Exploring Innovative Models for Affordable Healthcare Services in India: A Bottom of The Pyramid Approach

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Abstract: **In a developing economy like India, a large population at the bottom of the pyramid segment faces structural barriers while attempting to avail quality healthcare services. Reliability, affordability, and accessibility of health care remain a challenge. An emerging narrative captures this challenge and transforms it into an opportunity where innovative business models while addressing social depravations can simultaneously generate financial value. There are healthcare enterprises driven by passionate and visionary entrepreneurs who operate under severe resource constraints towards designing and delivering low-cost high quality and scalable market solutions for the underprivileged.**

The current investigation attempts to explore the purpose of this research paper is to understand the causal operational features of these business enterprises professing long-term sustainability along with generating socio-economic value.

This is an empirical study involving multiple case analyses, with the data points extracted from existing studies and enterprise websites of four affordable healthcare ventures. These selected ventures strive to manifest desirable socio-economic transformation for the underprivileged population residing in rural/semi-urban areas. This case study investigation reflects the critical operational features of these ventures with their target segment at the BOP. They deliver common value proposition in terms of providing services focusing on accessibility, affordability, acceptability and awareness. They leverage on collaborate stakeholder engagement, localised skills enhancement, experiential learning, innovative enterprise structures, passionate leadership, technology integration, and a scale-up mindset.

The intention behind this endeavour is to explore and highlight the knowledge and managerial values, catalyse forthcoming investigations, and guide future entrepreneurs engaged with the bottom of the pyramid segment.

Index Terms **- "Bottom of the pyramid", "Rural healthcare", "Low-income markets", "Emerging markets", "Shared value", "Developing countries", "Poverty".**

1. Introduction

Prahalad and Hammond (2002) opined that the bottom of the pyramid segment manifests peculiar challenges and possibilities for enterprises. It brings a unique prospect to address social deprivation in a financially sustainable manner. This can be possible only when innovative pro-market methods are utilized to engage the beneficiary segments throughout the value chain. Schumpeter (1934) envisaged that an entrepreneur through innovative technological advancements transforms enterprises and, in the process, the entire community/country. The enterprise enjoys certain competitive advantages owing to the entrepreneurs' ability to assess the environment, and dynamically use diverse stakeholders in the process of leveraging the core technological innovation. It has been observed that since 2010 onwards the GDP of many developed nations has been limited to 1-2% but developing nations have experienced high GDP (7-10%). The plateauing GDP and marketplace saturation in developed economies are heralding a definite archetypical alteration in cognizance and interest toward the incipient needs and latent entrepreneurial possibilities in emerging economies. The emerging markets are primarily considered to be ambiguous, epistolary, agrarian, and diverse with substantial populations bracketed with in the bottom of the pyramid portion.

As a developing country Indian economy is emerging with a satisfactory GDP since 2007 and boasts a massive potential human resource (1.18 billion as of 2013). As consistent with UNICEF (2011), 73% of the populace in India resides in the countryside. World Bank estimates, 43.5 % of India's populace is forced to survive with a meagre $1.25 per day and 74.5 % under $2 per day (Haub and Sharma, 2010). Asymmetric information, fragmented market, vulnerable legal institutions, unfavourable infrastructure, unavailability of critical resources, and "poverty penalty" (Viswanathan et al., 2007) define some of the structural imperfections in this epistolary marketplace which differentiate the BOP from other higher-in-source groups. As a result, the underprivileged section struggles to utilize the existing formal economic institutions to avail basic necessities. This creates potential for progressive commercial enterprises to venture into this unexplored segment with a unique strategic differentiation and institutional approach.

Healthcare is one such sector, where most developing nations face a formidable demand-delivery imbalance. This is accentuated by the factor that value proposition both in terms of standard of health care and the financial cost is widely dissimilar between the private and the public service providers. This opens a window for innovation and emphatic intervention to fulfil an unmet need of vulnerable segments. The Indian healthcare landscape currently consists of:

- Public healthcare system functional under a capital-constrained environment
- Commercial providers whose excessive fees keep the bottom of the pyramid outside their reach
- Multitudes of private nursing houses seem to function in a non-transparent manner when it comes to quality and price
- Quacks.

In the healthcare context, the bottom of the pyramid segment mostly faces challenges as they are unable to access and avail critical medical information, products, and services. With this latent demand in the picture, many enterprises are trying to utilize this demand gap to create business models that cater to the needs of the target beneficiary simultaneously ensuring sustainability and profitability. These passionate entrepreneurs represent a formidable combination of technical competence and social

consciousness leveraging innovative technological breakthroughs, for implementing low-cost medical interventions and scaling them up to the bottom of the pyramid sections.

This investigation aims to explore the nuances of new-age enterprise frameworks designed to attain sustainability and profitability while serving the underprivileged. The authors have used multiple case study methods to analyse and compare the data of 4 such enterprises.

The case study approach incorporates extant investigations, information available in archives, industrial communique, and digital literature available in the public domain (Yin, 2009). The socially and economically heterogeneous bottom of the pyramid allows us to use a case study approach to capture its complex dynamics. Unlike higher incomes segments, the bottom of the pyramid demands a differentiated approach in terms of entrepreneurial mindset and strategy. In this context, the current study employs a qualitative examination of information derived from diverse sources. The authors have gathered relevant information from social enterprises focusing on affordable health care.

This study attempts to understand how healthcare enterprises can remain sustainable while fulfilling the unmet needs of the masses. It contributes to and enriches the extant investigations focusing on sustainable enterprise in terms of providing rich insight into innovative operational practices aiming for maintaining a double bottom line, especially in the developing nation context. A comprehensive understanding of diverse business models will make us understand the nature of such socially sustainable models operational in the healthcare landscape.

This investigation has seven sub-sections. II provides detailed information regarding the extent of studies' bottom-of-the-pyramid business models. III-V elaborates on the methodological approach to sampling and designing the investigation. VI presents the analytical feature comparing multiple case lets. It is followed by concluding remarks along with a recommendation for future investigations.

2. Literature overview

2.1 BOP

The Bottom of the pyramid has emerged as an agglomerative denotation to the 370-crore population which represents the most vulnerable section in terms of income. With a meagre US$ 2,9000 annual income (2005 PPP) which translates to around 7 US$ daily (Hammond et al., 2007; Prahalad and Hammond, 2002). But they always by default mayn't offer inviting commercial possibilities. Landrum (2007) and Karnani (2007, 2011) believe that the assured market of US$4,500,000 crores market is non-existent and suffers from over-exaggeration, and enterprises planning to venture into the bottom of the pyramid must engage with proper due diligence. Karnani (2011) argues:

"BOP is a fuzzy phrase. The poor should be considered in terms of absolute poor. What is unique about the BOP idea as Prahalad and Stuart Hart first talked about it is that you could make a profit from it, not do it as a charity. I think we should impose three strict conditions on BOP logic: That it's profitable. It's actually (serving) the poor. It's good for the poor. Now, you put these three conditions together and there are very few positive examples (of BOP enterprises)."

Ignoring the distinct opinions on regarding identifying the bottom of the pyramid, worldwide corporations have found out that BOP is a massive unexploited possibility with its specific group of inherent demanding situations, that involves a specialized way of thinking and technique toward cost proffer, cost advent, logistics, and sales advancements. There is a dearth of knowledge in understanding nation-specific standards for the said segment. From a commercial enterprise perspective, it has to be characterized for its heterogeneity, naturally leading to further segmentation (poor-extreme poor based on their daily income threshold).

The Indian parameters show that there is a diverse approximation regarding the number of individuals under the poverty line (BPL). Figure 1 displays the relative figure of India's populace labelled as BOP, equally proposed via way of means of distinct research. This study regards the World Bank's explanation of the BOP section ($2 PPP per day).BOP needs a critical analysis exploring opportunities, needs, and barriers in this said segment. The social economic nature of BOP presents a series of mammoth opportunities through an unexplored consumer base of 3.8 billion with a combined family financial gain of US$ 500,000 crores (Hammond et al., 2007). Hammond further elaborates on this market segment.

The needs component corresponds to the central feature of the "value proposition", that is necessary to shape a marketplace at the bottom of the pyramid. This aspect should be viewed from a market development perspective which includes identifying key unmet needs, understanding pricing (in the sense of affordability instead of cost-plus profit), creating and giving pro-market solutions, which are low-priced, get-at-able, acquirable and results in market participation and sentience (Prahalad, 2004). Pricing involves discerning the beneficiary'sability to pay and working backward to determine the post-adjustment "challenge cost". Access along with availableness denotes the organization of logistics to facilitate the attainment and convenience of goods and services to target segments. sentience refers to being equipped with relevant knowledge and data of the said sector, that aids them to understand the market, and make decisions that are beneficial to them.

Aspects of market complexity represent the main barriers that enterprises face while venturing into the BOP (Shukla and Bairiganjan, 2011). Customer saliency reflects similar barriers in terms of decision-making adversely impaired by unpredictable external variables like currency fluctuations, dearth of economic capital, linguistic, geographical, and educational diversity, "mobility restrictions" and transportation challenges. and prevalence of societal beliefs and stereotypes which impact purchasing selection. The overall landscape also accentuates these difficulties in terms of population concentration in all geographic areas, lack of institutional assistance and political backup, and a lack of information regarding the target populace. The market intervention also suffers because of the non-availability of substructures such as electricity, water, technology, roads, etc., and the lack of supporting commodities that can aid in commercial expansion. This creates barriers to access and availability. The availableness of qualified assets like doctors, medical staff, engineers, etc. accentuates the challenges, which is a major obstacle to starting a product/service that requires professional services.

2.2 Business model

Business model as a concept evokes diverse definitions and forms of expression. Few opine that the business model intrinsically indicates the conception of value creation for an enterprise (Timmers, 1998; Linder and Cantrell, 2000; Hamel, 2000; Shafer et al., 2005; Mitchell and Coles, 2004a, b; Morris et al., 2005; Teece, 2010; etc.), Some visualize it as the conduit amidst the process of planning, enterprise operations with information organization (Amit and Zott, 2001; Chesbrough, 2007; Osterwalder and Pigneur, 2010). This diverse conceptualization indicates a common denominator that business models establish actionable relations between strategic intent, operations, and information systems. Chesbrough (2007) believed that commercial processes combine elements of "value proposition", "customer segmentation", cost structure to generate and disseminate profit, cost of capital and investment,

strong position, and "value network and competitive strategy". Osterwalder and Pigneur (2010) stated that the business model is a device that has to be enforced by the enterprise's organizational social system, operations, and functions. The business model is the logical blueprint revealing the ways in which the enterprise ensures the creation, control, and deliverance of value. Osterwalder and Pigneur (2010) created a comprehensive framework that incorporated analysis of product/service-specific analysis through 9 enterprise subsystems which are "value proposition, target market segment, market relations, channel distribution, key resources, key activities, key partnerships, cost structures, and financial systems."

3 BOP business model

BOP events are characterized by a wide and diverse range of research papers, which focus on different topics such as "value proposition, disruptive innovation" and cost-effectiveness by 'building localized capability and community education. The term "value proposition" is used to indicate how the enterprise is able to create value for the benefit of the beneficiary segment. The beneficiary segment is integrated with the value chain either as the end user, manufacturer, distributor, or retailer (Viswanathan et al., 2007; Karnani, 2007). Strengthening localized capability becomes critical in this context as the community has to be involved with the essential skillset and conducive environmental facilities. Chaskis et al. (2001) highlight the role of the local authority in community involvement:

"Interaction of human capital, organizational resources, and social capital existing within a given community that can be leveraged to solve collective problems and improve and maintain the well-being of that community."

Therefore, capability enhancement is reflected in augmenting the community's collective capacity toward opportunity identification and redressal. Similarly, BOP models aim for larger stakeholder integration ensuring collaborative and learning enterprises where the beneficiaries are not just bound by a transactional/commercial relation but a long-term community one. Miller (1996) claims:

"The extent to which a company's strategy reflects or is influenced by its social and institutional connections."

Therefore, one can understand that community business integration forms a community presence in public life., A stronger community integration can be achieved via scouting for unconventional partners for shared value creation (Hart and London, 2005). Similarly BOP models also value regional learning where the entrepreneurs enforce a top to down learning mechanism throughout the enterprise. It is important to properly identify, assess and desegregate diverse stakeholder needs and to identify and manifest novel commercial possibilities and enterprise frameworks for under privileged sections and groups (Hart and Sharma, 2004; Hart and London, 2005; Simanis and Hart, 2009).

The BOP market has elicited staggeringly diverse characteristics. Hart and Milstein (2003), believe that long-term developmental approach needs a multidimensional approach to handle multifaceted barriers throughout the societal, fiscal, and global interfaces. Thus, enterprise systems focus on emerging advancements just as green tech and "product stewardship". MNCs which are stuck in plateauing markets in industrialized economies will now have opportunities to reorient to developing ones. But before that, they ought to build a broader capability to understand societal issues by focusing on fiscally backward sections within emerging economies (London and Hart, 2004). Entrepreneurs have to develop a strong partnership with "non-traditional stakeholders and devise custom-build propositions through localized capability.

The extant literature claims that the social entrepreneurial approach has the ability to heraldinnovative frameworks toward providing basic necessities that address specific human needs which remain unaddressed by financial institutions and the abundance or current social relations (Seelos and Mair, 2005). Such hybrid enterprises promote societal transformation apart from fulfilling unmet societal needs where the entrepreneur realizes value not in the traditional fiscal sense. It necessitates the integration of various streams of thought from enterprise systems, entrepreneurial frameworks, capital management, and societal transformation (Mair and Marti, 2006).

BOP has emerged as a complementary facet of social entrepreneurship. According to Anderson and Markides (2007) strategic intent and implementation coupled with capacity, acceptance, accessibility, and salience are critical aspects of the BOP model. But Simanis and Hart (2009) advocate that enterprises should implement the "Integrated Innovation Paradigm (EIP)" instead of "the Structured Innovation Paradigm (SIP)" and BOP. While SIP ensures customer focus and a market-based approach through the pragmatic delivery of commodities in a quicker and cost-efficient manner, EIP values partnership and cognitive commitmenttoward positive transformation. Also, fiscal and social support act as drivers of innovation (Prahalad and Mahelkar, 2010). To address the barriers and possibilities, enterprises embrace development and origination through disruptive value frameworks, changing institutional capacities, and acquiring fresh capacities. It calls for having a well-defined goal, making business decisions within restraints, and grounding its focus on human resources alongside profit and shareholders' wealth.

Recently, studies have shown that entrepreneurs employ localized assets to make sure beneficiaries are effectively engaged. Dahan et al. (2010), advocates that MNCs too must strive to engage with not-for-profit entities toward the generation and transmission of benefits when entering developing countries. These partnerships allow countries to have expertise in the market, accuracy with customers/customers, actors, and public institutions, and accessibility to localised expertise in the transfer and dissemination process.

Researchers have repeatedly informed that enterprises intending to venture into the BOP market cannot confine their vision to the realization of fiscal profit, but must aspire for social/community well-being. according to Porter and Kramer (2011) enterprises when striving to realize dual value, financial gain is realigned with human welfare and development. It necessitates the restructuring of value offerings, defining efficiency and cost-benefit and enabling the development of regional clusters. Furthermore, Yunus et al. (2010) show the importance of the social entrepreneurship framework in the BOP, the resulting components, and the main objectives, compared to corporate social responsibility and enterprises with shareholder wealth maximization orientation and because of the influence of the enterprises engaged and also on the beneficiary segment and others in the value chains. The present study outlines 5 learnings extracted from Grameen Bank's story, including strong traditional reasoning, exploring collaborative partnerships, incessant inquiry, engaging stakeholders for community benefit, and defining clearly at the beginning of the public benefit objective. Therefore, it is necessary to change the business model to include social aspects and not only economic aspects.

3.1 BOP healthcare in India

Indian healthcare segment has shown a tremendous appetite for growth with a "CAGR of 14%". IBEF (2011) claims that the market share will witness an exponential rise from US $ 4000 crores (the year 2009) to the US $ 7900 crores (the year 2013). the growth in healthcare is explained in the following table.

WHO (2010) has presented a relative model which shows the distribution of "urban and rural health care" in India compared with other countries (Figure 3). Indian healthcare is featured with around 17,000 medical institutions; largely concentrated in cities compared to the most of people reside in the countryside (International Trade Administration, n.d.). Populace participation ranges from 20% to 80%. This raises serious questions about the accessibility of low-cost and superior health care for multitudes who live in BOP areas and often live in the countryside. Commercial facilities mainly focus on the profit-making upscale market. Due to not having micro-insurance cover the vulnerable section is excluded from availing of private healthcare facilities.

Figure 4, prominently displays that the Indian healthcare sector suffers due to a lack of human resources ("qualified doctors, nurses and nurses") where it is farbelow many developed and even developing countries (PWC, 2007). These figures are further distorted when compared to the distribution of urban and rural aggregation. According to IBEF (2011), in India, around 75 crores of people live in 640,000 villages. This represents 72% of the entire populace of India. The number of doctors in rural areas and the population is six times lower than in urban areas.

The bed/population ratio in rural areas is 15 times lower than in cities. the facts point out unmistakably the severe dearth of availability and access to low-cost health care, which adds to the scarcity of qualified assets ("doctors, nurses, medical equipment ", etc.) in the countryside. This state of affairs is worsened by the dearth of decent "health insurance coverage" for people in BOP in both cities and the countryside. The World Bank on Indian health-care landscape reports (2002) that:

"One episode of hospitalization is estimated to account for 58 percent of per capita annual expenditure, pushing 2.2 percent of the population below the poverty line. 40 percent of those hospitalized have to borrow money or sell assets."

It indicates that aroundthe fact that 2.2 crores of the aggregation are driven into poverty every year because of health expenditure. It emerges as a grave source of worry to all. Thus, this study attempts to explore the type of enterprises that is self-sustaining to provide BOP healthcare services in India.

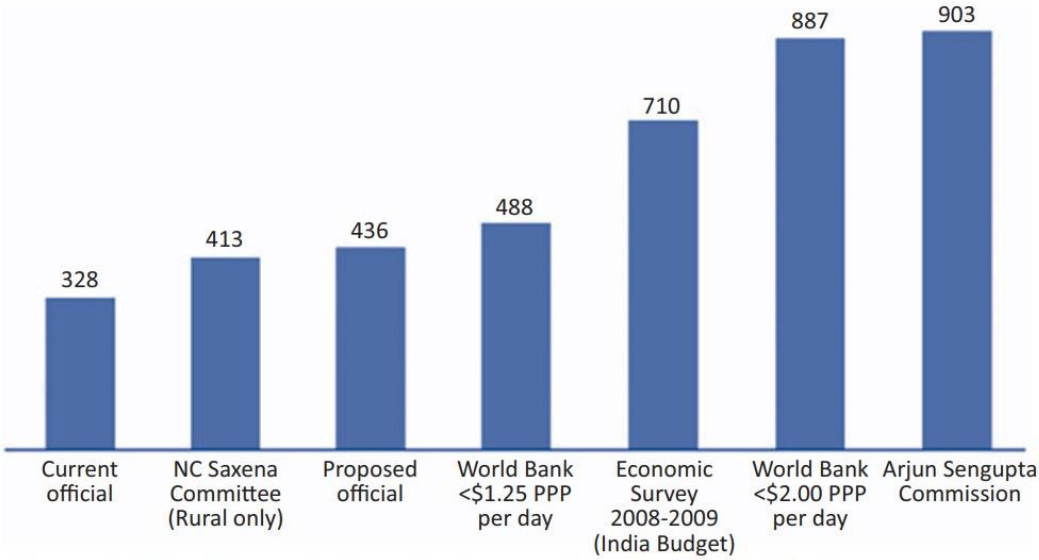
Table 1: Growth of Indian healthcare segment

Sub Sectors	Growth
Hospitals	(71%)
Pharmaceuticals	(13%)
Medical Supplies and Equipment	(9%)
Health Insurance	(4%)
Research	(3%)
Demand for Primary, Secondary and Tertiary Health Care	60:30:10.

Table 2: Regional distributions of BOP segment

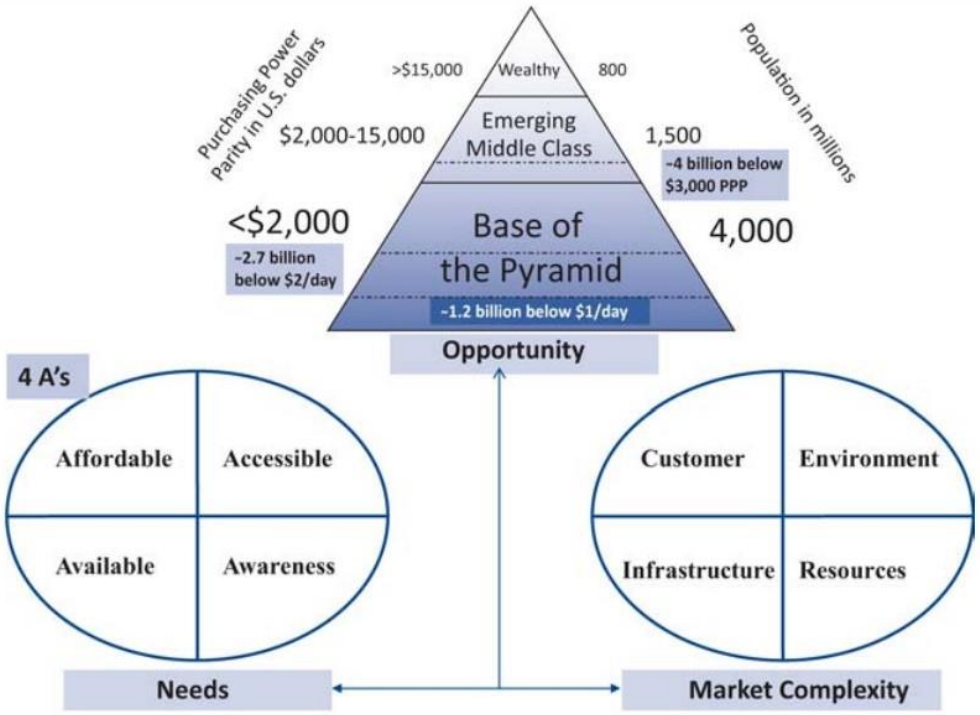
Region	Customer base	Household income combined
Asia	2.86 billion	$3.47 trillion
Eastern Europe	254 million	$458 billion
Latin America	360 million	$509 billion
Africa	486 million	$429 billion

Figure 1 India population comparative estimates – below poverty line (millions)



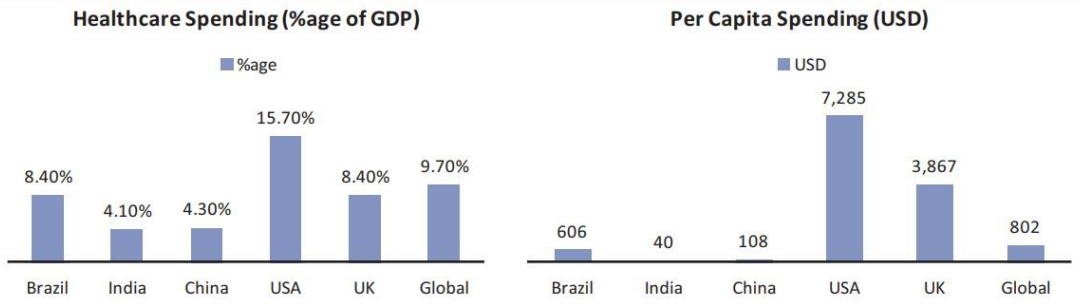
Source: Haub and Sharma (2009) – http://www.prb.org/Articles/2010/indiapoverty.aspx – Last accessed on 26 Jan 2012

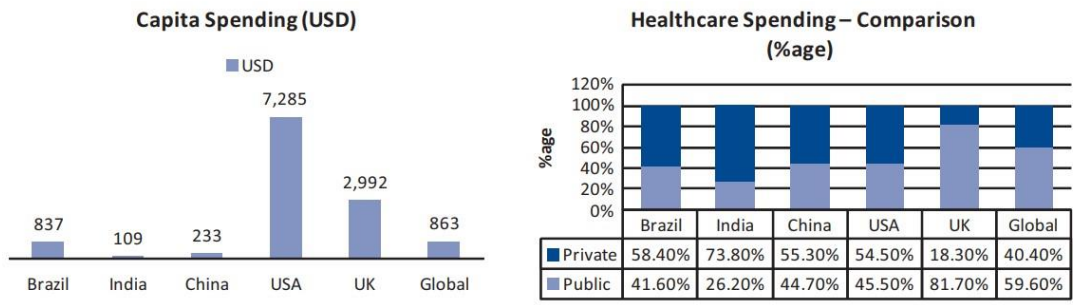
Figure 2 BoP market – challenge or/and opportunity



Sources: Chen and Ravallion (2001); Prahalad and Hammond (2002); Prahalad and Hart (2002); Hammond *et al.* (2007); London (2008)

Figure 3 Health care – comparative indicators

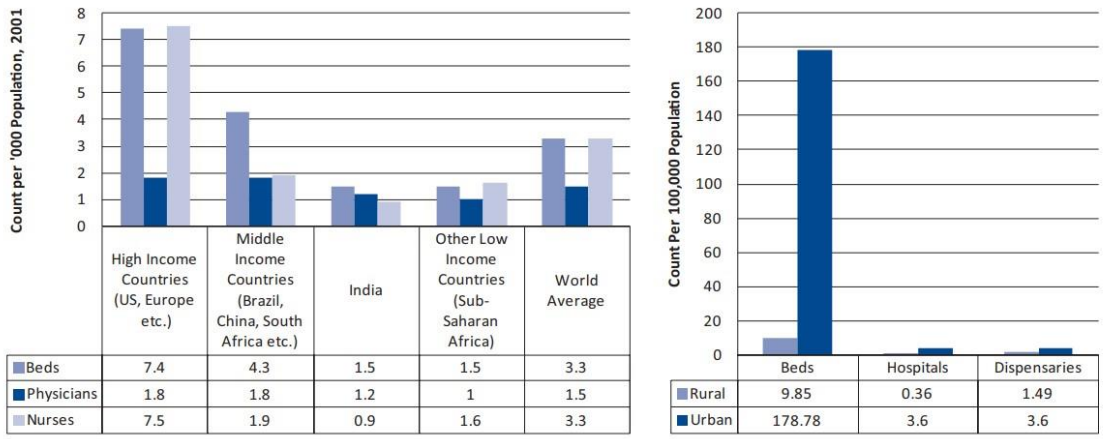




	Brazil	India	China	USA	UK	Global
Private	58.40%	73.80%	55.30%	54.50%	18.30%	40.40%
Public	41.60%	26.20%	44.70%	45.50%	81.70%	59.60%

Source: WHO World Health Statistics (2010)

Figure 4 Health care – comparative resources



	High Income Countries (US, Europe etc.)	Middle Income Countries (Brazil, China, South Africa etc.)	India	Other Low Income Countries (Sub-Saharan Africa)	World Average
Beds	7.4	4.3	1.5	1.5	3.3
Physicians	1.8	1.8	1.2	1	1.5
Nurses	7.5	1.9	0.9	1.6	3.3

	Beds	Hospitals	Dispensaries
Rural	9.85	0.36	1.49
Urban	178.78	3.6	3.6

Sources: PWC (2007); Gangolli *et al.* (2005)

4. Research study design

This is an empirical study involving a case study analysis, where data pertaining to 4 healthcare organizations were gathered from journals. The approach is necessary to understand complex issues and their multi-layered relation which cannot be easily captured by conventional methodology. Multidisciplinary methods allow for in-depth research into different situations and allow the researcher to get into the cause of things (Huberman & Miles, 1994). Provisional interpretations discovered in research ought to be investigated in another study, improving the "reliability and validity of the conclusions drawn" (Yin, 1981).

4.1. Sample selection

We have selected four health-care service providers, with a "vertical business model" and are engaged in providing services to the BOP sections.

Table I: Inclusive healthcare sample selection

S no.	Company	Offering	Type	BOP inclusion type	Source	Published in
AI	Aravind Eyecare	Eye care	Service, product	Consumer, employee	Kasturi Rangan and Thulasiraj (2007)	Innovation
A2	Narayana Hrudalaya	Heart care	Service	Consumer, employee	Kothandaraman and Mookerjee (2007)	UNDP
A3	Vaatsalya	Primary and secondary care	Service	Consumer	Mukherji (2010)	UNDP
A4	LifeSpring	Maternal care	Service	Consumer, employee	Krishnadas (2011)	Emerald EECS

Note: The selected cases had to describe a business model that included the poor in ways that could be profitable and that clearly promoted human development.

5. Research Methodology

The investigation includes rigorous data analysis. Data pertaining to each of the case organizations have been ordained from extant supplementary references, which include studies publicized in EMCS [3], UNDP [4], WDI [5], and Innovation [6] in print. documents from internet archives, webpages of selected enterprises, printed documents, etc. In the first stage,aneffort was made to identify data sources to gather relevant data points on the selected enterprises. In the second stage, the authors analyze the content of the published documents specific to the chosen enterprises using the software Atlas.ti[7]. In the third stage, the authors conducted a case study to explore the convergence and divergence amidst the enterprise models of the chosen enterprises. In The fourth stage, the authors summarize the general findings in a comprehensive format (Appendix 1-5) and build on these to develop recommended suggestions and concluding remarks, that helpus to understand the main principles at work for BOP in rural and medium-sized health care segments in India.

6. Analysis and findings

The data analysis provides a comprehensive and fruitful picture regarding important aspects of BOP business models. The first part is to identify the salient features and decide on a their contribution. The second part is to interpret the end-user segment. This provides understanding regarding the nature of the target segment, the process of building customer relationships, nature of available distribution channels. The third part deals with value generation. This addresses the queries related to the nature of the enterprise, the definite leadership style, behaviour, skills, and abilities that are needed to provide commodities based on the market need and create value. The fourth part captures the stakeholder network, nature of diverse partnership which constitutes a mutually collaborative ecosystem. In the fifth stage, the narrative is drawn to encapsulate the social and economic aspects. It elaborates on the nature of the social impact, and the type of reward and investment process involved. The four chosen enterprises are analysed according to the above mentioned parameters, which constitute the main analysis.

The comparative case study analysis begins with capturing the "needs identification and value propositions" of the selected enterprises. In all 4 enterprises ("Aravind Eyecare (AE), Narayana Hrudayalaya (NH), Vaatsalya (V), and LifeSpring Hospitals (LH) ") market segmentation was based on the entrepreneurs' capability and attitude.

AE focuses on providing low-cost treatment options for the treatment of curable blindness. Though its initial focus was on cardiac care, NH gradually moved into other related primary, secondary, and tertiary care services. V targets rural and semi-urban areas providing primary and secondary health care. LH limits its function in semi-rural areas by providing cost-efficient maternity care. The general objective converges for all groups, i.e., to build an enabling environment to provide affordable, convenient, and high-quality (effectiveness for value) health care to the rural and semi-urban populace. According to the ability and goal of the entrepreneurs, these enterprises have chosen a specific market segment. Their central aim is to increase the affordability of health care, simultaneously creating an ecosystem of health care awareness, which can lead to preventive health care.

The second stage deals with the target group. The heterogeneous market-space of BOP contains numerous sub-sections, those are classified with the aid of degree of income ($1/day, $1-2/day, $2/day, $5-8/day etc.), through geographic attention (rural, semi-urban etc.), gender and so forth.

Thus, for any BOP venture to be successful, understanding the identity of customer, segmenting prior to the finalization of the value proposition becomes critical. When it comes to customer segmentation these four healthcare service enterprises went to identify the specific unmet needs of the underprivileged sections, and devised a method to address the needs in a way that can be scaled up and replicated ensuring business expansion and growth. A few such enterprises target a broad range of social-financial segments but with a central focus on the BOP section. It allows them to cross-subsidize the potential loss in one section while ensuring service accessibility for the public. Whilst AE and NH offer their services to all irrespective of their ability to pay, V and LS target only the segment capable of paying thus excluding the extremely marginalized. When it comes to consumer relations, all 4 enterprises realize the need to sustain "trust and transparency" along with "affordability and accessibility" to extract their target segment from the undesirable income group they are struck with. This is ensured by incorporating the local stakeholders as "para medical staff and nurses" thus making the enterprise inclusive and sustaining the last-mile connectivity with the target segment. apart from helping the privileged with additional earnings opportunities, this helps in gaining trust and transparency. There is another facet that stands commonplace amongst this healthcare enterprise is that all of them understand the necessity to raise "healthcare awareness" amidst the BOP segment. this stems from the realization that affordable "preventive healthcare" through proactive attention and awareness is much more critical than "reactive healthcare offerings". AE focuses on customer relations by ensuring the remedy for all (notwithstanding their ability to pay) , through "eye-care camps" which also spreads sentience and marshal the public into a conscious stream. AE gives the best service and eye-care commodities at fraction of the accrued cost. NH followed a different approach by introducing and popularising innovative micro-insurance schemes ("Yeshaswini and Arogya Raksha") which simply altered the enterprise-customer relations and made their services more affordable. V created a complementary range ofprimary and secondary healthcare offerings through preventive healthcare camps like "rural delivery centers" and setting up lab for testing the fluoride percentage in water. LS targets the semi-urban segment through preventive healthcare/ community outreach programs. As far as "delivery channels" are concerned, all four consciously put effort to mitigate the high cost of making their offerings cost-effective in remote areas. V and LS used the conventional ‘‘hub’’ framework through a network of hospitals which can enhance access over time. "Hub" model also increases legitimacy and acceptability in the market as the enterprise becomes comparable to the extant public and private healthcare units. NH and AE followed the ‘‘hub-n-spoke’’ version for low-cost delivery. This involves constructing and integrating a network of hybrid institutions ("hospitals, mobile outreach vans, and tele-network"). Patients from the remote area with primary issues can avail services of videoconferences or mobile vans) and only critical cases can be referred to hospitals. Apart from bridging the accessibility gap it also saves money for these enterprises.

The third stage focuses on ways of "value creation"! This incorporates analysing enterprise structure, style of leaders, critical processes, and constraints. In this context, some of the usual decision points for comparison are cost effectiveness, performance price ratio, innovation, centralized-decentralized dynamics, and scaling up. All four enterprises have consciously built their enterprise structure around their most critical human resources i.e. doctors and paramedical workforce. They strive to maintain minimum administration-related hassle towards the functioning of the doctors and paramedical staff. This results in better efficiency as compared to the industry average thereby ensuing in accelerated potential utilization and more coverage of the target segment.

When it comes to the leaders, all four enterprises are driven and guided actively by the founder entrepreneurs, their vision and philosophy shaping the organizational contours. The entrepreneurs demonstrate a clear focus, motivated by way of ardor, high-quality attitude, ability to take risks, innovation, and aptitude to learn. All four of them stress balancing how fast projects are being executed while limiting the cost and maximizing the output. Being charity averse they are singularly interested in making their respective enterprises self-sustainable. They focus on strengthening their central resources and competencies, enhancing their understanding of the BOP market, marshaling a dedicated group of medical professionals, innovative service delivery and standardization of services. The following table summarizes the different capabilities of these enterprises.

When it comes to operationalizing their processes, these enterprises stress, adopting a "bottom-up method" for designing and transmitting their services. They adopt what is termed as ‘‘challenge cost’’ or ‘‘price minus’’, prompting them to finalize the end price first based upon the target's capability to pay and then laboured backward to meet the "challenge cost" even as maintaining some marginal gain. To efficiently meet the task value, some of these enterprises follow a light asset approach and stakeholder engagement enabling cost efficiency measures throughout the value chain by entering into short-term agreements with suppliers, using leased infrastructure, outsourcing ssecondary operations, standardizing processes and usage of equipment, in house training of beneficiaries for customer relations and paramedic services, minimizing participation of specialists in administrative tasks, extended use of OTs, technological adaptation, experimentation, innovations, and localized capability enhancement. AE and NH are able to accomplish the same by using a ‘‘no-frills-assembly line’’ model. This blanketed a lean organizational structure with professionals focusing simply on surgical procedures and consultations rather than administrative obligations, in-house training of women from the BOP segment as staff towards performing specialized healthcare-associated duties, facilitating high volumes of surgeries by adopting capacity usage and productiveness in addition to extended running hours for medical doctors and extended availability of operation theatres. NH limits the costs of its operations by getting into weekly contracts with its suppliers which enhances its bargaining power, acquiring equipment through lease, extensive use of technology (ECG machines, digital x-ray plate, mobile outreach van, and telemedicine network).

AE utilizes its famed assembly line setup to conduct operations (for example AE performs 10 times diverse surgical procedures, each taking 10-15 min in comparison to a number of surgeries done in other hospitals), vertical integration (manufacturing of IOLs, sutures, ophthalmic merchandise through AuroLab setup) and standardization of equipment, systems, and procedures. V and LShave achieved the same with the aid of adopting a ‘‘no-frills’’ approach. It minimizes the non-core expenditures enabling them to operate in less expensive semi-urban regions, rent buildings, and equipment, and own only essential items. They also recruit from the BOP segment as their staff. They have achieved good bargaining power with their suppliers by centralizing the procurement process. They have not only scaled up their operations by setting up new facilities but are also ensuring maximum capacity utilization in each of their units.

The fourth stage of analysis focuses on the stakeholder network and value chain. It involves analysing various forms of partnership toward sustaining a BOP ecosystem. the entrepreneurs are aware that technological advancement and suitable integration are necessary for scaling up such ventures. Steady investment is necessary for sustaining growth and unique operational

partnerships are vital not only for cost innovation but also enhancing transparency and trust by including the BOP segment in various aspects of the value chain.

Table 3: Unique features of healthcare BOP enterprises

Health care enterprise	Capabilities
Aravind Eyecare	Leadership, Customer Focus, In-House Funding, In-House Training Programs for Training Locals as Nurses, Continuous Focus on Technology and Innovation to Reduce Cost and Increase Access, Backward Integration into Manufacturing Eye-Products, Permanent Hiring of Doctors, Ability To Scale and To Build No-Frills, Asset-Light Infrastructure.
Narayana Hrudalaya	Leadership, Customer Focus, Strategic Partnerships for Funding, In-House Training Programs for Training Locals as Nurses, Continuous Focus on Technology and Innovation to Reduce Cost and Increase Access, Short Term Contracts with Suppliers, Permanent Hiring of Doctors, Ability To Scale and No-Frills, Asset-Light Infrastructure
Vaatsalya LifeSpring	Leadership, Customer Focus, Strategic Partnerships for Funding, Ability to Scale, Competency in Setting up Cost-Efficient Asset Light Infrastructure Set-Up, Engagement of Locals as Paramedical Staff

AE is the only enterprise that relies on internal funding and avoids external investors. The study highlights that these 4 enterprises operateindividually within their respective sphere of knowledge. Considering the complexity and the value of the healthcare services required at BOP, it'd be desirable to combine the individual BOP healthcare businesses into a uniform community. This development of an integrated ecosystem incorporating competencies of various setups is needed to maximize the attainment of collective competency and mitigate the scalability limitations.

The 5th stage stresses "socio-economic impact". These enterprises demonstrate sizable social impact as they all target low-income groups in rural and semi-urban set up. Simultaneously their effort to engage the beneficiary population by raining and recruiting them as employees enhances their perception of goodwill and also augments their skilled workforce in a professional manner. Employing staff from the target population also allows the locals to have another source of income augmenting the enterprise's impact beyond its core healthcare offering. Appendix 3 highlights these points.

When it comes to economic impact, most of these ventures highly focus on optimizing cost through integrating innovative tech with their operational processes, attaining higher bargaining power with suppliers on volumes and inventory, choosing to lease rather than purchase, hiring locals for medical procedures and customer interface and no-frills offerings having high-quality value bundling. The enterprises have consciously maintained the operational costs and salary overheads impressively less than the conventional industry average. When it comes to revenue generation, these enterprises even though they provide high-quality service with much less cost focus on core resource utilization and scaling up their operations which would keep the overheads low. AE and NH follow the textbook cross-subsidized model, implementing differential pricing strategies for diverse customer segments. It enables their value offering for the BOP segment to be effective and cost-pragmatic. Whereas V and LS generate their revenue from surgical procedures and through consulting fees from the patients who are capable of paying.

7. Conclusion

This investigation brings out the underlying factors of all four ventures; Intention, objectivity, and passionate zeal toward the creation of an efficient ecosystem for delivering inclusive healthcare service to the underprivileged. The visionary entrepreneurs of this venture have consistently displayed passionate zeal for change. Their mission-centric focus has enabled them to mitigate operational barriers like dearth of infrastructure. Their performance invokes wonder and also a legitimate query if these models can be replicated by conventional business enterprises and MNCs towards tapping the potential latent in the BOP segment. At the end of this study, the authors propose key learnings regarding the salient principles of these four social ventures.

Legitimate and durable segmentation: ddistinct identification of the target customer group is a must. BOP is deeply heterogeneous involving high complexity. Any business venture in the conceptualization stage needs to understand and focus on specific groups within the BOP.

Value proposition: Any enterprise venturing into BOP must highlight and strategize its core offering focusing on affordability, accessibility, availability, and awareness among the public.

Emphatic perception: Entrepreneurs must not impose their own perceptions and ideas regarding what the BOP needs but be emphatic and engage with them to understand their needs.

Capability building: Focus on acquiring and training skilled human resources. The healthcare segment suffers from supply shortages as far as medical professionals are concerned. Both NH and AE have pioneered in creating operational modules where potential recruits from the BOP segment itself are trained and educated which includes the target beneficiary into the value chain as nurses, support staff, and intermediate specialists. It helps in bridging the shortage of human resources and also strengthens the target groups through skill building and financial well-being.

Continuous learning through trial and error: Entrepreneurs should not be averse to marching ahead even without a conventional business plan. BOP intervention needs continuous and radical refinement owing to its complex and multifaceted features. Both designing and implementing the business plan require sufficient strategic flexibility.

Stakeholder web: Collaborate network enables entrepreneurs to forge strategic partnerships to acquire the latest technology, gain cheaper investment and also augment operational efficiency.

Aim to provide a range of products and services to the BOP: The heterogeneous nature of BOP and its inability to attract formal players have allowed this segment to be marred with scores of informal and at times illegitimate market players (money lenders, loan sharks, uneducated quacks, etc). If business ventures aspire to have a real impact in this context they need to replace the existing players by providing a range of commodities to fulfill the beneficiary needs. They need to have a diversification strategy where over time apart from their core offerings they should be able to provide other complementary goods and services. In the health care segment apart from usual medical services, BOP also needs preventive health care and micro insurance. The target population lacks awareness and health literacy which combined with insufficient income, and savings mmechanism restricts their ability to mitigate the fiscal repercussions of sudden medical expenses. V ensures such complementary offerings through organizations of preventive healthcare camps like "rural birth centers, test labs for checking the fluoride content in water," etc. NH ensures it by integrating its main offerings with telemedicine and mobile outreach vans and incorporating micro-insurance schemes like "Yeshaswini and Arogya Raksha".

External environment alignment: BOP ventures have to align themselves in a collaborative and complementary way with the existing public services and regulatory provisions.

Leveraging on technological breakthroughs: The BOP values offerings which are deemed to be affordable, accessible, and available to the underprivileged sections, technology becomes the critical enabler of success for any BOP venture. In particular, developing countries need to catch up and leverage new advancements in the technological front by integrating them into aspects of value generation and transmission.

Enterprise structure and role of the entrepreneur: BOP ventures often tend to prefer a decentralized style of management which is flexible enough to perform in an uncertain environment through adaptive efficiency and prompt decision-making capability. The entrepreneurs have to demonstrate rugged passion and dynamism to guide the venture. The entrepreneurs in this study are known to be passionate, positively dynamic, with high-risk appetites, innovative, and learners. They seem to maintain a consistence tension between the venture's ability to provide the services in a timely manner simultaneously minimizing the cost and maximizing the target overreach.

Scalability: BOP enterprises should stress their ability to scale up faster in order to mitigate the constraints of higher operations and infra-related costs and gain higher margins. It is inevitable to build suitable capability in order to achieve volume-centric revenue via a differential pricing strategy serving diverse segments through cross- subsidization approach. It also prompts many BOP ventures to diversify. For e.g., NH ventured into "non-cardiac related healthcare facilities" which enhanced its economies of scale and scope. V consciously adopted specializations towards treating a wider range of primary and secondary healthcare diseases.

Work towards a larger ecosystem: Different enterprises have to come together to build a larger collaborative platform in the macro field. This study points out a critical drawback in the existing BOP strategies where individual enterprises are confined to their spheres of influence and expertise. Healthcare in BOP is an over-specified and multi-layered challenge too complex to be solved by a single type of enterprise intervention. A cohesive network of all-encompassing health care is needed to capitalize on the spread and bearing with common capitals and to mitigate the scale-up constraints which the stand alone ventures face.

This investigation attempts to explore the critical strategic features for sustainable healthcare enterprises targeting the BOP segment. The study has tremendous implications for both academia and practitioners. Academia can use the study to develop further insight into emergent enterprise frameworks and their strategic features. The practitioners can utilize this study as a reference chaperon on the important prerequisites and develop a "to do" actionable sequence. The intention is to underscore and create a concrete framework for the knowledge and managerial values, which catalyzes the forthcoming investigations and enterprises in the BOP segment, particularly in the inclusive healthcare segment.

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Table A1: BOP healthcare services providers in India – Landscape				
	Aravind Eyecare	Narayana Hrudayalaya	Vaatsalya	LifeSpring Hospitals
	As per WHO (2010), 285 million people who are visually impaired worldwide, which includes 39 million as blind and 246 million people having low vision. About 90 percent of the world's visually impaired live in developing countries. About 80 percent of all visual impairment can be avoided or cured	India needs 2.5 million heart surgeries per year whereas all the hospitals in India, together perform around 80k-90k surgeries per year. There is a huge demand-supply gap. Another issue is the huge cost of heart surgery, which is unaffordable for the majority of the population in India	70 percent of India is living in semi-urban and rural areas while 80 percent of India's healthcare facilities are located in urban (Tier I) areas. This large gap in demand-supply requires focus on increasing availability of primary and secondary healthcare in rural and semi-urban areas	As per WDI (2008), India has a maternal mortality of 450 (per 100k live births) and infant mortality of 57 (per 1k live births). Only 43 percent of Indian women are cared for by a skilled attendant during birth and more than 100k women die every year from pregnancy-related causes. Health insurance, especially for the poor, is virtually nonexistent
Year of setup	1976	2001	2004	2005
Founder/managed by	Dr G. Venkataswamy	Dr. Devi Prasad Shetty	Dr A. Naik/ Dr V. Hiremath	Dr Anant Kumar
Business model philosophy	Assembly line (value creation); no-frills hub-n-spoke (outreach); hybrid (multi-tiered pricing and cross-subsidization) revenues	No-frills hub-n-spoke (outreach); hybrid (multi-tiered pricing and cross-subsidization) revenues	No-frills hub (outreach)	No-frills hub (outreach)
Vision/mission	V: ''Eradicates needless blindness in India''	V: ''Affordable quality healthcare for the masses worldwide'' M: ''A dream to making quality healthcare accessible to the masses worldwide''	''To set up an ecosystem of providing for affordable and high-quality primary and secondary healthcare services in rural and semi-urban areas''	M: ''To be the leading healthcare provider delivering high-quality, affordable core maternal healthcare to low-income mothers across India''

Issue addressed	Treatment for needless blindness for all	Provide primary, secondary and tertiary care for all	Provide primary and secondary healthcare in rural and semi-urban areas	Provide maternal healthcare to low-income segment
Outreach	India (mainly Tamil Nadu)	India (mainly Kamataka)	India (mainly Kamataka and Andhra Pradesh)	India (mainly Andhra Pradesh)
BoP engagement	Consumers, employees	Consumers, employees	Consumers, employees	Consumers, employees
Price challenge	Depends on paying capacity	Depends on paying capacity	@15 percent-20 percent cost vis-a`-vis other hospitals	@30 percent-50 percent cheaper than other hospitals
Awards	Conrad (2010), Gates Award (2008), Antonio Champalimaud Vision Award (2007)	The Economist (2011), Schwab Foundation (2005), E&Y (2003)	Sankalp (2009), LRAMP (2008), BiD Challenge (2007)	World Business Development Awards (2010), Frost & Sullivan Award, ETNow award

Table A2: BOP healthcare service providers in India – outreach and socio-economic impact

	Aravind Eyecare	Narayana Hrudayalaya	Vaatsalya	LifeSpring Hospitals
Capacity	Year 2010-2011 E Eye hospitals (8), vision centers (40), community clinics (7), PG and research institutes, AuroLab, LAICO	Year 2008-12 + hospitals, 1,000 + beds, tele-medicine network, 24 + OTs	Year 2012 14 + hospitals (45-50 beds each), 800 + beds, 14k employees	Year 2011 12 hospitals (25-30 beds each)
Productivity	2k surgeries per surgeon per year, 10-12 min. per surgery (10x)	30 major heart surgeries/day		
Economic impact	Year 2010-2011 70:30:Free:Paying; > 30 percent margins	Year 2008 Revenues: individuals (68 percent), corporate (22 percent), philanthropic funds (9 percent), margins: 22 percent (EBIDTA)	Year 2012 Revenues: INR 1,378 million Net profits: INR 47.9 million	Revenues: each setup gets profitable in two years
Social impact	Year 2010-2011 AEH (2.6 million consultations, 0.3 million surgeries) 2,600 camps (0.7 million screened, 76k surgeries) Training (6,500 candidates from 94 countries) Aurolab (7.8 percent global share, 120 countries) Eye bank (procured 4,300 þ eyes) LAICO (consulting to 280 hospitals)	Year 2008 35k surgeries, 70k catheterization, benefit ($2.5 million) Tele-medicine (30k þ consultation, 144k þ ECG image, 33k þ angiogram) Micro-insurance (1.8 million farmers by 2006) Skill building (19 PG courses for nurses and doctors)	Year 2009 No. of patients covered (175,000) Access to affordable (@15 percent costs) healthcare	Year 2011 200,000 customers, 12,000 þ babies delivered Awareness via community outreach programs Affordable (services cheaper by at least 30-50 percent vs private clinics/hospitals) Customer focus – ''LifeSpring CARES''

Table A3: BOP healthcare service providers in India – key attributes and areas of future consideration				
	Aravind Eyecare	Narayana Hrudayalaya	Vaatsalya	LifeSpring Hospitals
Value offering	Enable access to high quality and affordable eye care for needless blindness for all, irrespective of the paying capacity	Enable access to affordable and high quality primary, secondary and tertiary healthcare with specialization in cardiac care for all, irrespective of the paying capacity	Enable access to affordable and high quality primary and secondary care for mid and low income population in semi-urban and rural areas	Enable access to affordable and high quality maternal care and pediatrics for low-income mothers in urban slums
Key operating principles	Focused – eye care needs Dynamic leadership having belief in experimentation and cost-based innovation Rely on self-funding Focus on 4As* and price-minus Hybrid revenue model – free and paying patients Focus on innovation, experimentation and learning-by-doing Accessibility – eye hospitals (hubs) supported by spokes as vision care centers and community camps. Mobile outreach van and ICT for integrating hub-n-spokes Skilled staff – eco-system being set up to identify and train locals as nurses Affordability – ongoing focus on productivity, standardization and cost of innovation across the value-chain Backward and forward integration into eye care products and	Diversify – primary, secondary, tertiary health care needs Dynamic leadership having belief in technology-driven innovation Rely on funding partners (equity, loan, grants) Focus on 4As* and price-minus Hybrid revenue model– free and paying patients Focus on technology, innovation and experimentation Accessibility – mobile outreach vans, tele-medicine network (CCUs, tele-consultation), ICT and video-conferencing access, e-image conversion software Skilled staff – eco-system being set up to identify, train locals as nurses Affordability – ongoing focus on productivity, standardization and cost of innovation across the value-chain Low cost, cross-subsidized and micro-insurance (Yeshaswini and Arogya Raksha) for the poor sections Focus on scale-up and scale-out	Focus on primary and secondary, health care needs Dynamic leadership having belief in rapid scale based expansion Rely on funding partners (equity, loan, grants) Focus on 4As* and price-minus Pay-for-service model Focus on technology, innovation and scale Accessibility – by choice of strategic locations for maximum outreach Doctor-centric model – break-even (12-18 months), capacity utilization (. 80 percent) Affordability – ongoing focus on productivity, standardization and cost of innovation across the value-chain Focus on scale-up and scale-out Transition from hub-n-spoke (hospitals-daycare-clinics) to hub model (50 bed	Focused – maternal care Dynamic leadership having belief in rapid scale-based expansion Rely on funding partners (JV with Acumen Fund) Focus on 4As* and price-minus Pay-for-service model Focus on process-driven model (standardized across 180 þ processes) ensuring ease in scaling up Accessible – choice of locations closer to urban slums Awareness – community outreach programs Affordability – ongoing focus on productivity, standardization and cost innovation across the value chain

	consulting setup Focus on volume-based scalability within eye care only		hospital) to differentiate from government setups and private clinics	
Areas of future	Belief in philosophy of expansion by self-funding Centralized decision-making. This inhibits the scalability and diversification Eye camps could reach 7-10 percent of the needy population Retention of core resources – skilled doctors and paramedical staff How to undertake geographic expansion?	Government support for financial incentives, tax subsidies, resources for medical training centers, or public land for constructing newer medical facilities Lack of adequate number of skilled manpower Need for micro-insurance coverage and government recognition of private sector for availing government healthcare schemes Funds for expansion How to undertake geographic expansion?	Prices are still unaffordable for the poorest of the poor – the bottom 30 percent Retention of core resources – skilled doctors and paramedical staff Lack of financial and insurance tie-ups to help economically weak patients Lack of government support like RSBY health insurance scheme for private treatment Lack of finanicial viability of extending the portfolio of services like dialysis How to undertake geographic expansion?	Prices are still unaffordable for the poorest of the poor – the bottom 30 percent Retention of core resources – skilled doctors and paramedical staff Lack of financial and insurance tie-ups to help economically weak patients Lack of government support like RSBY health insurance scheme for private treatment Lack of finanicial viability of extending the portfolio of services like dialysis How to undertake geographic expansion?