricing encouraged the economically weaker sections to undergo cataract operations. The period between 1992 and 2002 witnessed a significant surge in cataract surgeries, which went up from 0.8 million to 6 million per year.

In 2007, Aurolabs entered the surplus zone, generating incremental surplus y-o-y and becoming an example of a robust sustainable model (Refer to Exhibit IV (A) & (B) for Aurolab's Financials y-o-y). By 2012, Aravind was attending to 32 million patients and performing about 4 million cataract surgeries, i.e. about 45 surgeries each hour. This would probably not have been possible had Green not pushed for the setting up of Aurolab. As compared to about 35% of the cataract surgeries that used IOLs in 1992, by 2002, Aravind was performing about 99% of its surgeries using IOLs (**Refer to Table V IOL Surgeries at Aravind**).

**Table V**



Source: [www.aravind.org](http://www.aravind.org)

By 2017, Aurolab’s lenses were being exported to over 120 countries. With 2.2 million volumes of IOL sold around the country every year, Aurolab claimed about 10% of the global IOL market.

Green led the replication of Aurolab’s model across 285 eye hospitals in India, making each of them sustainable. Aurolab’s innovative, replicable, and sustainable framework was rolled out across several countries, creating a similar impact. Green went on to collaborate with global organizations like Lions, SightSavers, CBM, WHO, and ORBIS and made an impact in about 19 developing and under-developed countries.

Green’s efforts also brought about regulatory changes in the pricing mechanism of the IOLs. The governments of several countries acknowledged that IOL makers were charging exorbitant prices and unconscionable margins. In 2017, the health ministry of Sri Lanka announced regulation of the prices of about 38 brands of cataract lenses. Bangladesh followed suit with the country’s drug administration regulating the prices of IOLs in 2017. The new regulations were expected to reduce the prices by more than half. Ruhul Amin, the Directorate General of Drug Administration, Bangladesh, declared, “We have fixed the prices of lenses and sent copies of the price list to public and private hospitals directing them to strictly follow the price list and hang the list in a place so that the patients can see and choose on their own.”

In 2017, the Indian Government declared its intention of regulating the prices of IOLs, a move that was expected to make the devices as well as the surgeries cheaper. The Food and Drug Administration (FDA) of the Maharashtra government had raised an alarm stating that the manufacturers, distributors, and hospitals were indulging in making profits ranging from 59 to 1500 per cent on the manufacturing cost of the IOLs, which was detrimental to people from the weaker economic sections, as they could not afford them. A survey report by the FDA revealed that of the 15 brands of IOLs used in India, the cost for the hospital ranged between

Rs.350 and Rs.15,200, whereas for a patient it ranged between Rs.5,800 and Rs.26,550. With the mismatch between the cost and the price coming to light, regulation of the prices was expected.

The resounding success of his two initial interventions, viz. Aurolabs and LEI, kindled in Green the passion to do more. He went on to create more sustainable models around the world with the mission of reducing preventable and curable blindness. Some of his other projects were the He Eye System – China, Magrabi Eye Hospital – Egypt, Grameen Eye Hospitals – Bangladesh, Visualiza – Guatemala, and the Pacific Vision Foundation Eye Institute – the US.

## THE ROAD AHEAD

Though Green had managed to decode the framework to develop and successfully run a social yet sustainable model toward the blindness prevention initiative, he had no intention of relaxing. His next passion was to address the problem of hearing impairment. There were over an estimated 600 million people with hearing difficulties, 280 million of them suffering from total hearing loss and about 340 million from partial or moderate loss.

There were appalling facts that painted a gloomy picture with regard to hearing devices too. While about 7 million hearing aids were sold each year, only 10% reached the developing countries, and these met only 1% of their needs. The average price of the basic hearing aids was around \$ 1500- \$ 2000, though they could have been sold at about \$50, suggesting another unfortunate situation of a low volume and high margin product.

Green, a subscriber to the idea of compassionate capitalism and collaborative problem solving, realized there was a pressing need to erect collaborative frameworks in the hearing segment too. He started raising funds for his new passion under the mission ‘Affordable Hearing Aid Project’ as a part of the firm that he co-founded called Sound-World Solutions. It remained to be seen whether Green could repeat the success he had had in the eye care segment in the hearing segment too.

### Exhibit I

<b>LEI's Revenues, Expenses and Surplus statement</b>							
	<b>92/93*</b>	<b>93/94*</b>	<b>94/95</b>	<b>95/96</b>	<b>96/97</b>	<b>97/98</b>	<b>98/99</b>
Outpatients	87,966	94,650	108,279	127,106	131,592	149,937	144,816
Total Surgeries	6,327	6,389	8,855	11,518	12,328	16,284	19,112
Cataract	5,383	5,392	7,561	10,113	11,158	14,874	17,584
Cataract with IOL	3,313	3,970	6,687	9,305	10,353	13,988	16,734
<b>(In US\$)</b>							
Revenue		127,462	250,217	392,076	446,447	498,075	585,351
Expenses	83,984	111,550	216,174	245,994	293,944	396,782	411,861
Surplus		15,912	34,043	146,082	152,503	101,293	173,490
Unit cost / Surgery	13	17	24	21	24	24	23

Source: [www.aravind.org](http://www.aravind.org)

## Exhibit II

### Aravind's Core Values

**Integrity:**

We will pursue all our actions within the legal framework of whatever region we operate in internationally. We respect the law and follow the same in word and spirit. We will hold steadfast to the commitments made to suppliers, customers and technology partners alike.

**Innovative Solutions:**

We believe innovation is the best way to address the societal needs today. We will work towards delivering impactful customer value through innovative solutions in products, processes and support etc.

**Emerging Opportunities:**

We will be open and eager to embrace new opportunities and challenges that come our way. Taking a step into the unknown confidently and making a successful venture shall be the guiding principle for Aurolab's future growth in diversified segments. This is a trait that is expected to establish Aurolab as a Model Enterprise.

**Excellence:**

We will strive for excellence in all aspects of our work. It shall reflect from house-keeping to product development and from customer satisfaction to adopting IT to stay ahead.

**Nurturing employees:**

We understand that the strength of the organization and its growth depends on its employees and we will strive to nurture our employees to bloom to their full potential by providing opportunities for growth, taking additional responsibilities and being tolerant to their mistakes thereby creating an environment to learn and shoulder responsibilities. We will remain a humane organization while achieving professionalism in work

*Source: [www.aravind.org](http://www.aravind.org)*

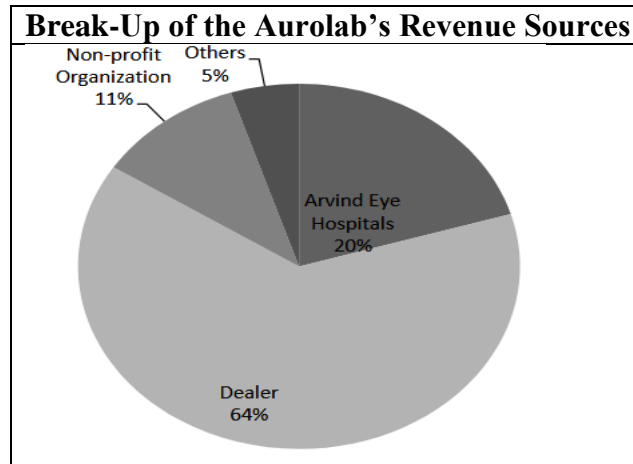
### Exhibit III

#### DEALER NETWORK

Toward the early 2000s, as the production of IOLs and other equipment at Aurolab grew and as the external customers also increased, stock keeping became more challenging. Aurolab started to rely on the dealers to act as intermediaries. The dealer was responsible for maintaining stocks and supply to the users on order. Introducing the dealer channel also did away with the issues of receivables from the customers. Dealer selection was primarily based on the reputation of the individual in ensuring effective stock keeping, timely services, and prompt accounts management. Aurolab's personnel took special care in the selection of dealers. This ensured a dedicated, hardworking dealer network. In order to start up a dealership for Aurolab's products, the dealers needed a seed capital of about \$ 15,000 and a small office. What was more important was their dedication toward the products and their social orientation to drive the products and make them for the maximum number of people.

Aurolab's dealer network proved immensely effective with excellent service, just-in-time deliveries, and prompt settlement of the account receivables. In addition to the direct marketing expenses, Aurolab provided each dealer a margin of 25–30%. The incentive for the dealers varied from 5% to 10% based on their sales performance (*Refer to Table for The breakup of revenue for Aurolab from various sources for IOLs*).

*Table*



Source: AurolabExcellence; www.aravind.org; 2009

*Compiled from various sources*

**Exhibit IV (A)**

<b>Component</b>	<b>2006</b>	<b>2005</b>	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>	<b>2000</b>	<b>1999</b>	<b>1998</b>	<b>1997</b>
Net Sales/Income from operations	2.31	1.51	0.93	0.58	0.65	0.97	4.17	1.49	2.58	2.49
Other Operating Income	--	--	--	--	--	--	--	--	--	--
Total Income From Operations	--	--	--	--	--	--	--	--	--	--
<b>EXPENDITURE</b>										
Consumption of Raw Materials	2.18	0.82	0.76	--	--	--	--	--	--	--
Purchase of Traded Goods	--	--	--	--	--	--	--	--	--	--
Increase/Decrease in Stocks	-1	0.07	-0.4	0.06	-0.05	--	--	--	--	--
Power & Fuel	--	--	--	--	--	--	--	--	--	--
Employees Cost	0.28	0.28	0.17	0.05	--	--	--	--	--	--
Depreciation	0.11	0.08	0.08	0.06	0.07	0.06	0.07	0.06	0.08	0.04
Excise Duty	--	--	--	--	--	--	--	--	--	--
Admin. And Selling Expenses	--	--	--	--	--	--	--	--	--	--
R & D Expenses	--	--	--	--	--	--	--	--	--	--
Provisions And Contingencies	--	--	--	--	--	--	--	--	--	--
Exp. Capitalised	--	--	--	--	--	--	--	--	--	--
Other Expenses	0.72	0.64	0.45	0.71	1.02	1.12	4.26	1.65	3.36	3.34
P/L Before Other Inc. , Int., Excpt. Item	--	--	--	--	--	--	--	--	--	--
Other Income	0.02	0.06	0.07	0.08	0.19	0.24	0.44	0.04	0.61	0.64
P/L Before Int., Excpt. Items & Tax	--	--	--	--	--	--	--	--	--	--
Interest	0.06	0.01	0.01	0.01	0.02	0.01	0.03	0.04	0.03	0.06
P/L Before Exceptional Items & Tax	--	--	--	--	--	--	--	--	--	--
Exceptional Items	--	--	--	--	--	--	--	--	--	--
P/L Before Tax	--	--	--	--	--	--	--	--	--	--
Tax	--	--	--	--	--	--	--	--	--	--
P/L After Tax from Ordinary Activities	--	--	--	--	--	--	--	--	--	--
Prior Year Adjustments	--	--	--	--	--	--	--	--	--	--
Extra Ordinary Items	--	--	--	--	--	--	--	--	--	--
Net Profit/(Loss) For the Period	<b>-0.02</b>	<b>-0.33</b>	<b>-0.09</b>	<b>-0.23</b>	<b>-0.21</b>	<b>0.01</b>	<b>0.25</b>	<b>-0.21</b>	<b>-0.28</b>	<b>-0.32</b>
<b>Aurolab's Financials 1997- 2007</b>										

Source: Aurolabs Financials y-o-y, [www.moneycontrol.com](http://www.moneycontrol.com), 2017



### Exhibit IV (B)

<b>Aurolab's Financials 2007- 2017</b>											
Component	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Net Sales/Income from operations	17.33	16.22	16.83	16.51	22.11	14.68	11.06	6.15	5.8	2.45	2.93
Other Operating Income	--	--	0.13	0.21	--	--	--	--	--	--	--
Total Income From Operations	17.33	16.22	16.96	16.72	22.11	14.68	11.06	6.15	5.8	2.45	--
<b>EXPENDITURE</b>											
Consumption of Raw Materials	8.8	6.73	10.87	12.27	14.18	11.72	8.12	4.1	4.03	1.51	1.96
Purchase of Traded Goods	0.01	0.01	0.01	0.02	--	--	--	--	--	--	--
Increase/Decrease in Stocks	0.63	4.14	1.03	0.57	1.36	-1.41	-0.99	-1.43	-0.71	-0.98	-0.54
Power & Fuel	--	--	--	--	--	--	--	--	--	--	--
Employees Cost	1.84	1.45	1.32	0.97	1.05	0.93	0.79	0.55	0.42	0.26	0.27
Depreciation	0.46	0.28	0.33	0.34	0.32	0.27	0.21	0.21	0.14	0.14	0.1
Excise Duty	--	--	--	--	--	--	--	--	--	--	--
Admin. And Selling Expenses	--	--	--	--	--	--	--	--	--	--	--
R & D Expenses	--	--	--	--	--	--	--	--	--	--	--
Provisions And Contingencies	--	--	--	--	--	--	--	--	--	--	--
Exp. Capitalised	--	--	--	--	--	--	--	--	--	--	--
Other Expenses	3.35	2.48	2.03	1.64	4.14	3.03	2.33	1.74	1.35	1.18	0.9
P/L Before Other Inc. , Int., Excpt. Items & Tax	2.22	1.13	1.37	0.91	1.07	0.13	0.6	0.99	0.58	0.34	--
Other Income	0.3	0.28	-0.28	--	0.02	0.4	0.3	0.02	0.31	-0.01	-0.01
P/L Before Int., Excpt. Items & Tax	2.52	1.42	1.09	0.91	1.09	0.53	0.9	1.01	0.89	0.33	--
Interest	0.31	0.77	0.46	0.61	0.86	0.39	0.49	0.21	0.11	0.01	0.11
P/L Before Exceptional Items & Tax	2.21	0.65	0.63	0.3	0.23	0.14	0.42	0.81	0.79	0.38	--
Exceptional Items	--	--	--	--	--	--	--	--	--	--	--
P/L Before Tax	2.21	0.65	0.63	0.3	0.23	0.14	0.42	0.81	0.79	0.32	--
Tax	--	--	--	--	--	--	--	--	0.01	0.01	0
P/L After Tax from Ordinary Activities	2.21	0.65	0.63	0.3	0.23	0.14	0.42	0.81	0.78	0.31	--
Prior Year Adjustments	--	--	--	--	--	--	--	--	--	--	--
Extra Ordinary Items	--	--	--	--	--	--	--	--	--	--	--
<b>Net Profit/(Loss) For the Period</b>	<b>2.21</b>	<b>0.65</b>	<b>0.63</b>	<b>0.3</b>	<b>0.23</b>	<b>0.14</b>	<b>0.42</b>	<b>0.81</b>	<b>0.78</b>	<b>0.31</b>	<b>0.13</b>

Source: Aurolabs Financials y-o-y, [www.moneycontrol.com](http://www.moneycontrol.com), 2017

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