"Market Research to find Business Opportunity for Accenture in India's Healthcare IT Industry"

A Dissertation Proposal for

Post-Graduate Diploma in Health and Hospital Management

By

Dr. Jasmeet Singh

Roll No. PG/10/015

International Institute of Health Management Research

New Delhi -110075

April 2012

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A dissertation submitted in partial fulfillment of the requirements

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accenture

April 24, 2012

IIIMR Delhi

This is to certify that Dr. Jasneet Singh is pursuing an internship with Accenture Services Pvt. Ltd., The period of internship is from February 17 2012.

During this period, the intern has been working on a project entitled as "Market Research for Healthcare IT in India".

We found the intern's conduct satisfactory.

Yours Sincerely,

Pushpa Nitin Nalawade
India HR Services Centre
Accenture Services Pvt. Ltd

Accenture Services Pvt. Ltd.
IBC Knowledge Park • 4/1, Bannerghatta Road
Bangalore 560 029
Tel : +91 80 4036 3000 • Fax : +91 80 4106 5004
accenture.com

Registered Office :
Accenture Services Pvt. Ltd.
Plant 3, Godrej & Boyce Complex, LBS Marg
Vikhroli (W), Mumbai 400079, Maharashtra • India
Tel : 022 6800 3000 • Fax : 022 25 9 3280
accenture.com

Certificate of Approval

The following dissertation titled "**Market Research to find Business Opportunity for Accenture in India's Healthcare IT Industry**" is hereby approved as a certified study in management carried out and presented in a manner satisfactory to warrant its acceptance as a prerequisite for the award of **Post- Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation

Name	Signature
Dr. S B GOGI	
Dr. Anandi Ramachandra	
Dr. T. MUTHUKUMAR	

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Jasmeet Singh**, a participant of the **Post- Graduate Diploma in Health and Hospital Management**, has worked under our guidance and supervision. He is submitting this dissertation titled "**Market Research to find Business Opportunity for Accenture in India's Healthcare IT Industry**" in partial fulfillment of the requirements for the award of the **Post- Graduate Diploma in Health and Hospital Management**.

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Hari Viswanathan
Manager
Health COE
Accenture Services Pvt Ltd
India
Date:

Prof. Indrajit Bhattacharya
Professor Healthcare IT
IIHMR, New Delhi

Date: 1st May 2012

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Thank You

Dr. Jasmeet Singh

(Post Graduate Diploma in Health and Hospital Management)

International Institute of Health Management Research, New Delhi

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PART A

INTERNSHIP REPORT

PROFILE OF THE ORGANIZATION

Accenture is a global management consulting, technology services and outsourcing company, with more than 246,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world's most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments.

Accenture's "high performance business" strategy builds on the expertise in consulting, technology and outsourcing to help clients perform at the highest levels so they can create sustainable value for their customers and shareholders. The company identifies new business and technology trends and develops solutions to help clients around the world:

- Enter new markets.
- Increase revenues in existing markets.
- Improve operational performance.

Deliver their products and services more effectively and efficiently.

Accenture have extensive relationships with the world's leading companies and governments and work with organizations of all sizes—including 92 of the Fortune Global 100 and more than three quarters of the Fortune Global 500. Company's commitment to client satisfaction strengthens and extends our relationships. Among the much strength that distinguishes Accenture in the marketplace are:

- Extensive industry expertise.
- Broad and evolving service offerings.
- Expertise in business transformation outsourcing.
- History of technology innovation and implementation, including our research and development capabilities, on which we spend approximately $300 million annually.
- Commitment to the long-term development of our employees.

- Proven and experienced management team.

CORE VALUES AT ACCENTURE

- ✓ **Stewardship:** Building a heritage for future generations, acting with an owner mentality, developing people everywhere we are, and meeting our commitments to all internal and external stakeholders.
- ✓ **Best People:** Attracting and developing the best talent for our business, stretching our people and developing a "can do" attitude.
- ✓ **Client Value Creation:** Improving our clients' business performance, creating long-term, win-win relationships and focusing on execution excellence.
- ✓ **One Global Network:** Mobilizing the power of teaming to deliver consistently exceptional service to our clients anywhere in the world.
- ✓ **Respect for the Individual:** Valuing diversity, ensuring an interesting and inclusive environment, and treating people as we would like to be treated ourselves.
- ✓ **Integrity:** Inspiring trust by taking responsibility, acting ethically, and encouraging honest and open debate.

ACCENTURE HEALTH SOLUTIONS

Accenture Health delivers a wide range of healthcare solutions—from health information management and electronic medical records to clinical transformation and health analytics. Its solutions are backed by real-world experience, business and clinical insights and innovative technologies. Accenture Health helps organizations around the world use knowledge in new ways for more effective, efficient and affordable healthcare with Insight Driven Health.

Health providers

From physician groups and community hospitals to academic medical centers, healthcare providers have opportunities to deliver better healthcare. Taking advantage of new technologies and using innovative care delivery models, healthcare providers can use knowledge in new ways to deliver more effective, efficient and affordable healthcare with Insight Driven Health.

Health plans

Healthcare reform is driving sweeping change for private health plans. Meeting these demands means using knowledge in new ways to drive more effective, efficient and affordable healthcare with Insight Driven Health. Complex issues like mandates to cut costs to the impact of payment reform and new business models are met effectively.

Public health

Public health organizations the world over share a common goal—improving patient care, efficiency and safety while lowering healthcare costs. In today's era of widespread healthcare reform, many of these agencies are leading the way toward significant change. Yet public health organizations must move ahead in the face of legislative and regulatory mandates, scarce resources, new technologies and changing patient safety access and privacy needs.

INSIGHT DRIVEN HEALTH FOR U.S STATE HEALTH ORGANIZATIONS

The convergence of cost pressures, healthcare reform and technology changes are redefining the landscape for U.S. state healthcare organizations. Because the number of people who depend on them for healthcare is growing while budgets are not, improving the reach and impact of the money they spend—doing better with less—is critical. In addition, taking advantage of healthcare reform incentives means improving program performance while serving growing numbers of recipients—striking the balance between lowering per-recipient costs and providing quality services.

Accenture Health works with state healthcare organizations to help them transform these challenges into opportunities by using knowledge in new ways across their organizations. This helps organizations achieve Insight Driven Health—the foundation for more effective, efficient and affordable healthcare. Accenture healthcare solutions address administrative, operational, clinical, business and technological needs. They help states to:

- **Transform:** Modernize Medicaid Management Information Systems with a sustainable model.
- **Save.** Lower administrative costs such as enrollment, billing, claims processing, and provider and recipient services while reducing waste, fraud and abuse.

- **Connect.** Use healthcare IT to connect fragmented healthcare systems and stakeholders by integrating electronic health records and health information exchanges and establishing regional extension centers.
- **Align.** Link e-health policies, processes and functions across agencies to support Medicaid healthcare goals.
- **Comply.** Leverage healthcare reform opportunities and reduce risk of penalties.
- **Improve.** Use healthcare analytics to improve healthcare quality and outcomes.
- **Innovate.** Explore new pharmacy benefits management approaches, proactive health management solutions and integrated care delivery models that incorporate non-medical supportive services.
- **Rethink.** Improve the effectiveness and cost efficiencies of business functions with healthcare consulting and business process outsourcing solutions.

ACCENTURE DIGITIZED HEALTH SOLUTIONS

From electronic medical records and medical imaging to tablet computers and telemedicine, the realm of digital has entered healthcare. Not only is digital health here to stay, it is poised to reinvent healthcare as the world knows it.

Going paperless has been a promising answer for the healthcare community as organizations look to reduce healthcare costs, improve health outcomes and respond to healthcare reform incentives and penalties. By integrating digitized health information into the workflow, organizations are improving clinical and financial outcomes. In the United States alone, Accenture estimates that nearly 90 percent of hospitals over the next three years will invest to install or upgrade their EMRs to meet meaningful use requirements.

Digitized medical data is driving the next wave of insight-driven healthcare and enabling a future of patient-centered care models.

Accenture Health helps organizations answer questions like these as part of their move toward Insight Driven Health—using knowledge in new ways for more effective, efficient and affordable healthcare. We help organizations throughout their digital journey—from

implementation through adoption and support. Our digital healthcare consulting and insight-based solutions are comprehensive and tailored to each client's unique needs.

Business Analysis Training

The primary purpose of the two weeks business analysis training was to define the profession of business analysis. The training is a framework that describes the business analysis tasks that must be performed in order to understand how a solution will deliver value to the sponsoring organization. The form those tasks take, the order they are performed in, the relative importance of the tasks, and other things may vary, but each task contributes in some fashion, directly or indirectly, to that overall goal.

Objectives of Business analysis training program:-

- Identify business analysis best practices
- Describe the Business analysis body of knowledge (BABOK) guide
- Identify the phases in the business analysis process
- Describe the role of the BA

PART B

DISSERTATION REPORT

ABSTRACT

Market Research to find Business Opportunity for Accenture in India's Healthcare IT Industry

INTRODUCTION

India is one of the world's most lucrative healthcare markets, and is expanding rapidly, according to latest findings by a report published in February 2012, by market research firm RNCOS. The privatization of hospitals, medical insurance and public private partnership becomes major driver of HIT adoption, which creating a big push for comprehensive patient information and consequently the use of HIT. The HIT industry is in initial growth phase in India. Healthcare has vast untapped market for IT. Market demand is high, application software thriving and the IT Service market rapidly growing. There is a vast demand for high quality of e health technologies in the market. Many IT companies national as well as International entered in this sector but Accenture presence is still unknown in this scenario. Market analysis is needed to understand the untapped needs and upcoming market where Accenture can prove its excellence.

OBJECTIVE OF STUDY

This research analyzes Indian healthcare IT market to find out opportunities for Accenture in India's Healthcare IT Industry. The study focus broadly on three sectors of Indian healthcare industry: (1) Hospital Industry, (2) Health Insurance industry, and (3) Public Health to analyze untapped market of India's Healthcare IT for Accenture.

METHODOLOGY

The study is an exploratory study. Indian Healthcare system is studied; health IT in public health, hospitals and health insurance markets in India is studied and described. The business opportunities available for Accenture in these markets in India are being explored and analyzed.

CONCLUSION:

We analyzed that Accenture can focus on the blooming opportunities in tier 2 and tier 3 cities as there will be a high demand for quality healthcare services in these cities and healthcare providers would look for low cost models and high patient turnover models. Accenture can partner with the vendor and provides various services described below. Partnering with the local vendor is the best market entry strategy as service provider.

CHAPTER 1:

INTRODUCTION

India is one of the world's most lucrative healthcare markets, and is expanding rapidly, according to latest findings by a report published in February 2012, by market research firm RNCOS. The privatization of hospitals, medical insurance and public private partnership becomes major driver of HIT adoption, which creating a big push for comprehensive patient information and consequently the use of HIT. The HIT industry is in initial growth phase in India. Healthcare has vast untapped market for IT. Market demand is high, application software thriving and the IT Service market rapidly growing. There is a vast demand for high quality of e health technologies in the market. Many IT companies national as well as International entered in this sector but Accenture presence is still unknown in this scenario. Market analysis is needed to understand the untapped needs and upcoming market where Accenture can prove its excellence.

RATIONAL FOR THE STUDY:

As per the Springboard Research, healthcare IT spending in India is expected to grow from $274.2 million in 2009 to $609.5 in 2013, growing at a Compounded Annual Growth Rate (CAGR) of 22 per cent from 2009-2013. By 2013, India's healthcare sector's total spend is projected to grow to nearly $40 billion. This throws up a lot of opportunities for IT players as more and more hospitals are adopting information technology apart from medical technology. With increasing IT applications and insurance penetration, the demand for EMR is anticipated to increase robustly in next few years. With increasing emphasis on the implementation of hospital information system (HIS) in the country, the market of instruments such as PACS will grow rapidly. So there is vast opportunity present which need to be analyzed so that Accenture can tap that opportunity.

OBJECTIVE OF STUDY:

General objective:

- To analyze Indian healthcare Market
- To find out opportunities for Accenture in India's Healthcare IT Industry

Specific Objective:

- To find and analyze untapped market of India's Healthcare IT for Accenture.

PROBLEM STATEMENT:

What are the opportunities existing in Indian Healthcare IT market for Accenture?

How and Where Accenture can enter in India's Healthcare industry?

HYPOTHESIS OF THE STUDY:

Can Accenture expand its network in untapped market in Indian healthcare industry?

Introduction to Indian Healthcare Industry

Healthcare in India is delivered through public sector and private sector. The public healthcare system consists of a large number and a variety of institutions dispensaries, primary healthcare institutions, small hospitals providing specialist services, large hospitals providing tertiary care, medical colleges, paramedic training schools, laboratories, etc. Public healthcare facilities are run by central and state government which provide services free of cost or at a subsidized rate to low income group in rural and urban areas, despite the size and reach of the public healthcare system, however, India scores poorly on most generally accepted health indicators. This may, in part, explain the growing role of the private sector in addressing India's healthcare needs. Healthcare is delivered by predominately unorganized Private sector which caters to 80% of Population (PWC).
Public-private partnerships have also emerged as one viable method of growing the healthcare sector while keeping public goals in mind. The main objectives of public-private partnerships are to improve quality, accessibility, availability, acceptability, and efficiency of healthcare services. While different states in India have had different levels of success with implementation of such initiatives, it is expected that the private sector will continue to take on an increasing role in India's healthcare system.

Current Size of the Healthcare Industry

The Indian Healthcare sector currently represents a USD 65 billion industry. India is one of the world's most lucrative healthcare markets, and is expanding rapidly, according to latest findings by a report published in February 2012, by market research firm RNCOS. The health care industry in India is reckoned to be the engine of the economy in the years to come. *(Source: IBEF)*

A break-up of the sector as:

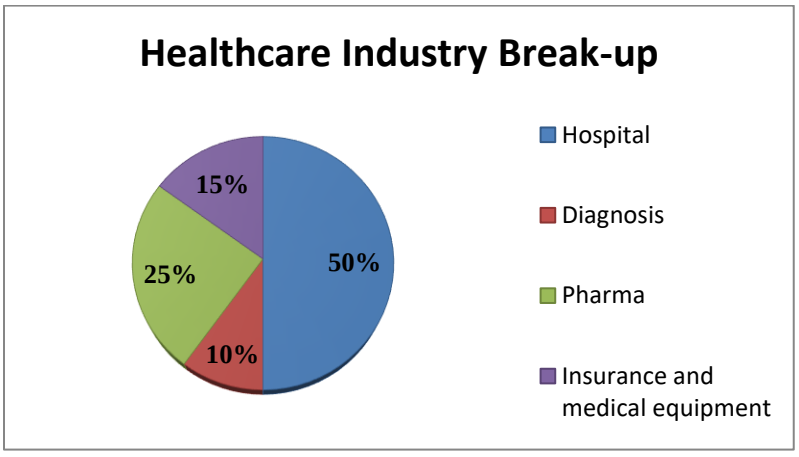
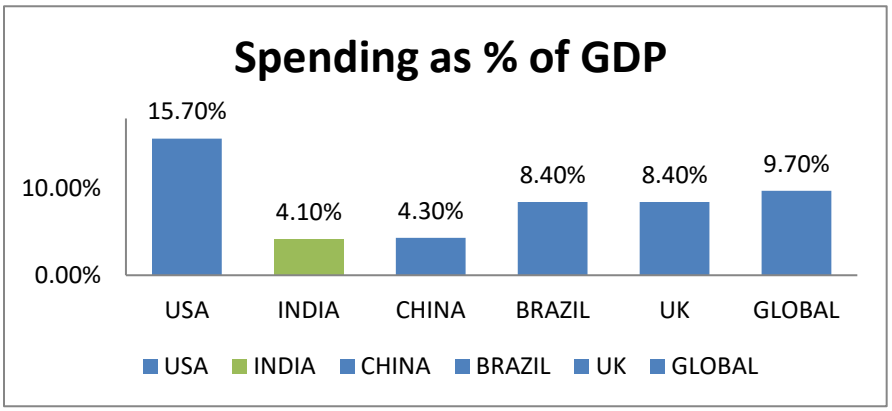


Chart 1.1 showing percentage wise breakup of health industry across Hospital, Diagnosis, Pharma, insurance and Medical equipment. *(Source: IDFC Securities Hospital Sector November 2010, KPMG Report)*

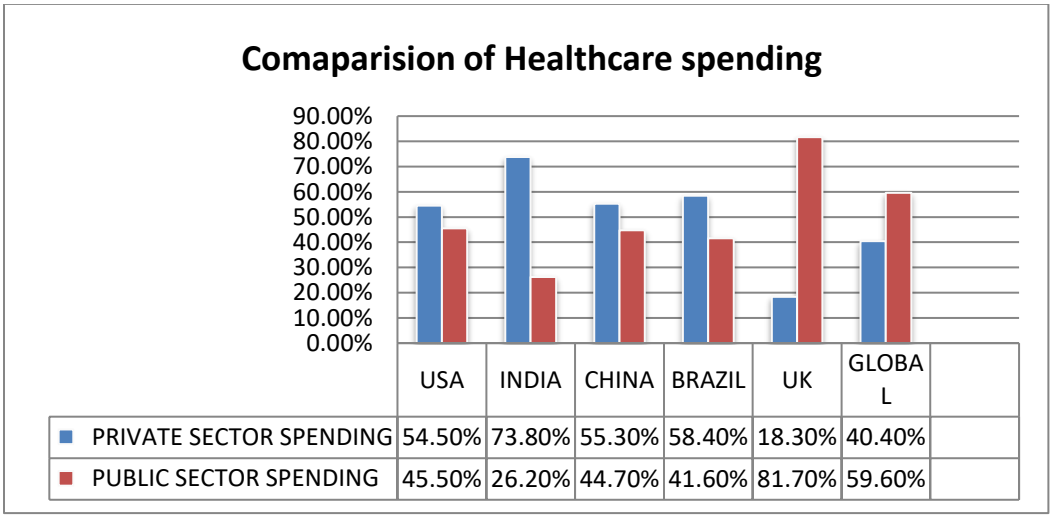
Healthcare Spending

Healthcare is one of India's largest sectors, in terms of revenue and employment, and the sector is expanding rapidly.
India's expense on health care sector comprises 5.25% of the GDP. Chances are that the health care market could experience a hike and attain a figure ranging between $53 to $73 billion five years from now. This in turn will reflect an increase in the gross domestic product to 6.2% GDP



Graph 1.2 showing Comparison of spending on healthcare as % of GDP by USA, INDIA, CHINA, BRAZIL, UK and Global spending.

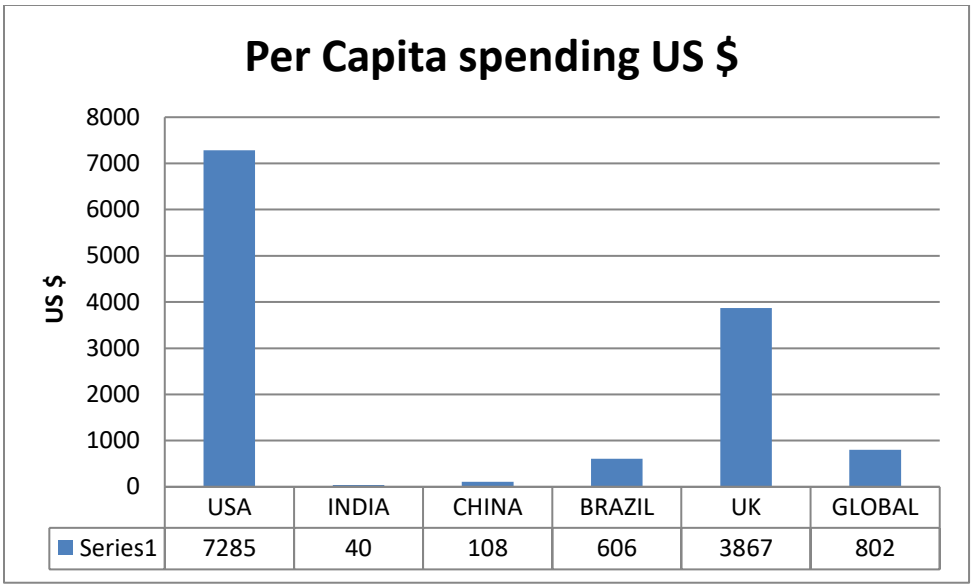
Source: WHO World Health Statistics 2010



	USA	INDIA	CHINA	BRAZIL	UK	GLOBAL	
PRIVATE SECTOR SPENDING	54.50%	73.80%	55.30%	58.40%	18.30%	40.40%	
PUBLIC SECTOR SPENDING	45.50%	26.20%	44.70%	41.60%	81.70%	59.60%	

Graph 1.3 showing comparison of public and private healthcare spending by different countries across the globe.

Source: WHO World Health Statistics 2010



Graph 1.4depicts comparison of per capita spending in US $ by different countries across the globe

Source: WHO World Health Statistics 2010

Table 1.1:State-wise Per Capita Health Expenditure and Number of Government Hospital Beds Available per 100,000 Population

S.No	States / UTs	Per Capita Health Expenditure2008-09 (Rs.) (#)	Number of Government hospital beds available per 100,000 Population (@)	Reference Period*
1	2	3	4	5
	States which are above National Average of Per Capita Health Exp. 2008-09			
1	Mizoram	1611	128	1/1/2008
2	Sikkim	1446	173	1/1/2009
3	Andaman & Nicobar (UT)	1347	233	1/1/2009
4	Pondicherry (UT)	1333	284	1/1/2009
5	Lakshadweep (UT)	1315	274	1/1/2008
6	Goa	1149	178	1/1/2009
7	Himachal Pradesh	884	123	1/1/2009
8	Jammu & Kashmir	845	36	1/1/2008
9	Delhi (UT)	840	141	1/1/2009
10	Chandigarh (UT)	798	225	1/1/2008
11	Nagaland	794	85	1/1/2009
12	Arunachal Pradesh	771	188	1/1/2008

13	Tripura	740	66	1/1/2008
14	Manipur	695	94	1/1/2008
15	Meghalaya	690	106	1/1/2007
16	Uttarakhand	630	84	1/1/2009
	States which are below National Average of Per Capita Health Exp. 2008-09			
17	Assam	471	11	1/1/2004
18	Kerala	454	82	1/1/2008
19	Dadra & Nagar Haveli (UT)	430	87	1/1/2009
20	Karnataka	419	86	1/1/2009
21	Andhra Pradesh	410	43	1/1/2007
22	Tamil Nadu	410	72	1/1/2008
23	Daman & Diu (UT)	405	105	1/1/2004
24	Chhattisgarh	378	41	1/1/2008
25	Punjab	360	40	1/1/2008
26	Jharkhand	328	18	1/1/2008
27	Uttar Pradesh	293	18	1/1/2007
28	Rajasthan	287	51	1/1/2008
29	Haryana	280	32	1/1/2009
30	Maharashtra	278	28	1/1/2009
31	Gujarat	270	53	1/1/2009
32	Orissa	263	37	1/1/2009
33	West Bengal	262	58	1/1/2008
34	Madhya Pradesh	235	29	1/1/2008
35	Bihar	173	24	1/1/2008
	All India	503**	43	

Calculations are based on the Health Expenditure by Central & State Governments in 2008-09 published in National Health Accounts India-2004-05 (with provisional estimates from 2005-06 to 2008-09) and Population figures published in Census of India 2001-Population Projections for India and States 2001-2026 (Report of the Technical Group on Population Projections-May 2006)

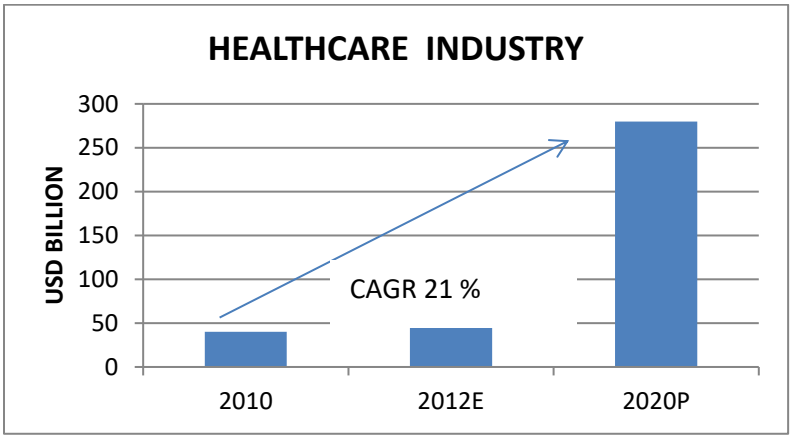
(@) Calculations are based on data (Population served per Government Hospital Bed) published in the National Health Profile 2008 - Central Bureau of Health Intelligence

* Reference period relates to Population per Government Hospital Bed based on which figures in Col. No. 4 have been arrived at.

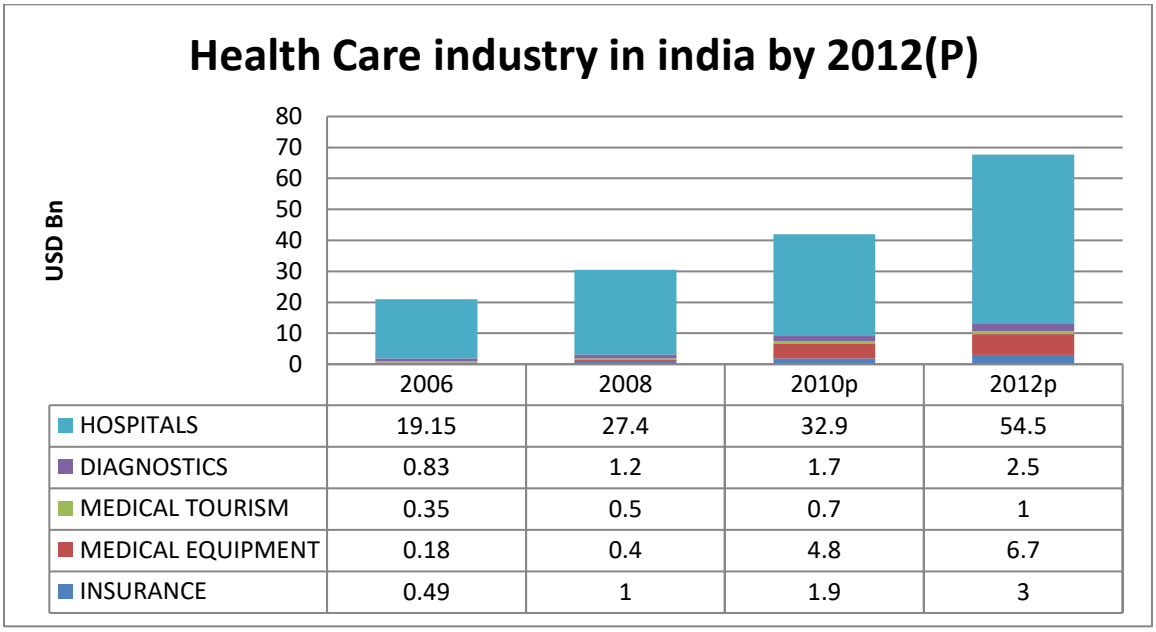
** All India Average is based on expenditure on health by States/UTs and Central Government.

Growth in the Healthcare Industry

As stated earlier, the Indian Healthcare Industry is currently estimated at USD 65 Billion. The Indian healthcare industry is witnessing growth at a rapid pace and it is expected to grow from USD 65 Billion in 2012 to USD 280 Billion by 2020. Healthcare sector sales have been rising at an impressive 17 per cent CAGR over the period 2005-10 The average CAGR for the next 10 years, therefore, has been estimated at ~ 21 percent.(KPMG and IBEF).By 2012 healthcare spending is estimated to contribute 8 per cent of GDP and employ around 9 million people (IBEF)



Graph 1.5 depicts Status and Growth of Health care industry in India in 2010 it is approximately USD 40 Billion and is expected to grow to USD 79 Billion by 2012 and USD 280 Billion by 2020. The average CAGR for the next 10 years, therefore, has been estimated at approx.21 percent. (*Source: IBEF)*



	2006	2008	2010p	2012p
HOSPITALS	19.15	27.4	32.9	54.5
DIAGNOSTICS	0.83	1.2	1.7	2.5
MEDICAL TOURISM	0.35	0.5	0.7	1
MEDICAL EQUIPMENT	0.18	0.4	4.8	6.7
INSURANCE	0.49	1	1.9	3

Chart 1.6 depicts health care industry break up and expected size of each segment by 2012

(Source: Yes bank Report)

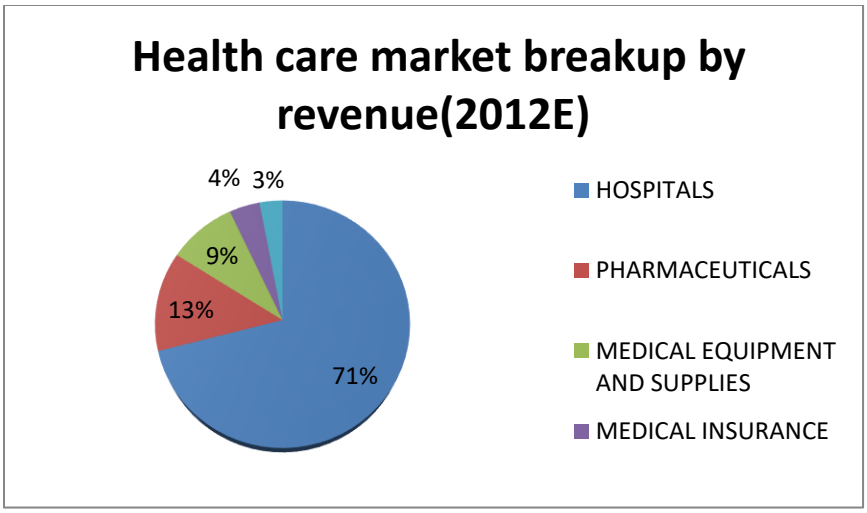


Chart 1.7 depicts Health Care market break up by revenue (percentage wise) which is expected for year 2012. (*Source: Hospital Market – India by Research on India, Aranca Research)*

The hospital and diagnostic centre in India has attracted foreign direct investment (FDI) worth US$ 1,183.04 million, while drugs & pharmaceutical and medical & surgical appliances industry registered FDI worth US$ 9,170.24 million and US$ 514.08 million respectively, during April 2000 to January 2012, according to the data provided by Department of Industrial Policy and Promotion (DIPP).

Drivers of growth for the Healthcare Sector

A combination of demographic and economic factors is expected to bring about increased healthcare coverage in India which is expected to drive the growth of the sector

***Demographic factors*:**

a. Increasing Population: Expected increase in population from about 1.1 billion in 2009-2010 to 1.4 billion by 2026(*Crisil Research Hospitals Annual Review November 2010*)

b. Rising disposable income: Households in the above INR 200,000 per annum bracket can benefit from an increase in disposable income from 14 percent in 2009-2010E to 26 percent in 2014-2015P making healthcare more affordable (*Crisil Research Hospitals Annual Review November 2010*)

c. Shift in demographics: 60 percent of the population in the younger age bracket and an expected increase of geriatric population from current 96 million to around 168 million by 2026. This represents a huge patient base and creates a market for preventive, curative and geriatric care opportunities (*KPMG Analysis*)

d. Increasing incidence of lifestyle-related diseases: There is likely to be a marked increase in the incidence of lifestyle-related diseases, such as cardiovascular, oncology and diabetes, when compared to the communicable and infectious diseases

e. Rising Literacy: Growing general awareness, patient preferences and better utilization of Institutionalized care as a result of increase in literacy rates (*NFHS Survey*)

***Economic factors*:**

a. Tax benefits: Lower direct taxes, higher depreciation on medical equipment, income tax exemption for 5 years to hospitals in rural areas, etc. are being provided by the Government to the sector (*KPMG Analysis*)

b**.** Insurance coverage: Increase in health insurance coverage with a number of private players and foreign players entering the market to cater to increased demand. The sector is expected to see an increase in the penetration from the current 10-15% to almost 50% at a CAGR of 24%. At an institutional level, insurance penetration is likely to continue to increase from 5 -15% to 20%. In tertiary care this is almost as high as 40 -55 %with the inclusion of employer paid coverage. (*KPMG Analysis*)

c. Medical Tourism: India emerging as a major medical tourist destination with medical tourism market expected to reach USD 2 billion by 2012*(IDFC Securities Hospital Sector November 2010*)

Emerging trends in the Indian healthcare sector:

Dual Disease Burden
Urban India is now on the threshold of becoming the disease capital of the world and facing and increased incidence of Lifestyle related diseases such as cardiovascular diseases, diabetes, Cancer, COPD etc. At the same time, the Urban Poor and Rural India are struggling with Communicable Diseases such as tuberculosis, typhoid, dysentery etc. Rural India is also seeing a higher occurrence of Non-Communicable Life-style related diseases. It is estimated that by 2012, 50 per cent of the spending on in-patient beds would be for lifestyle-related diseases. This has resulted in increased demand for specialized care. This represents a serious challenge that the Indian Healthcare system would need to address

Expansion to tier-II and tier-III cities:
There is substantial demand for high-quality and specialty healthcare services in tier-II and tier-III cities In order to encourage the private sector to establish hospitals in these cities; Government of India has relaxed the tax burden on these hospitals for the first five years.

Management contracts
Many healthcare players such as Fortis and Manipal Group are entering management contract to provide an additional revenue stream to hospitals

Emergence of telemedicine:
Telemedicine is fast-emerging in India, supported by the ICT sector .Several major private hospitals such as Apollo, AIIMS, Narayana Hrudayalaya, etc have adopted telemedicine services and a number have developed PPPs

UNION BUDGET 2012: BETTER HEALTHCARE SERVICES FOR THE POOR

The budget for 2012-13 focused on better health services to the poor in rural as well as urban slums, increasing the outlay of the National Rural Health Mission (NRHM) and launching the National Urban Health Mission. The government hiked by nearly 15 percent the budget for NRHM with an outlay of Rs.20, 822 crore ($4.14 billion).To increase the allocation to NRHM from Rs.18, 115 crore in 2011-12 to Rs.20, 822 crore in 2012-13.

To target the urban poor, the government also launched the National Urban Health Mission, which aims to provide basic primary health needs of the people who live in shanties in cities.

Aiming to reach out to people living in the remotest part of the country, the government has already started upgrading the existing hospitals and establishing new hospitals. This has been done under the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY). Under this scheme, the government had aimed at setting up eight All India Institute of Medical Sciences-like institutions and up gradation of existing government medical colleges.

The new hospital with at least hundred beds was earlier eligible for the 100 per cent deduction for capital expenditure. This deduction has been stepped up to 150 per cent of the capital expenditure. However, this amendment will be effective from 01st April 2013. If implemented, this provision would set a precedent for hospitals to mushroom in tier-II and tier- III cities. It would also help in creating employment in these areas.

Deduction of up to Rs 5,000 for preventive health check-ups: This provision definitely receives thumbs up from the healthcare industry. One can be assured of an increase in the demand for diagnostic services.

HOSPITAL INDUSTRY:

Introduction and current scenario:

The hospital services market represents one of the most lucrative segments of the Indian healthcare industry. Various factors such as, increasing prevalence of diseases, improving affordability, and rising penetration of health insurance are fuelling growth in the Indian hospital industry. Several private players are entering the sector with new plans of establishing hospitals and health centers around the country. On the back of continuously rising demand, the hospital services industry is expected to be worth US$ 52.4 Billion by 2012.

According to research report “Booming Hospital Services Market in India”, the country needs to cover the cumulative deficit of around 2.8 Million hospital beds by 2014 to match up with the global average of 3 beds per 1000 population. Currently, the market is dominated by unorganized investors, and this scenario is likely to continue in near future as well. Huge private sector investments will significantly contribute to the development of hospital industry, comprising around 80% of the total market. India has more than 1000 Corporate Hospitals and has one of the highest number of Joint Commission International Accredited Hospitals outside the US (PWC)

Strong demand for hospital services in tier-II and tier-III cities are bound to fuel the growth of the hospital services sector. It is anticipated that most of this demand will be met by private

investments as majority of the government investments will be focused on primary healthcare segment.

Healthcare Delivery Landscape

- 1.37 Million Total Beds but only 50% beds are Functional and Relevant
- 1 Bed per 1000 Population, much lower than other BRIC nations including China and Brazil
- 40% beds Located in Top 20 Cities where only 10% of the population resides
- 60% private hospital Beds cater to 80%of all Patients

Mumbai:

In Mumbai there are 72 government hospitals and 95 private hospitals. At present, private hospitals in Mumbai have 80-85 per cent occupancy rate and which could come down in the next five years to 60-70 per cent. Mumbai may soon face an over-capacity in hospital beds as three new heart hospitals are expected to be operational in the next 12-18 months and as majority of privately-run hospitals are on an expansion spree. There are altogether 539 hospitals in Mumbai. Out of these 48 per cent are nursing homes, followed by private hospitals.

Delhi:

75-80 per cent of the households prefer to use private sector treatment in Delhi for minor or major illness. The cost of the treatment in Delhi is 1/5th of the cost in Europe and USA. The occupancy ratio for private hospital in Delhi is between 70-90 per cent. There are approximately 523 hospitals in Delhi and the total number of beds in the city is in between 33000 to 40000 beds. Delhi has approximately 380 private hospitals.

Kolkata:

The average occupancy ratio for private hospital in Kolkata is 75-80 per cent. Medical care cost in Kolkata private hospital is 1/5th of the cost when compared with that of USA. Kolkata's literacy rate is 81 per cent and exceeds the all-India average of 66 per cent. With high literacy rate and high per capita income there is high health awareness and willingness to spend more. There are approximately 200 hospitals in the city, and the total number of beds in the city is 20000 to 25000 beds.

Bangalore:

The average occupancy ratio for private hospital in Bangalore is 70-80 per cent. The cost of treatment in Bangalore hospitals is 1/5th of that the cost in Europe and USA. Bangalore has second highest literacy rate i.e. 83 per cent and the per capita income of INR 0.03 million. So there is better health awareness and willingness to spend. There are approximately 320 hospitals with the total number of 22,000 beds. It has approximately 212 private hospitals.

Pune:

The average occupancy ratio for private hospitals is 60-70 per cent. The cost of treatment in Pune private hospitals is 1/5th of the cost in Europe and USA. There are approximately 360 hospitals within the city and the total number of beds in the city is around 5500 to 7000.

Hyderabad:

The cost of treatment in Hyderabad hospitals is 1/10th of the cost in Europe and USA. The average occupancy ratio for private hospitals is 70-85 per cent. There are approximately 523 hospitals within the city and the total number of beds is around 10,000-15,000 beds in the city. The city has around 300 private hospitals.

(*Source: Hospital Sector Report, November 2010 by Northbridge Capital)*

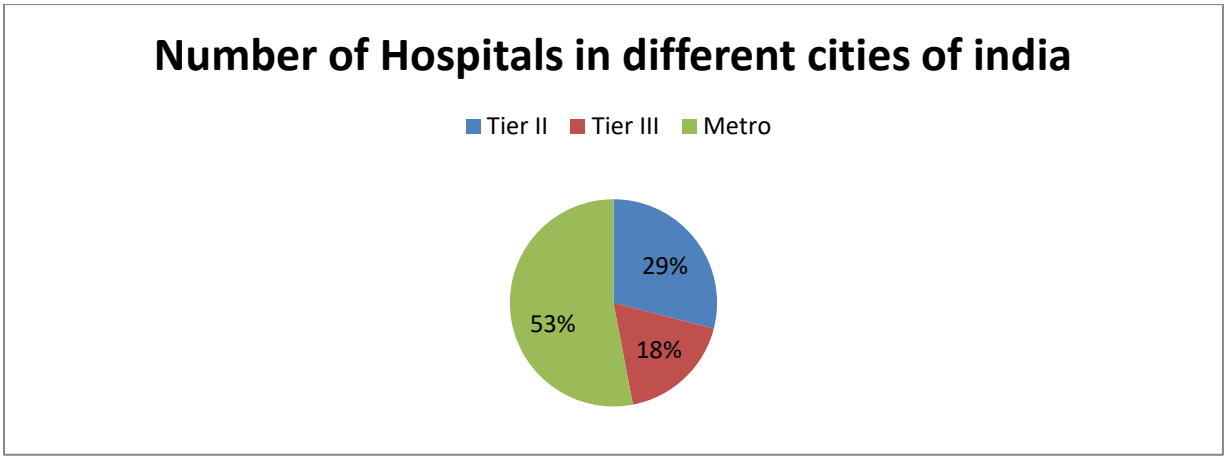


Chart 1.8 depicts percentage of hospitals in tier I, II and II cities in India.

It is estimated that nearly 75 per cent of all the hospitals and 40 per cent of hospital beds in the country are in the private sector.

The private sector provides 60 per cent of all out-patient care in India and as much as 40 per cent of all in-patient care.

Share of private expenditure as a percentage of total expenditure on healthcare has grown to nearly 80 per cent over the last decade and it is further expected to increase.

Growth Trends:

The Indian hospital industry would be worth USD 280 billion by 2020 as against USD 44 billion in 2010. Its estimated revenue is USD 30 billion in 2010. During 2010-2015 the Indian hospital service industry is projected to grow at a CAGR of more than 9%.

Hospitals and Diagnostic centers have received FDI worth USD 786. 14 million between April 2000 and April 2010

The various hospitality brands have started aggressive expansion in the country. Some of the companies that are planning to expand include Anil Ambani's Reliance Health, Hindujas, Sahara Group, Apollo Tyres and Panacea Group.

Key players in the Indian market:

ALL INDIA INSTITUTE OF MEDICAL SCIENCES, NEW DELHI

It is located in Ansari Nagar of South Delhi. The hospital was established in1956 and considered to be one of the best hospitals of the country for its low cost treatment by well qualified doctors. The Cardiothoracic Science Center, Institute Rotary Cancer Hospital, the R P center for ophthalmic sciences, Jai Prakash Narayan Apex Trauma Center, the Drug Dependence Treatment Center are some of the best centers of AIIMS marked with international recognition for its advanced treatment.

FORTIS HEALTHCARE LIMITED

Fortis is India's leading Pharmaceutical and healthcare company that has its presence in over 20 countries. Currently, Fortis manages 3000 beds with a network of 26 hospitals and is planning to double its capacity by 2012.

Investment Rationale:

- Future Plans:

Two green field hospitals are under construction they are:
A super-speciality hospital in Delhi with 250 beds in phase1 and Fortis International Institute of Medical and Biosciences with two multi-speciality hospitals having 750 beds, first phase having 350 beds in Gurgaon.

Fortis healthcare intends to have 80 hospitals with 12000 beds by 2012.

- Recent Deals:

Fortis is selling its

24% stake in Parkway to Khazanah for $2.88 per share.

Fortis Healthcare will raise US$ 83.5 million from GIC Special Investments Pte Ltd, Singapore. Trikona Trinity Capital exits part from Fortis healthcare by selling 5 million shares for INR 81 crore.

- Health sector beneficial for long term investors:

Healthcare is emerging as one of the fastest growing sectors in India, contributing 6% of the country's GDP. Private sectors offer huge opportunity for corporate hospitals and healthcare providers. The government had provided five one year tax holiday for setting up new private healthcare facilities in tier-2 and tier-3 cities.

APOLLO HOSPITAL ENTERPRISE LTD

Apollo hospitals group has become an integrated healthcare organization with owned and managed hospitals, diagnostic clinics, dispensing pharmacies and consultancy services. Apollo manages over 8500 beds across 50 hospitals in India and overseas.

Investment Rationale:
Global Expansion: Chennai-based Apollo hospital has expanded globally by opening Apollo Bramwell hospital in Mauritius. It will have 220 beds with an investment of $70 million.

Projects lined up:
Apollo Hospital Enterprise Ltd is in the process of building 3 hospitals in Mumbai.

In the first phase Apollo will build a 350-bed hospital in Navi Mumbai and then it will ramp up to 550 beds thereafter.

Another hospital will be built at Thane which will have 250 bed facilities. Over the next 2-3 years Apollo plans to build facilities providing 2000 beds.

Apollo ties up with Cisco: Apollo hospital entered into an agreement with IT giant Cisco for providing telemedicine services in the country. The alliance with Cisco will revolutionize the delivery of healthcare in India.

Launch of Apollo's 50th hospital: Apollo group of companies launched its 50th hospital in Secunderabad; it has 150 beds and is considered as tertiary care hospital. The hospitals offers speciality care in over 30 medical and surgical disciplines

GLOBAL HOSPITALS

This hospital was founded by Dr K Ravindranath as a first Organ Transplant Center in South Asia. The best treatment provided by this hospital involves nucleus replacement in spine and the transplantation of other bodily organs. It is India's leading and fastest growing super speciality care and multi-organ transplantation hospital. It has introduced information centre usage website, which is the first of its kind in the world. It is the only Indian Hospital to be associated with King's college hospital, London, United Kingdom for Liver transplantations.

The Global Hospitals located in Hyderabad and Bangalore and Chennai are considered to be equipped with finest facilities across the world.

CARE HOSPITAL:

CARE is one of the fastest growing hospital chains in India, engaged in providing primary as well as tertiary healthcare services. It is a multi-specialty hospital chain comprising of 1400 beds across 12 hospitals. It is ranked one amongst the Top Healthcare Providers of India by CRIS-INFAC Report 2006. Located in Hyderabad, Secunderabad, Visakhapatnam, Nagpur, Raipur, Pune, Bhubaneswar, Surat

TATA MEMORIAL CENTRE, PAREL, MUMBAI

This hospital was planned by Sir Dorabji Tata Trust on 28th February 1941 and later established in 1966. It is regarded as the top Education & Research centre in Cancer and the largest Cancer Hospital in Asia. Governed by the Department of Atomic Energy, Radiation Therapy and Chemotherapy are the two major forms of treatments offered by this hospital.

National Institute of Mental Health and Neuro Sciences, NIMHANS, Bangalore

It was established in 1954 and became autonomous in the year 1974 for neurological cases. This mental hospital provides treatment for mental and neurological disorders. The doctoral degree of NIMHANS came into existence in 1970. Neuropathology, Neurochemistry, Microbiology, Neuro-radiology, Neurosurgery are the various departments of this hospital.

RAJIV GANDHI CANCER INSTITUTE AND RESEARCH CENTRE

Set up in 1996, this hospital is meant for cancer patients. It is located in sector 5, New Delhi. With the latest technologies including Radiology in Oncology, IGRT, PET-CT scan and Breast Guided Biopsy facilities, it is one of the best cancer hospitals of the country.

LV PRASAD EYE HOSPITAL (LVPEI)

This hospital was established in 1987. Located in Hyderabad, the L V Prasad Eye Institute offers treatment for blindness with its highly efficient service and eye care programs. Andhra Pradesh, being the core centre of this hospital has been undertaken by the Govt. of India as the leading eye care hospital. The Hyderabad Eye Institute and the Hyderabad Eye Research Foundation are the two major trusts that govern the LVPEI.

CMC, Vellore

Founded by Ida S. Scudder, The Christian Medical College, Vellore is located in Tamil Nadu. CMC treats patients suffering from mainly heart and blood vessel problems. The Department of Clinical Biochemistry and The Neurology Unit are two of the active departments of CMC providing comprehensive services.

BREACH CANDY HOSPITAL, MUMBAI

It was established in 1958 and designed by English Architect Claude Batley. Located at Breach Candy suburb, South Mumbai this hospital is well known for its excellent health care facilities. From regular health checks to critical surgeries, all kind of treatments are offered here. It was awarded with Ramakrishna Bajaj National Quality Award in 2009 for its distinguished services.

MAX HEALTHCARE:

It is India's first truly integrated healthcare system, offering three levels of clinical service (primary, secondary, tertiary) within one system. Its revenue across network of hospitals is INR 4230 million as against INR 3730 million last year, registering a 13 per cent growth.

Key Players in Hospital industry (Hospital Chains):

Company	No. Of beds	Presence
Apollo Hospitals Enterprise Ltd	8,500	Chennai, Madurai, Hyderabad, Karur, Karim Nagar, Mysore, Visakhapatnam, Bilaspur, Aragonda, Kakindada, Bengaluru, Delhi, Noida, Kolkata, Ahmedabad, Mauritius, Pune, Raichur, Ranipet, Ranchi, Ludhiana, Indore, Bhubaneswar, Dhaka
Aarvind Eye Hospitals	3,649	Theni, Tirunelveli, Coimbatore, Pondicherry, Madurai, Amethi, Kolkata
CARE Hospitals	1,400	Hyderabad, Vijayawada, Nagpur, Rajpur, Bhubaneswar, Surat, Pune, Visakhapatnam
Fortis Healthcare Ltd	5,044	Mumbai, Bengaluru, Kolkata, Mohali, Noida, Delhi, Amristar, Rajpur, Jaipur, Chennai, Kota
Max Hospitals	800	Delhi and NCR
Manipal	+7,000	Udupi, Bengaluru, Manipal, Attavar, Mangalore, Goa,

Group of Hospitals		Tumkur, Vijaywada, Kasaragod, Visakhapatnam

Table1.2 depicts key players in hospitals chains in India
Source: Company websites, Aranca Research
*Note: *No of beds include owned, subsidiaries, joint ventures and affiliations*

Key Developments in Hospital Sector

The country's first healthcare Special Economic Zone (SEZ), Frontier Mediville, is being set up by Frontier Lifeline Hospital at Elavoor, near Chennai.

Major healthcare players such as Fortis and Apollo are expanding to tier-II and tier-III cities, along with urban cities, due to substantial demand for high-quality and specialty healthcare services in these cities.

Healthcare majors such as Apollo, Max Healthcare and Manipal Group are targeting new segments such as primary care and diagnostics. Demographics, health awareness and increasing capacity to spend are the key drivers of the preventive healthcare segment in India.

India's share in the global medical tourism industry is predicted to be around 3 per cent by the end of 2013, according to a report 'Booming Medical Tourism in India' by research firm RNCOS, released in December 2010. The sector is expected to generate around US$ 3 billion in revenues by 2013, with the number of medical tourists to grow at a CAGR of over 19 per cent during 2011-2013 to reach 1.3 million by 2013.

Indian medical technology industry is expected to reach US$ 14 billion by 2020 from US$ 2.7 billion in 2008, according to a report by PwC and an industry body.

Major Investments Plans:

Hospitals chain Apollo Hospitals Enterprise Ltd plans to invest around US$ 204.04 million- US$ 226.70 million over the next two years. They plan is to increase 2,000 beds in 24 months, Develop 5 hospitals each year with 200 beds, with a vision to raise a total capacity of 20,00,Plan to develop hospital in Kerala with an investment of amounted to USD 35 million

Wockhardt Hospitals plans to invest up to US$ 158.32 million to double its bed capacity to 2,000 by 2013.

Hospitals chain Fortis Healthcare plans to invest US$ 146.81 million and add 2,100 new beds.

Fortis, International Centre for Robotic Surgery (ICRS) to invest Rs USD 20 million for robotic surgery centres to set up 10 ICRS and to increase 6-10 centres in 2013
The BCG Group plans to build a multidisciplinary health facility, BCG Health square in Palarivattam in Kochi, Kerala, by August 2011. The company's long-term plan is to set a 750,000 sq ft health village with an estimated cost of US$ 88.91 million.

GE Healthcare will invest US$ 50 million to set up more facilities for developing diagnostic services.

Manipal Hospitals plans to invest US$ 45.23 million in the next three years to double its capacity to 8,000 beds.

Max Healthcare India plans to develop 4 hospitals to increase 2,000 beds
Plans to increase its capacity to 5,000 beds in the next 5 years through mergers and acquisitions

Vasan Healthcare to invest USD 65 million to new hospitals
Plans to develop 45 hospitals in March 2012
25 new hospitals are expected to be built in July 2012
(*http://www.oifc.in/Article/Booming-Indian-healthcare-industry and Hospital build and infrastructure india, http://www.hospitalinfra-india.com/)*

Recent deals and expansion plans:

Mumbai:

Pacific healthcare holdings have tied up with India's Yash Birla Group to form a joint venture that will invest US$ 10 million in India's healthcare sector over the next three years. Birla-Pacific Medspa will be 50 per cent owned by Yash Birla unit Birla Wellness and Healthcare, with the remainder to be held by Pacific Healthcare 42.5 per cent and Abhijit Desai 7.5 per cent, a dermatologist based in India.

Kohinoor city hospital is a 150 bed multi speciality hospital coming at Kurla-Vidyavihar section which is an INR 750 million project.

Mulund Fortis healthcare hospital started construction of aradiation oncology unit and the expansion involves 335 beds in phases and is expected to be commissioned by Q2FY2011.

Lilavati hospital and research centre plans to establish another 300 bedded hospital in Mumbai with a total investment of INR 200 crore.

Wockhardt Hospitals Limited, one of the largest private healthcare services companies in India, plans to develop a network of regional specialty ICU hospitals.

Apollo Hospitals Enterprise Ltd is building 3 hospitals in Mumbai by investing approximately US$ 151 million (Rs600 crore).

Project Mumbai is a Greenfield joint-venture project (50/50) between Koncentric Investments Ltd and Parkway Group Healthcare Pvt Ltd to build a leading 500-bed international-standard tertiary hospital with world class facilities.

Singapore based Parkway plans to develop a 600-bed Greenfield, multi-specialty hospital in Mumbai.

London & Pacific Healthcare Inc., a California-based healthcare advisory company, has acquired Mumbai-based YEN Healthcare Advisors Pvt. Ltd in an all stock deal.

Hinduja announced 51:49 joint venture with Limitless LLC will initially set up hospitals in cities like Mumbai, Delhi, Bangalore and Hyderabad.

Delhi:

Emami-backed AMRI Hospitals, it's a Kolkata-based healthcare venture and is looking forward to raise up to INR 100 crore in private equity.

Max Healthcare Ltd would invest about INR 250 crore in not only Delhi but also complete three hospital units in Gurgaon and Noida. The company opened a 200-bed Super Speciality Hospital in South Delhi. It is offering 33 specialties and four super speciality facilities.

Apollo hospital is poised to buy a Delhi-based pharmacy chain for about INR 20 crore. It is also in talks with Pharma retailers and CRS Health for a possible buyout, with a deal to bring some two dozen stores into its fold.

Apollo Hospitals is planning to raise INR 3000 crore through private equity to fund its expansion plans. It is planning to add 4000 beds by 2014 which also includes a hospital in an international airport.

The Ranbaxy group company, Fortis Healthcare has entered into a joint venture agreement with New Delhi-based construction company, DLF to set up 15 hospitals in the next five years with an investment of US$ 754 million.

The Rockland Group is establishing five multi-speciality hospitals in Delhi and is coming up with a 250-bed multi-speciality hospital in Manesar.

Panacea Biotech is planning to set up a multi-speciality hospital with Gurgaon-based Umkal Medicals with an investment of US$ 200 million.

Kolkata:
Ruby General Hospital has planned an infrastructure expansion, which involves the investment of USD 2 million. The new project will take the beds capacity from the existing 150 to 300. The Hospital has also planned direct collaboration with the University of Medicine, New Jersey and other medical colleges in the US.

An Emami-backed AMRI hospital is planning to raise INR 1000 million in private equity funding to expand its footprints. It plans to build a 300 bed super speciality hospital in Bhubaneswar and another 270 bed super speciality hospital in Kolkata, these two projects will together attract capex of INR 5500 million.

Fortis has invested around INR 1750 million to set up hospital in Kolkata which comprises of 400 beds. It is a super speciality hospital and the expansion is fully funded from company's own sources.

Medica Synergie Private Limited is planning to build a 350 bed hospital in Kolkata. It requires an investment of INR 800 million that would be raised through a mixture of venture capital, debt and internal accruals.

Bangalore:

Cipla Ltd may acquire a minority stake in Stempeutics Research for about INR 450 million. Stempeutics Research intends to use the equity infusion to venture into the diabetes segment and Cipla is also expected to market the products developed by this firm.

Manipal Health Systems needs USD 9 million for renovating three of its older hospitals in Bangalore and Goa, which will be partly funded by private equity in the next three months.

Manipal Education and Medical Group, the holding company of Manipal Group is in discussion with Private Equity players including Kotak to raise INR 1000 – 1250 million for hospital expansion.

The Bangalore hospital has acquired KVG Bangalore hospital which has a capacity of 100 beds mainly catering to rural population.

Narayana Hrudayalaya P Ltd is expanding the 1000 bed Bangalore facility to a 5000 bed facility.

Pune:

The Hiranandani constructions are planning to set up a chain of hospitals in Chennai, Pune, Nasik, Panvel and Kolkata. It will be having a capacity of 100 beds with the investment of over INR 5000 million.

Spring Healthcare acquired 49 per cent in Pune-based Oyster and Pearl Hospital for USD 13 million.

ICICI Venture's Special Purpose Vehicle has invested USD 35.4 million in Pune-based Sahyadri Hospitals. Sahyadri Hospitals intends to create a network of hospitals and care centres to reach 1,000 beds in one year and 3,000 beds in three years with an investment of about INR 5000 million.

Seattle-based investment fund Columbia Pacific will invest close to USD 70 million in Columbia Asia Hospital's India operations. It has announced plans of opening two hospitals in Pune. These projects are expected to become operational by 2011.

Hyderabad:

Krishna Institute of Medical Sciences is planning for expansion through private equity. The hospital is looking for raising up to INR 1000 million to partly fund its INR 5000-6000 million expansions planned for next four years.

Narayana Hrudayalaya P Ltd (NHPL) has announced plans to establish 5,000-bed health cities in the major state capitals of India. The total investment used would be of USD 100 million.

Hindustan Latex Ltd has come up with a joint venture of 50:50 with the US based venture fund, Acumen fund. The US fund, Acumen will infuse INR 200 million as authorized capital in the Hyderabad for a new hospital entity.

Global hospital has acquired Chennai-based Sri Kanchi Kamakoti Sankara Hospital for USD 58.4 million in an all-cash deal transaction but to be paid in tranches.

Sneha diagnostics has planned of opening 10 diagnostic centres in major district centres of Andhra Pradesh including Hyderabad. It is planning an investment of USD 1.3 million. The hospitals to be opened will be of super specialty in nature and each hospital will likely have around 200-400 bed capacity. The land acquired for it is around 26-37 acres which have already been allocated. The investment constitutes 35% private investments and 65% through bank.

TIER II CITIES

Healthcare players are now targeting smaller cities due to: increasing focus on unexplored regions of India in terms of healthcare, growing need for improved healthcare infrastructure in tier II & III cities and even due to better access owing to development of new national/international airports.

Over five lakh beds are required in Tier II and Tier III cities.

Apollo hospitals will come up with 10 hospitals in tier II cities with 150-200 beds capacity. They would be investing 6000 million.

Columbia Asia Hospital has recently constructed hospital in Ghaziabad and will start its development in Lucknow, Thiruvanthapuram and Jalandhar.

Rockland Hospital is coming up in Gurgaon in the FY 2010 having capacity of 350 beds. The investment made by Rockland hospital is around ` 25,000 million.

Apollo hospital is coming up in Bhubaneswar in the FY 2010 having capacity of 350 beds. They have invested around ` 3000 million.

People International Hospital is coming up in Bhopal in the FY 2010 having capacity of 400 beds. They have invested around ` 2000 million.

Eternal Heart Hospital is coming up in Jaipur in the FY 2010 having capacity of 150 beds. They have invested around ` 600 million.

ILS Hospital is coming up with another project in Agaratala in the FY 2010 having capacity of 166 beds. They have invested around ` 900 million.

AMRI Hospitals is coming up in Bhubaneswar I the FY 2010 having capacity of 300 beds. They have invested around ` 1200 million.
(*Source: Hospital Sector Report, March 2011 by Northbridge Capital*

TABLE 1.3 SOLUTION PROVIDER AND PRODUCT IN INDIAN HOSPITAL:

Hospitals	**Solution Provider**	**product**
Max health care	Dell services	Vista HER-Open Source
Fortis Health care	M-tac-intersystem and HCL	Medtrack(HIS and EMR)
Artemis	Isoft	Isoft
Lal Path Lab	IBM-Project management services	Star lims-LMIS
Apollo	In-house –HIS,	
Rajiv Gandhi	Ohum	Shristi(HIS), Vista(EHR)
Ruby Hall Pune		Napier
P.D.Hinduja	e-symphony	e-symphony
Yashodha Hospitals, Hyderabad	e-symphony	e-symphony
ESIC	Wipro	Wipro(k21)
MCD	Wipro	Wipro(k21)
Sir Ganga Ram	Intersystem	Trackcare(EMR) Prodigius(HIS) Speedminer(BI)
DDU Shimla	HISP	Open MRS
Medanta Medicity	CSC & SAP	Isoft & SAP
Dharmshila	Paras	Shristi
Rockland	Wipro	Wipro(k21)
AIIMS (Emergency Dept)		Vista

Medical Technology in India:

The medical technology market in India was valued at US$2.75 billion* in 2008, a growth of approximately 14% over 2007. The market is estimated to reach US$5 billion* by 2012 with an annual growth rate of nearly 15%. However, this industry has not been well documented in the Indian context, and estimates of industry size and growth vary significantly across different sources. Other estimates of the market size range from US$1,Estimated growth rates for the key market segments during 2008-12 range between 14-20%*, with the ‘other’ segment witnessing the highest growth.

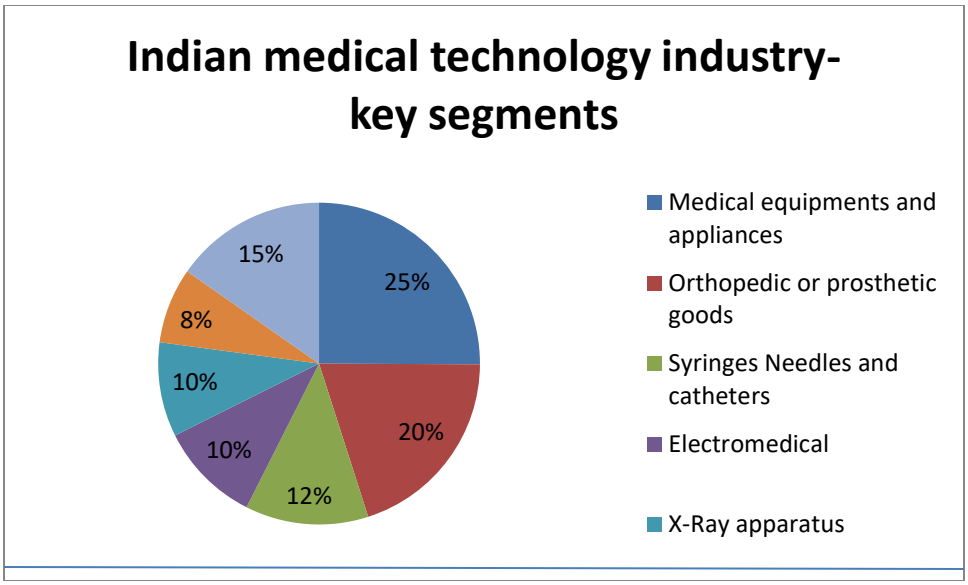


Chart1.9 depicts medical technology industry key segments % wise.

Though not identified as a separate segment in the above pie chart, diagnostic kits represent one of the fastest growing segments of the medical technology industry in India, enjoying an annual average growth rate of over 30%...9 billion in 2009 to US$3 billion in 2010

Competitive market- presence of MNCs as well as domestic firms

The Indian medical technology industry is highly competitive and fragmented, with domestic firms primarily manufacturing low technology products such as disposables/ medical supplies, and MNCs primarily importing high end medical equipments. However, in recent years, some domestic firms have expanded local manufacturing operations to produce cost effective, medium end, medical devices. Most MNCs are involved in distribution of medical technology products, though some of them have set up manufacturing operations in India. MNCs seeking to enter the industry typically forms joint ventures with local manufacturers, establish subsidiaries or employ local agents to distribute their products. However, increasingly these companies are moving away from the practice of importing through local agents and setting up subsidiaries. According to industry sources, in 2007, over 25 foreign medical device companies received licenses to import medical devices in India through their subsidiaries.

Regulations:

The regulatory environment for medical technology in India is ambiguous, complex and lacks transparency. There are two key issues pertaining to regulation of the medical technology industry in India:

- No distinct status for the industry

The medical technology industry in India has no separate legal status. It is currently regulated by the drug controller general of India (DCGI) of the Central Drugs Standard Control Organization (CDSCO), Department of Health. The limited regulation that has been introduced to date covers 14 medical devices (e.g. cardiac stents, catheters, orthopaedic implants etc.) under the Drugs and Cosmetics Act 1940 and subsequent amendments. Application of the Drugs and Cosmetics Act has resulted in redundant rules for medical devices and equipments.

- Complex rules and guidelines

Absence of specific regulation for the industry, and coverage under the Drugs and Cosmetics Act has resulted in lack of clarity and transparency about the regulations. There are problems pertaining to multiple levels of government authority involved in enforcing the guidelines, as well as inconsistent interpretation and application of the regulatory guidelines by customs officials at the ports, state drug controllers, and officials within CDSCO.

- Absence of quality standards

Lack of regulation of the industry has resulted in products of sub-standard quality being brought into the market, creating wider gaps of quality and cost within the same category of products. There have been some cases of illegal/ counterfeit products also – e.g. illegal reprocessing and re-packaging of used syringes for re-sale. This creates significant risk for the consumer.
Source: Medical technology industry in India-Riding the growth curve, Deloitte Report, July 2010

Medical Imaging:

Imaging in healthcare is largely an untapped market. The market is growing, and by year-end it will emerge as a strong vertical for IT hardware sales. Large super-speciality hospitals such as Sri Satya Sai Baba, Jayadeva Institute of Cardiology, Apollo Hospital, CMC (Vellore), Tata Memorial and dozens of others are spending an average of Rs 90 lakh-Rs 2 crore (mostly on servers and storage) for rolling out DICOM. Industry observers say that end-2004 will find 20 new large cardiac hospitals. Another 20 hospitals will be looking for technology upgrades. PACS (Picture Archiving and Communication System) deployments by these healthcare providers will result in spending on servers and storage. Eight to 10 hospitals are expected to invest in full-blown medical imaging systems that cost around Rs 1.5 crore-3 crore. About 10 small hospitals will implement single systems with imaging solutions that will cost Rs 15 lakh-20 lakh. Adding all this we come up with a market spend of Rs 200 crore-300 crore annually on IT hardware by hospitals investing in DICOM. The ability to store and share medical images can be done in a more efficient and effective manner by applying storage networking technology

PACS in India

Trends:

PACS implementation is slowly catching up in India with more hospitals aiming towards a paper-less environment. The Indian PACS market is estimated to be $5.5 – 6 Million and is expected to grow at a compound annual growth rate of 27 percent from 2007 to 2011.Corporate hospitals are the front-runners with some of the mid-size and Government hospitals following suit.

Private hospitals are opting for PACS to provide services efficiently and have an edge over their competitors, whereas, Government hospitals use it to help in keeping patient records, reduce the number of films used, and also the cost of record maintenance.

Radiologists are using it even for Tele-radiology services to provide consultation and second opinion to remote areas in India as well as abroad. Technology savvy doctors are providing consultation and opinion even when away from healthcare facilities by accessing the records online from the comforts of their home or clinics.

Major Players

Some of the major foreign PACS application providers in India include

- Agfa
- Carestream Health (earlier Kodak)
- Fuji
- GE
- Siemens
- Vepro

Local players include:

- 21st Century Healthcare solutions
- Amrita Medvision
- Ashva Technologies
- Karishma Software
- Perfint Technologies
- Sobha Renaissance IT Ltd. (SRIT)
- Softlink International
- Srishti Software
- Matrixview

Major PACS implementations in India are at:

- Aditya Birla Memorial Hospital, Pune
- Amrita Institute of Medical Sciences, Coimbatore
- Apollo Hospital, Chennai
- Christian Medical College, Vellore
- Deenanath Mangeshkar Hospital, Pune
- Dr Shyama Prasad Mukherjee Hospital, Delhi
- Fortis Hospital, Mohali and Delhi
- G Kuppuswamy Naidu Memorial Hospital, Coimbatore
- Indraprastha Apollo Hospital, Delhi
- Jehangir Hospital, Pune
- Kidwai Memorial Hospital, Bangalore
- KIMS, Bangalore
- LNJP Hospital, Delhi
- M S Ramaiah Memorial Hospital, Bangalore
- Max Devki Devi Hospital, Delhi
- Madras Medical Mission, Chennai
- NIMHANS, Bangalore
- P D Hinduja Hospital, Mumbai
- Rajiv Gandhi Cancer Institute, Delhi
- Ruby Hall Clinic, Pune
- Sahyadari Hospital, Pune
- Sree Chitra Tirunal Institute of Medical Sciences, Trivandrum
- Tata Memorial Hospital, Mumbai

- Vallabhbhai Patel Chest Institute, Delhi
- Vikram Hospital, Mysore
- Wockhardt Hospital, Bangalore

(References: Frost & Sullivan Technical Insights and reports, http://ehealth.eletsonline.com/2008/01/11076/)

Health insurance

Health Insurance is an expression used to exemplify a kind of insurance that pays for medical cost. It may be at times used more largely to include cover of disability or long term nursing or custodial care needs. It may be extended through a government-sponsored social insurance program, or from private insurance companies or other non formal means. The concept of insurance can be extended to the level of the country, where the health of the citizens, comes at the core for its long term sustainable development.

Insurance schemes in India

The health insurance schemes in India have been broadly classified in four categories, namely

1) Mandatory,
2) voluntary,
3) employer based, and
4) NGO based

The Mandatory schemes include ESIS, CGHS. The penetration was these are very slight but they are best illustrations of social security schemes in a developing economy. They are principally financed by the contributions of the beneficiaries and their employers and from taxes. Whereas the voluntary schemes as offered by various private insurance companies give the beneficiaries a wide range of choices to chose the best from as suited to their requirements. Employer based and NGO based schemes have been constituted to benefit the employers and community respectively against catastrophic out of pocket expenditure at the time of sickness.

Government Sponsored:

RSBY has been launched by Ministry of Labour and Employment, Government of India to provide health insurance coverage for Below Poverty Line (BPL) families. The objective of RSBY is to provide protection to BPL households from financial liabilities arising out of health shocks that involve hospitalization. For the first time IT applications are being used for social sector scheme on such a large scale. Every beneficiary family is issued a biometric enabled smart card containing their fingerprints and photographs. All the hospitals empanelled under RSBY are IT enabled and connected to the server at the district level. This will ensure a smooth data flow regarding service utilization periodically.

The Life Insurance Company of India (LIC)
The General Insurance Company of India (GIC)

The Life Insurance Corporation (LIC) offers:
The Asha Deep Plan: It provides cover for cancer, paralytic stroke resulting in permanent

disability, renal failure and coronary artery disease where by-pass surgery has been done. It caters to people between 18 - 65 years.
Jeevan Asha: The Jeevan Asha policy is the other healthcare product offered by LIC. It is an open-ended scheme covering many surgical procedures.

While LIC deals with insurance for life coverage only, the GIC deals with the other aspects of insurance, including health. Following are the main health policies offered by the Indian Insurance Companies. These policies are regulated by the General Insurance Corporation and are marketed by the four big insurance companies: United India Insurance Co Ltd., New India Assurance Co Ltd., Oriental Insurance Co Ltd. and National Insurance Co Ltd.

The insurance policies offered by GIC are:

1. Mediclaim
Insures against any hospitalization expenses that may arise in future. This policy is designed to prevent the insured from paying for any hospitalization expenses owing to illness or injury suffered by the insured, whether the hospitalization is domiciliary or otherwise.

2. Jan Arogya Bima Policy
It insures hospitalization or domiciliary hospitalization expenses incurred on medical or surgical treatment for any illness or disease (contracted after 30 days from the commencement of the policy) or injury. Any person in the age group of three months to 70 years can be insured under this. This insurance policy was designed for the lower income group of society and the common masses. The entire idea was to protect them from high costs of hospitalization.

3. Overseas Mediclaim Policy
Any person going abroad on holiday, business, study or employment can avail this policy. Coverage under the medical expense section of this insurance is intended for use by the Insured person in the event of a sudden and unexpected sickness or accident arising when the Insured is outside the Republic of India.

4. Personal Accident Policy
The policy compensates an individual against death, loss of limbs, loss of eyesight, permanent total disablement, permanent partial disablement and temporary total disablement, solely and directly resulting from accidental injuries.

5. Critical Illness Policy
Critical Illness Policy is an exclusive benefit policy for individuals in the age group 20-65 years covering coronary artery surgery, cancer, renal failure, stroke, multiple sclerosis and major organ transplants like kidney, lung, pancreas or bone marrow.

6. New India Assurance Bhavishya Arogya
This caters to persons between 3 to 50 years. This policy is essentially to take care of medical expenses needs of persons in their old age. The policy provides for expenses in respect of

hospitalization and domiciliary hospitalization during the period commencing from the Policy Retirement Age selected till survival. This is selected by the insured for the purpose of commencement of benefits in the policy.

Health insurance products from some private insurance companies:

Bajaj Allianz Health Guard

Covers individuals between 5 to 55 years. Children below 5 years can be insured if the parents are concurrently insured with the company. It provides cashless facility across various hospitals across India. Herein pre-existing illness and injuries are covered in the year of cover, if the insured renews his policy consecutively for 5 years.

Royal Sundaram Health Shield Gold

Covers individuals between 5 to 55 years from 91 Days to 75 years and also persons above the age of 55 years are covered as a part of family and not on individual basis. All in hospitalisation expenses are covered (period of stay in hospital should be more than 24hours). Pre hospitalisation expenses are covered for a period of 30 days & post hospitalisation for 60 days. Under this policy pre-existing illness and injuries are covered in the 6th year of cover, if the insured renews his policy consecutively for 5 years. Maternity treatment charges are covered up to the extent of Rs. 20,000. These include expenses incurred in hospital/ nursing homes as in -patient in India.

Birla Sun Life

Birla Sun Life Insurance is the coming together of the Aditya Birla group and Sun Life Financial of Canada to enter the Indian insurance sector. The Aditya Birla Group, a multinational conglomerate has over 75 business units in India and overseas with operations in Canada, USA, UK, Thailand, Indonesia, Philippines, Malaysia and Egypt to name a few.

HDFC Standard Life

HDFC Standard Life Insurance Co. Ltd. is a joint venture between HDFC Ltd., India's largest housing finance institution and Standard Life Assurance Company, Europe's largest mutual life company.

ICICI Pru

ICICI Prudential Life Insurance is a joint venture between the ICICI Group and Prudential plc.of the UK. ICICI started off its operations in 1955 with providing finance for industrial development, and since then it has diversified into housing finance, consumer finance, mutual funds to being a Virtual Universal Bank and its latest venture Life Insurance.

Om Kotak Mahindra

Established in 1985 as Kotak Capital Management Finance promoted by Uday Kotak the company has come a long way since its entry into corporate finance. It has dabbled in leasing, auto finance, hire purchase, investment banking, consumer finance, broking etc.

Tata AIG General Insurance Company

The Tata AIG joint venture is a tie up between the established Tata Group and American

International Group Inc. The Tata Group is one of the largest and most respected industrial houses in the country, while AIG is a leading US based insurance and financial services company with a presence in over 130 countries and jurisdictions around the world.

Max India
Max India Limited is a multi-business corporation that has business interests in telecom services, bulk pharmaceuticals, electronic components and specialty products. It is also the service-oriented businesses of healthcare, life insurance and information technology.

(http://doctor.ndtv.com/storypage/ndtv/id/3723/type/feature/health_insurance_in_india.html?cp Friday, 18 February 2011)

CURRENT SCENARIO:

The health insurance cover is still limited to only 15 per cent of the total population of India. Indian Health insurance market is expected to grow at a CAGR of 43 per cent between 2011 and 2015. The market penetration will be three fold higher in 2015 as it is one of the fastest growing segments in non-life insurance. ***(KIT: Health insurance market in India, Technopak Advisors / New Delhi Oct 24, 2011, 00:23 IST)***

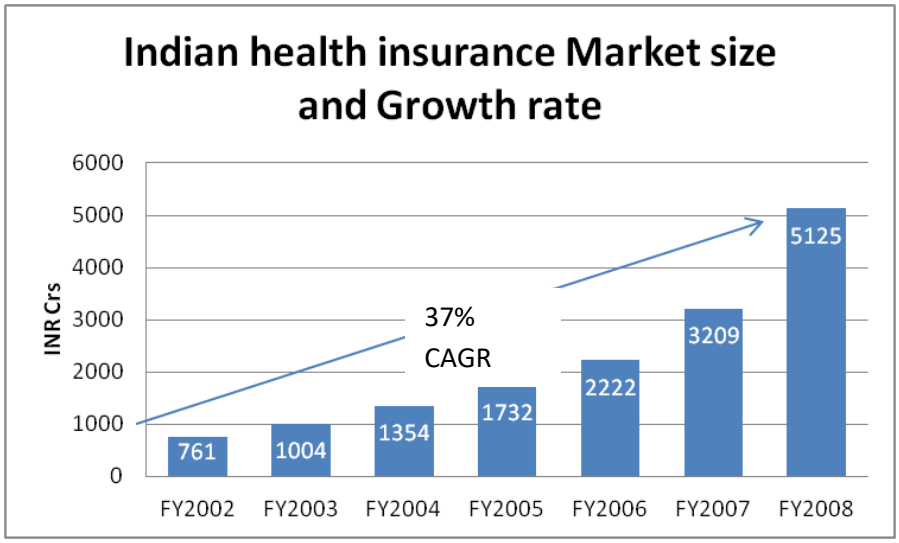
April to December 2010 :
According to the latest data released by the IRDA, the total health insurance premiums written by non-life companies and standalone health insurance companies grew by 36.5 per cent during the nine month period April to December 2010, as compared to the corresponding period in the previous financial year.

Among private players, ICICI Lombard occupied the top position and the third spot in the industry with a growth of over 70 per cent and a market share of 13.2 per cent, followed by Star Health & Allied Insurance (Star Health) with a share of 11.5 per cent. Today, health insurance is not only the fastest growing segment of the insurance market, but also constitutes a large portion—more than 20 percent (approx)of the country's non-life insurance market

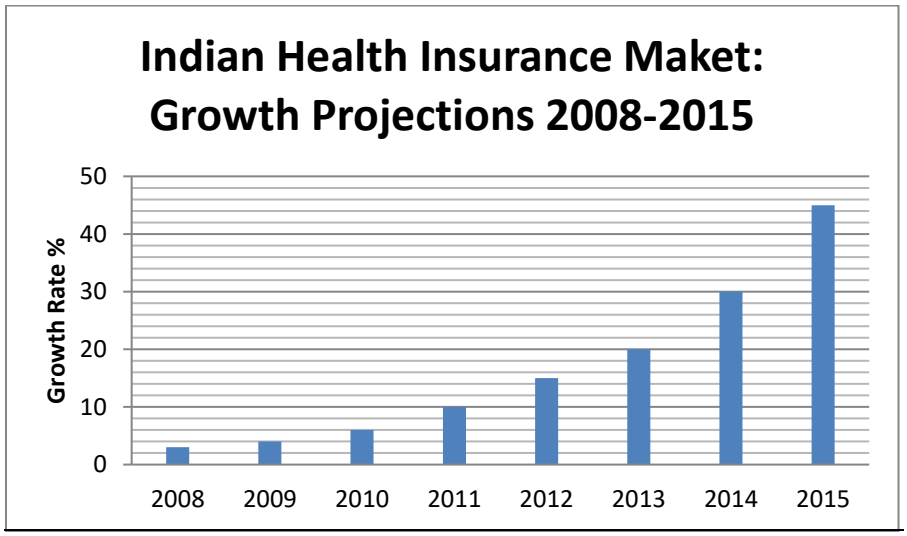
Key Developments in health insurance

Indian health insurance market represents one the fastest growing and second largest non-life insurance segment in the country; according to a report by research firm RNCOS. The health insurance premium is expected to grow at a Compound Annual Growth rate (CAGR) of over 25 per cent for the period spanning from 2009-10 to 2013-14, according to the report (*http://www.oifc.in/Article/Booming-Indian-healthcare-industry*)

It is estimated that medical insurance would be a USD3 billion industry by 2012



Graph 1.10 depicts Indian Health insurance industry Market size and Growth rate from FY 2002-2008
Source: IRDA



Graph 1.11 depicts Indian health insurance Market Growth projections from year 2008-2015
Source: IRDA

The future trends in this sector are a shift in focus from group insurance to retail insurance portfolio, rationalization of premium in group insurance policies, sub-limits, like co-pay and deductibles will increase and government companies are likely to increase their healthcare offerings.

New entrant: Financial services group **Religare** is reportedly considering setting up a standalone health insurance company in a joint venture with two public sector banks Union Bank of India and Corporation Bank.

The major health insurance companies in India

- National Insurance Company
- New India Assurance
- United India Insurance
- ICICI Lombard
- Tata AIG
- Royal Sundaram
- Star Allied Health Insurance
- Cholamandalam DBS
- Bajaj Allianz Apollo
- AG Health Insurance Company etc

Among all Health insurance companies in India, ICICI Lombard is the leader in Pvt. Sector and New India Assurance Co Ltd is market leader

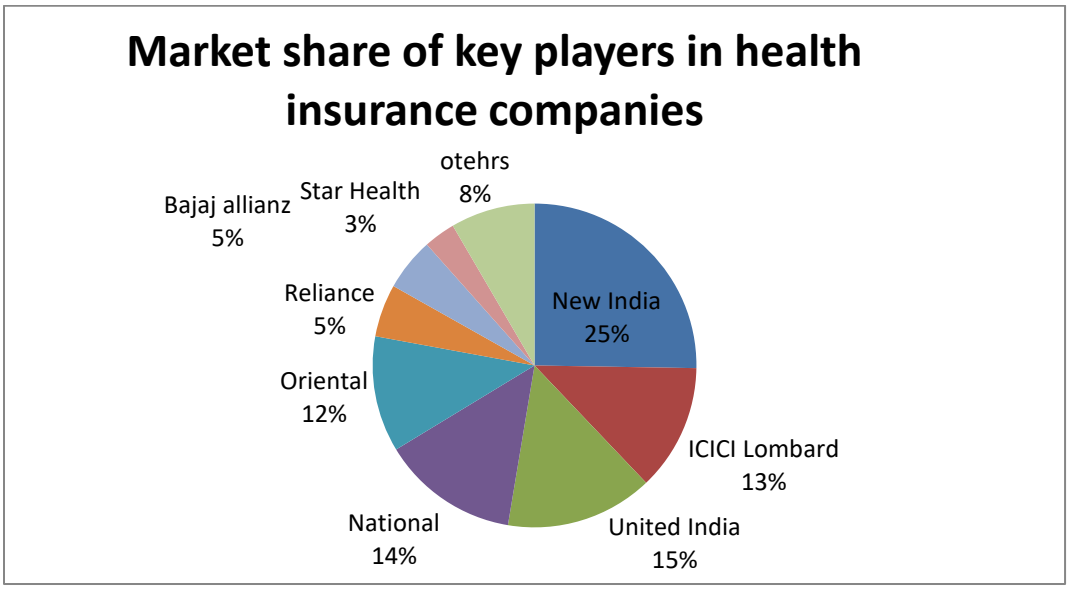


Chart 1.12 depicts market share of key palyers in Indian health insurance Industry in 2008 Source: IRDA,Health insurance forms a low proportion of the total business for life insurance companies in India (0.2 percent of the individual regular premium for FY2008) it forms a significant proportion of the business for non-life Insurance companies (approx.18 percent of the total Gross Written Premium for FY2008

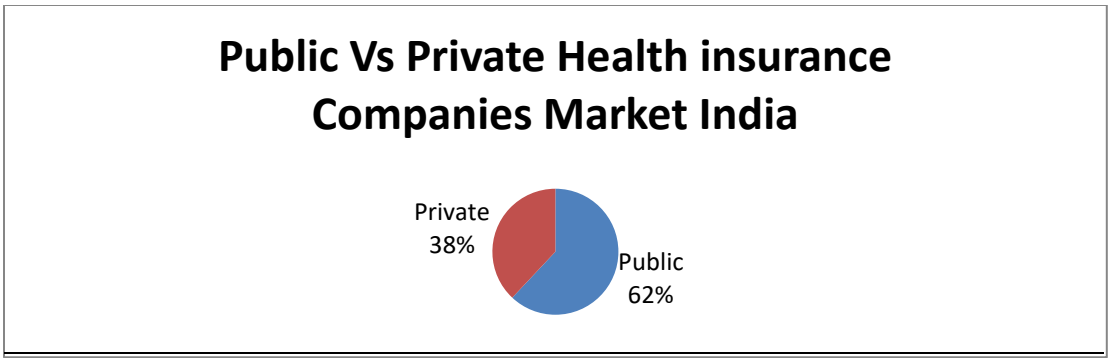


Chart 1.13 depicts Private and Public health insurance market % wise in year 2008

Private Healthcare Companies have doubled their market share since 2004. The public sector companies are increasingly losing their market share. The public health insurance companies accounts for 62% while the private sector accounts to 38% of the Indian Health Insurance market in 2008.

Companies Plans:

The Preferred Provider Network (PPN) of hospitals introduced in July 2010 to offer cashless medical treatment following the initiative taken by the four pubic insurers to bring discipline on the pricing of hospital services, will be extended to four more cities, viz. Hyderabad, Kolkata, Ahmadabad and Chandigarh from 1 April 2011. Hospitals under the PPN now charge pre-negotiated rates for medical procedures.

Star Health & Allied Insurance is said to be launching an aggressive approach to reach a premium collection target of Rs20 billion for the next fiscal year. The company plans to infuse Rs1.2 billion capital in the coming months. The company's premium target for the current year is mentioned as Rs15 billion and it hopes to register underwriting profit during the current fiscal. Meanwhile, it has been reported that the venture capital fund Sequoia Capital has acquired a 25 per cent stake in Star health for approximately Rs1.58 billion (US$35 million).

Apollo Munich Health Insurance is said to target a premium income of Rs2.1 billion for the current fiscal year. The company has plans to increase its agency and branch network, with the number of agents slated to increase by 6,000 and the numbers of branched by 15.

Max Bupa is said to have prepared plans to infuse Rs4.5 billion of capital over the next four years to expand its operations. This would increase the company's paid up capital from the current Rs2.36 billion to nearly Rs7.0 billion.
Meanwhile, about 3 per cent of Max India, the parent company of Max Bupa, is said to have been acquired by Temasek, the investment vehicle of the Singapore government with an active investment portfolio across several sectors in India.
In an attempt to increase the accessibility of medical insurance in urban and rural locations,

Bharti AXA General Insurance has tied up with 39 hospitals in Nashik in Maharashtra and 170 hospitals in the state of Andhra Pradesh. The health portfolio currently contributes 30 per cent of the company's total insurance business, which the company plans to double by December 2011.

L&T General Insurance, the latest entrant in the non-life insurance space, has identified health and micro-insurance as its key focus areas to increase market penetration. The company intends to launch several comprehensive health insurance products in FY2011-12.

Cholamandalam MS General Insurance (recently branded as Chola MS General) has announced its intention to expand the consumer base in the rural health sector by leveraging the reach of its parent, the Murugappa Group companies, such as Coromandel Fertilisers, EID Parry a Parry Agro and reach out to farmers with health insurance products.

Emerging role of TPA's:

The TPA's (Third Party Administrators) have added to the changing scenario of health insurance in India. Their role is gradually changing from green field ventures to an established system. Their wide spread network with hospitals and other healthcare providers have certainly strengthened the health insurance structure in India.

Major TPA's and Number of Hospitals In their Network:

Major TPA's	*No of hospitals added to the network*
I Care Health Management and Services	2040
E Meditek Services	867
Health India Services	786
Total coverage by all the TPA's in India	10974

Table 1.4 Showing major TPA's in Indian health insurance Industry and number of hospitals in their network. (Source: IRDA Annual Report 2010)

Information Technology as a Tool for Health Insurance Schemes

Information technology represents an important tool in running an effective health insurance scheme. Information systems play an important role in:

- Enabling the identification and enrollment of under-served populations
- Facilitating the accurate and efficient processing of claims, benefiting governments and care providers alike
- Harnessing data to improve the long-term policies and management of the schemes

Max Bupa has launched its online sales portal, with the aim of boosting policy sales, especially renewals. Senior company officials indicated that the company will increase the use the internet for marketing, with a focus on health-related websites. The company's recent international survey *'Bupa Pulse Survey part III'* has revealed that about 40 per cent of Indians regularly go online for health information, and this ratio is higher than countries such as China, Brazil and Mexico.

Regulatory update

Guidelines on health insurance portability
The IRDA has permitted health insurance portability for all existing and new policies with effect from 1 July 2011. The portability facility will allow policyholders to switch to another insurance company with the same conditions. The accepting insurer shall provide cover, at least up to the sum assured (plus accumulated bonus) as in the previous insurance policy. The new facility would prevent the loss of credit for Pre Existing Diseases (PED) and no-claim bonus gained with the previous insurer, and ensure continued coverage for employees switching / leaving jobs.
As per the guidelines of the regulator, all porting requests should be acknowledged within three working days, and insurers should make available claim details data to counterparts within seven days of request.

Other initiatives
The IRDA is said to be working on a set of comprehensive health insurance guidelines. Some of the areas likely to be covered in the guidelines are:
Standard Treatment Guidelines ('STGs') for common causes of hospitalisation like diarrhoea, asthma, cataract surgery and typhoid. The trade body, Federation of Indian Chambers of Commerce & Industry has recommended 22 STGs to the regulator.
A list of items as part of common exclusions under non-medical expenses. This may include costs for diabetic chart, external durable devices like walking aids and cervical collar, eye kits and X-ray films.
Standard definitions of 11 critical illnesses such as cancer, first heart attack, open heart replacement and major organ/bone marrow transplant. Insurers would be required to cover these under their critical illness plans.
A common form for claim settlement including claim settlement protocol.
To alleviate the problems faced by insurers on account of delayed receipt of insurance premiums under government sponsored health insurance schemes, the regulator has made some allowance in maintaining the solvency margin norms. A maximum period of 180 days is allowed to correct any solvency margin fall below the stipulated 150 per cent due to such delays

Possibilities for India

India's health insurance market has consistently increased at a double-digit rate since the industry was liberalized in 2000, and the pace of growth is expected to be sustained for the next few years.
Many factors are driving this rapid growth, among them the fact that relatively few people have yet bought health insurance and increasing awareness of health.

Models from other markets do not necessarily meet the specific requirements of the Indian health insurance business environment. Specifically, the Indian health insurance market differs from markets elsewhere in the level of consumer awareness, and their financial power and preparedness to spend on insurance. The Indian market is characterized by strong differences between the attitude and financial power - India's rural and urban consumer bases. In addition, India's regulatory framework is also unique. But some similarities between India and other markets are also evident. These similarities include:

• Increasing demand for adequate health care coverage and supply.
• Increasing sensitivity of governments and public authorities to gaps in health care coverage and rising health care costs.
• Insurers' awareness of the growth potential offered by health insurance.
• The need to contain costs in order to counteract strongly increasing medical expenses and thus secure profitability.
These points suggest that Indian health insurers can learn a great deal from a close study of foreign case studies. Before developing products, Indian health insurers will need to play an active role in addressing the lack of consumer awareness about the need for, and potential benefits of, health insurance. Indian insurers will need to rethink their strategies to recognize product innovation as a key to unlock growth opportunities in the Indian health insurance market. They will need to make product innovation a business priority and assess their own value proposition to customers by detailed comparison with the value propositions of their competitors.

Health Sprint in Health Insurance IT

It was founded in May 2006 by 3 promoters who possessed desired and complementary skills in healthcare, technology and marketing. HealthSprint has a growing customer base of providers, such as Wockhardt, Manipal, and Payers, such as TTK, MediAssist, Anyuta, Spurthi, UHC, DHC. The major customer base is Tamil Nadu Chief Minister Kalaignar's insurance scheme, Government of Karnataka – Vajpayee Aarogyasri Health Insurance Program, SAST, Dharmasthala Temple Trust –SKDRDP Micro Health Insurance program and Government of Uttarakhand-RSBY Health Insurance.

The relationship is through Star Health and Allied Insurance where Star is the leading insurer for Tamil Nadu Chief Minister scheme and for government of Uttarakhand-RSBY Health Insurance. HealthSprint is a partner with HCL infosystems for deployment and implementation of IT solution for the Suvarna Arogya Suraksha Trust for Karnataka government (Health Insurance Scheme for BPL families) which covers 25 million lives.

Application and technology will be deployed for the Central Tibetan Administration for the Micro Health Insurance program. The application and technology infrastructure will be maintained by HealthSprint on a Software-as-service for a period of 5 Years under this contract. One lakh members are covered under this program.
HealthSprint is the first mover in SaaS offerings in Healthcare and Health Insurance in India and India's largest health insurance data exchange platform

Products/services:

• I sprint
Core health insurance applications
Customer relationship management applications
Business intelligence applications
Business support applications

• H Connect
Adept at handling complex scheduling situations (re-visits, re-schedule, etc), and multi-person events, Centralized system for all departments
CRM features: SMS and e-mail confirmations and reminders
Appointment workflow and status with check-in feature for tracking no-shows, cancellations, etc, highly granular user-group based access rights
Designed for HIPAA and PHIPA compliance

• H Comm
Integrated healthcare communication and management solutions
Used for laboratory, EMR, patient billing, employee management, finance, accounts, pharmacy, OT management, ward management and health insurance

• Health Insurance Managed Services :
Patient counseling - Setting patient expectations right with respect to cashless hospitalisation
Pre-authorization – Screening and transferring patient relevant data for possible authorization
Pre-discharge validation - Validating relevant patient data and providing billing insights with respect to approval remarks
Claim validation – Validating for reconfirming and segregating patient details
Claims query handling - Assisting hospital staff in replying to insurance queries

PUBLIC HEALTH SECTOR IN INDIA

Introduction and current scenario:

After independence India has made considerable progress in economic and social development. India has invested huge sums of money in the development of extensive healthcare system which caters to a population of 1000 million residing in 6, 00,000 villages. India, compared to other developing nations spends slightly higher amount in the health sector. It spends approximately 6% of the GDP or $13 per capita in the health sector.

Organization Of Health Care Administration In The Country
Ministry of health and Family Welfare is the apex executive organization dealing with the issues of Health and Family Welfare health and in the country as per the guidelines enshrined in the constitution of India and depicted in the national health policy and in accordance with the policy decisions of the cabinet. Health is the state subject in India and the Ministry of Health and Family welfare acts as a Coordinator between the state Health departments, Planning commission, central council of Health etc. besides implementing various national programs and items under unions list and concurrent list. In the process it is aided by the Directorate General of Health Services.
Health administration at the apex level of the Government of India consists of a Secretary for health and Secretary for Family Welfare supported by Additional, Joint secretaries who are drawn from the Indian Civil Service. The rest of the organization is mostly program/project based. Adhoc project structures such as TB project or Malaria project etc., are created as and when necessary. Since state governments implement the projects and deliver the regular health services they have fairly well demarcated systems. Separate directorates or head offices usually

exist at the state capital for primary, secondary and tertiary healthcare which includes medical colleges and medical education. Many states have separate structure for family welfare operations since population control through family planning is given great importance. An average Indian State will have 10 to 25 districts where from most of the revenue and civil administration is governed. District health administration consists of number of officers and doctors who on an average handle 10 to 15 hospitals, 30 to 60 primary health centers and 300 to 400 sub centers. The entire complex arrangement results in a number of vertical channels of information, multiplicity of agencies, dual reporting systems etc.

Fig 1.1 STRUCTURE OF PUBLIC HEALTH IN INDIA

CENTER	Political head- minister of state Divided into Health, Family welfare, Indian systems of Medicine each headed by a career bureaucrat Helped by specialized national level institutions and hospitals Mostly play advisory and supportive role in health Total support for family welfare – RCH Total support for national programs Runs central government health scheme (CGHS) for Central government employees
STATE	Political head- minister of cabinet rank Divided into Health and Family welfare and headed by a career bureaucrat. Organised into Directorates of Health, Family welfare, primary health, secondary health and medical education, training etc., headed by promoted doctors Responsible for hospital care and implementer of national programs and family welfare Concentration of financial and personal powers
DISTRICT	Last administrative unit ---- 1.0 to 2.5 million population Headed by a civil surgeon. District medical officer doctor/physician Coordinates and controls nearly 10-15 hospitals, 40-70 PHCs

Maintains the logistics of drugs and supplies, collects the statistics
Does not have much financial and personal powers

Key Developments in public health

Rural healthcare sector in the country is also witnessing an upsurge. The rural health sector has added around 15,000 health sub-centres and 28,000 nurses and midwives during the last five years, according to the Rural Health Survey Report 2009, released by the Ministry of Health. The number of primary health centres has increased by 84 per cent, taking the number to 20,107, according to the report.

Computer-based bio-surveillance projects generating data about diseases and creating databases on healthcare in rural areas are gaining popularity in India with various organizations such as Narayana Hrudayalaya and the Mazumdar Shaw Cancer Centre entering into this sector.

HMIS – A Digital Initiative

The HMIS (Health Management Information System) web portal was launched by the Ministry of Health and Family Welfare (MoHFW) on 21st October, 2008 to enable capturing of public health data from both public and private institutions in rural and urban areas across the country. The portal is envisaged as a "Single Window" for all public health data for the Ministry of Health and Family Welfare. The web portal also has data from NFHS, DLHS etc. and will subsequently have data from Concurrent Evaluation and other such surveys as and when the data is available.
Before the launch of the web portal, the NRHM physical performance formats were rationalized and divided in to 5 separate formats, one each for District Hospital, Sub Divisional Hospital, CHC, PHC and HSC and their equivalent health institutions (both public and private). The rationalized formats were then e-enabled in the HMIS web portal that was developed by MoHFW in collaboration with a solution provider, namely ,M/s Vayam Technologies Ltd. (formerly "iBilt Technologies Ltd."), selected through a tendering process. The web application would also be maintained by the solution provider.
The HMIS application has been developed using ASP Dot Net in the front end which facilitates its access through common web browsers. The application's analytical power is provided by a data warehousing engine (SAS Technologies). The web portal has been hosted in the data centre of the National Informatics Centre (NIC) in New Delhi. The hardware powering this web portal consists of state of the art blade servers along with high bandwidth internet connectivity being provided by NIC/NICSI. This ensures lower down time of the application while a large number of HMIS users are logged in. To quantify, on an average, there have been over 5000 page views on this portal on a daily basis and users from 31 countries have also visited the portal.
The MoHFW initially rolled out the HMIS up to the District Level and as it stabilizes, the application will be expanded to the Sub District/Block level. The disaster recovery site is being configured at NIC Hyderabad as per established protocols.

Health Care IT

Healthcare IT Spending in India:

As per the Springboard Research, healthcare IT spending in India is expected to grow from $274.2 million in 2009 to $609.5 in 2013, growing at a Compounded Annual Growth Rate (CAGR) of 22 per cent from 2009-2013. The report revealed that hardware accounted for the largest proportion of total IT spending in the healthcare vertical with 55% share, followed by software and IT Services at 25% and 20% respectively in 2009.

The spending on basic computing products is expected to increase over the next five years, as hospitals build and upgrade their IT infrastructure. Moreover, with new and upcoming applications such as telemedicine and e-prescriptions penetrating the healthcare vertical in India, IT investments on software would further increase with a focus on integrated billing and online availability of patient records across hospitals.

Indian healthcare is experiencing a transformation, with the application of newer, better IT systems and applications. Adoption of IT has become one of the top priorities for the Indian healthcare companies. But most big healthcare organizations allocate only two to three per cent of their annual budget to IT expenditure. These percentages when calculated on a lower base seem insignificant as compared to US IT spends in actual dollars.

However, by 2013, India's healthcare sector's total spend is projected to grow to nearly $40 billion. This throws up a lot of opportunities for IT players as more and more hospitals are adopting information technology apart from medical technology. With increasing IT applications and insurance penetration, the demand for EMR is anticipated to increase robustly in next few years. However, initially the scope of the services will be limited to the metro and Tier-I cities only.

With increasing emphasis on the implementation of hospital information system (HIS) in the country, the market of instruments such as PACS will grow rapidly. However, the success of these factors will largely depend upon various factors including technology adoption and cost.

Overall, India can learn from the US experience on leveraging technology for healthcare and benefit.

Investments made by health care organizations are expected to increase in the near future due to strong economic growth, increased public spending and private investments in health care, the rising penetration of health insurance, and the emergence of new health care delivery models.

At INR690 billion, private expenditure accounts for significant proportion of health care delivery market. The Government of India (GoI) is also encouraging private participation due to constraints in the public-funding capability.

The GoI has also launched the Health Management Information System (HMIS) portal to convert local health data into real-time information, management indicators and trends. The

real-time data provided by web-enabled technologies helps to strengthen monitoring, thereby enabling policy makers to make better informed decisions on public health delivery.

Several multinational companies such as GE Healthcare, Intel, Hewlett Packard, Cisco Systems, Qualcomm, Microsoft, Google, IBM, Computer Sciences Corporation (CSC), Perot Systems, TCS and HCL have entered the health space

According to a report by Springboard Research, India has the Fastest-growing health care IT market in Asia, with an expected growth rate of 25%, followed by china and Vietnam.

The Indian health care IT market has seen the evolution of many models to cater to the needs of the local market. Apart from standard hospital information systems (HIS), the need for picture archiving and communication system (PACS), remote installation services (RIS), electronic medical records (EMR) and clinical systems is also on the incline. Further, trends such as IT Outsourcing (ITO) in health care in India are emerging.

Key growth drivers

The following trends and factors are driving the rapidly growing use of IT in the health care industry in India:

Topography and travel/cost factors:
With the majority of the population in India living in villages and most health care facilities located in metropolitan cities, it is difficult for patients to seek advice from medical specialists. As such, the specialists based in urban areas can rarely make time to travel to far-flung locations for patient visits. Therefore, the use of IT in this sector will enable doctors to reach their rural clients with great ease, reduce travel and open access to extending the best possible treatment in real time via technology.

Innovation and upgrade of existing technology:
The availability of advanced and sophisticated medical technology with the appropriate use of IT has created new markets. Further, the growing exposure of patients to the latest IT services available globally has triggered new demand in India for the increased use of such systems to make health care services more convenient.

Proactive wellness:
With the increasing health consciousness among Indians, preventive health care is gaining importance. To cater to this demand, a range of software, which enables access to the individual's health risk, the selection of optimum preventive measures and the monitoring of patient profiles, is available in the market.

Impact of Healthcare IT growth on the healthcare delivery segment

Information technology (IT) is a critical contributor to transform care delivery and helps improve the quality, safety and efficiency of healthcare delivery. The possibility of innovative new technology that is simple to use, cost effective and helps data to be portable – is a phenomenal

change in how care could now be delivered. Additionally, the information could also be used to standardize the delivery process inside the provider's facilities.

The positive impacts on the healthcare delivery segments are:

- Enabling and improving healthcare processes
- Delivering timely information to care providers
- Integrating facilities and share information between facilities
- Enabling analytics for more effective and efficient care to each patient
- Bridge India's rural-urban users equally

The biggest impact of good information technology systems will be on improving upon the inefficiencies in existing procedures inside Indian hospitals. India lags behind in terms of hospital infrastructure and manpower. The adoption of IT will help hospitals develop innovative and efficient healthcare infrastructure necessary for rural and urban population. IT solutions, which can help improve asset optimization, schedule doctors/clinicians, pharmacy orders, lab test orders etc. are needed on priority. The growth in healthcare IT sector will also help hospitals in enhancing the efficiency of their administrative functions thus leading to reduced patient waiting time and increased success rate in treatment.
The scale of e-health services in India has been very small so far considering its size, mostly limited to medical transcription, health awareness through portals, telemedicine and hospital management system. In today's time, it is basically the private sector that is driving and paying for HIT. Telemedicine has the potential for 80-90% of financial savings and high acceptability ratio in the rural communities of India. According to Sangeeta Reddy, Executive Director of Apollo Hospitals, a healthcare scenario, which uses IT and communication as an enabler, improves access and provides better preventive measures of treatment in time to urban as well as rural population. The key driver for health information technology for the people of India can be public private partnership.

eHealth: A revolution in the making

India's private healthcare sector is marketing itself not just to domestic patients, but to patients all over the world. Around 450,000 foreign patients visit the country per year for medical treatment. Cardiology is a major specialty, as well as hip replacements. Hospitals are turning to accreditation agencies to standardize their protocols and obtain the required approvals on safety and quality of care. The likes of Apollo are using eHealth to raise efficiency, reduce medical errors and improve disease management. Their challenges are similar to those of hospitals overseas. But their solutions are not. Apollo did not purchase an out-of-the-box solution from an international vendor; they worked closely with one to develop their own patient-centric IT system, with EMRs that cover the entire continuum of care.
(http://www.healthcareitnews.com/news/ehealth-india-advancing-all-levels)

HOSPITAL INFORMATION SYSTEM IN INDIA

Tech Navio's analysts forecast the Indian Hospital Information System market to grow at a CAGR of 15 percent over the period of 2010-2014. One of the key factors contributing to this market growth is the rapidly developing Healthcare industry in India. The Indian Hospital

Information System market has also been witnessing growth in medical tourism. However, the high capital cost could hinder the growth of this market.

Several large hospitals in India have announced extensive expansion plans for the near future. This has been as a result of growing healthcare needs of the growing population. With the introduction of these new hospitals, hospital information systems are expected to be implemented to streamline workflow, boosting the market in India.

In spite of the demand for hospital information services in India, the high capital cost is hindering the growth of this market. However, the increasing purchasing power of end-users in India is expected to boost the market. Moreover, the Hospital Information Systems market in India is witnessing a gradual move to cloud computing.

CHALLENGES AND ISSUES AT POLICY LEVEL FOR THE INDIAN GOVERNMENT

The implementation of policies regarding HIT adoption has always been on the government's radar and serious exploratory initiatives are underway to explore coordination of a national health IT infrastructure and network.

However, the challenges faced for adopting HIT are:

Government Funding: Further improvement in government funding for HIT is required to avoid the restrained HIT adoption in government health facilities. Apart from this, it has to be ensured that the number of trained medical informatics professionals increases.

Computer literacy: A high percentage of computer literacy among the government staff, and to a large extent in the private provider community should be one of the major objectives of the government.

Infrastructure and Coordination: improvement in the supporting infrastructure and coordination between public and private sector.

Legacy Systems: Except for a very few privately owned large hospitals, most patient records are paper based and very difficult to convert to electronic format.

Standards and Guidelines: Local HIT systems that do not adhere to common standards for information representation and exchange. However HL7 and DICOM standards have been under consideration in India.

Interoperability: Discussions of interoperability focus on development of standards for content and messaging, among other areas, and adequate security and privacy safeguards. Interoperability needs to be achieved in the rapidly expanding applications in areas such as home telehealth and remote monitoring for patients and consumers.

Privacy: Patient confidentiality is an open area and he Supreme Court of India has not addressed the specific right of privacy issue with respect to health information.

Information Overload: Health IT or Telemedicine is not a cure for the inadequacies related to health delivery system and neither HIT is supposed to be a cure. In fact too much information on wireless media and information coming from a large number of patients to a single doctor or miniscule group of doctors may result in over information or less remedial actions.

Regulations in HIT

Government Policy

Currently, official HIT adoption or implementation policies are almost nonexistent. However, HIT is on the government's radar and serious exploratory initiatives are underway to explore coordination of a national health IT infrastructure and network.

Framework for Information Technology Infrastructure for Health (ITIH)

In consultation with Apollo Health Street Limited, the Department of Technology (within the Ministry of Communication and Information Technology) created the ITIH Framework in 2003. The Framework is a guideline document and comprehensive roadmap that prescribes IT standards and guidelines for each stakeholder across diverse healthcare settings in India with the goal of building an Integrated Healthcare Information Network.

"To build Information Technology Infrastructure for Health in India that will standardize the capture, storage and exchange of health information in an environment supported by a robust legal framework and a mature health informatics education system that will bring administrative simplification and improve patient care services through a continuum of care"

National Knowledge Commission (NKC)

Established in 2005 with a three-year mandate, the NKC is a high-level advisory body to the Prime Minister of India, with the objective of transforming India into a knowledge society. It covers sectors ranging from education to e-governance, with a working group focused on health information technology.

Recommendations by National Knowledge Commission (NKC)

Initiate Indian health information network development (I-Hind)(web based)network, connecting all health care establishment in both private and public sector.
Establish national standards for clinical terminology and health informatics
Create a common electronic health record.
Medical informatics to be a part of medical and pharmacy curriculum
Create an institutional framework for implementation
Create appropriate policy framework to protect health data of citizens (technical and legal framework, encryption, anonymity, confidentiality, security)

Who Drives and Pays For HIT?

In the last 4 to 5 years many positive developments have set the tone for potentially much greater HIT adoption in India. With a maturing private healthcare sector, the private hospital chains have become the primary consumers and financiers of HIT. The aggressive IT sector in India is slowly managing to move large government hospitals toward HIT adoption.

India's experience in Assessment and adaptation of Electronic standards for Healthcare Quality

Before 2002 –no healthcare standards in India

Wanted to learn from others errors
The Min. of Comm. and IT (MCIT), Govt. of India worked with Apollo and other stakeholders to create comprehensive Health Information standards (incl. telemedicine)
The project was called 'Health UnITe' and proposed framework for Information Technology infrastructure for Health in India (ITIH)
ITIH focused additionally, on the Legal and educational Framework
Status of Ministry Of Health and Family Welfare GOI (2010-11)

Standardize common set of protocols for treatment across the country
Expert panel set norms for unified treatment standards
Led by Health insurance firms declaring withdrawal of Cashless payment facility -alleging over-charging of customers by Hospitals -leading to losses by insurers*
Clinical Establishment Act-calls for common standards to be maintained by healthcare facilities
As health is a state subject, the Centre can only recommend stating governments - adopting the Clinical Establishment Act.

Constitution of committee for EMR standards
Task1: Standards Terminology, Coding standards etal.
Task2: Data connectivity
Including hardware, software and interoperability.
Task3: Data ownership
Data protection and security including legal aspects/complaints, guidelines and reports already available.

TELEMEDICINE IN INDIA

India's healthcare infrastructure is currently unable to meet the needs of rising population .About 70 percent people are poor and often live in remote areas and inhospitable terrain. Most Public health facilities have resources shortage (staff, doctors or equipment).Healthcare services are highly skewed in favor of urban population which is 28% of Indian population. With inadequate infrastructure and inadequate healthcare network India is facing daunting challenge of providing quality healthcare to its citizens.

Telemedicine –use of telecommunication has provided an impetus to the government's vision of quality health for all by helping in delivering affordable and quality healthcare. More than 3 lakh people already benefited by using this technology.

The telemedicine market in India has witnessed significant growth, has a market of more than $500mn. The industry has garnered the support of both the government and private organizations that are investing in telemedicine to make healthcare accessible across India

As the reach of Telemedicine increases, the market for medical diagnostic, healthcare providers, drug manufactures, telecom equipment manufacturers, software vendors is bound to increase.

Telemedicine however is not a panacea for Indian healthcare problems. It is instead a great facilitator in bridging the healthcare divide, representing an early opportunity in the sector which has 5.2% share in the Indian GDP. The future for Telemedicine at the moment looks promising with governmental backing and private initiative. An early move by private enterprise in PPP is highly recommended in the sector

11th Five-Year plan in India allocates priority for Telemedicine, providing accessible health care to rural population using existing fibre optic and satellite infrastructure with the help of IT, satellite and fibre optic network,

Public healthcare network using Telemedicine consists of 42 super-specialty hospitals with 8 mobile vans and 200 rural and remote hospitals .Telemedicine at present is mainly used for non-invasive and non-surgical diagnosis and treatment. Telemedicine is making healthcare financially viable to non-insured and poor people.

Telemedicine System

The Telemedicine system consists of an interface between hardware, software and a communication channel to eventually bridge two geographical locations to exchange information and enable tele consultancy between two locations.

The hardware consists of a computer, printer, scanner, videoconferencing equipment etc. The software enables the acquisition of patient information (images, reports, films etc.). The communication channel enables the connectivity whereby two locations can connect to each other.

Utility of Telemedicine

- Easy access to remote areas
- Using telemedicine in peripheral health set-ups can significantly reduce the time and costs of patient transportation
- Monitoring home care and ambulatory monitoring
- Improves communications between health providers separated by distance
- Critical care monitoring where it is not possible to transfer the patient
- Continuing medical education and clinical research
- A tool for public awareness
- A tool for disaster management
- Second opinion and complex interpretations
- The greatest hope for use of telemedicine technology is that it can bring the expertise to medical practices once telecommunication has been established.
- Telementored procedures-surgery using hand robots
- Disease surveillance and program tracking
- It provides an opportunity for standardization and equity in provision of healthcare, both within individual countries and across regions and continents.

- The Centre for International Rehabilitation recognizes that telecommunication and telemedicine are important technologies to improve and provide rehabilitation services in remote areas.

Challenges

- Perspective of medical practitioners: Doctors are not fully convinced and familiar with e-medicine.
- Patients' fear and unfamiliarity**:** There is a lack of confidence in patients about the outcome of e-Medicine.
- Financial unavailability: The technology and communication costs being too high, sometimes make Telemedicine financially unfeasible.
- Lack of basic amenities**:** In India, nearly 40% of population lives below the poverty level. Basic amenities like transportation, electricity, telecommunication, safe drinking water, primary health services, etc. are missing. No technological advancement can change anything when a person has nothing to change.
- Literacy rate and diversity in languages: Only 65.38% of India's population is literate with only 2% being well-versed in English.
- Technical constraints: e-medicine supported by various types of software and hardware still needs to mature. For correct diagnosis and pacing of data, we require advanced biological sensors and more bandwidth support.
- Quality aspect**:** "Quality is the essence" and every one wants it but this can sometimes create problems. In case of healthcare, there is no proper governing body to form guidelines in this respect and motivate the organizations to follow-it is solely left to organizations on how they take it.
- Government Support: The government has limitations and so do private enterprises. Any technology in its primary stage needs care and support. Only the government has the resources and the power to help it survive and grow. There is no such initiative taken by the government to develop it.

Potential for Growth

A January 2012 report titled, "Global Telemedicine Market Analysis," by RNCOS Industry Research Solutions, an India-based market research and information analysis company, projects that the global telemedicine market will grow at a compound annual growth rate (CAGR) of around 19% from 2010 to 2015. An earlier report in 2009, titled "Global Telemedicine Market: 2008-2012" published by Infiniti Research, a London-based market intelligence firm, pegged the size of the global telemedicine market in 2008 at US$9 billion. According to this report, Asia is the fastest growing region for the telemedicine market with India and China leading the growth.

There are no clear numbers, though, on the current size of the telemedicine market in India. Murali Rao, associate vice president for health care at the New Delhi–based research and consultancy firm Technopak Advisors, estimates the current size of the Indian telemedicine market to be around US$7.5 million. "This is expected to grow at a [compound annual growth rate] of 20% over the next five years," he says. That would take it to around US$18.7 million by 2017. Mehta of PwC on the other hand notes: "Studies indicate that the size of India's

telemedicine market is expected to be US$500 million by 2015." (This is a nascent area and estimates vary widely.)

Key Players in the Telemedicine Ecosystem

- Ministry of Health,
- Government of India (GoI)
- Department of Information Technology, GoI
- State Government, which manages hospitals in district and remote places
- Satellite bandwidth provider – ISRO
- Medical Education provider – AIIMS, SGPGI,
- Medical Colleges across India
- Healthcare providers - Apollo Hospitals, AIIMS, Asian Heart Foundation, Narayana Hridyalaya , Amrita Institute of Medical Sciences, District hospitals
- Telemedicine software provider – C-DAC, Televital, Apollo Telemedicine Networking Foundation
- Medical equipment providers – Wipro GE Healthcare, Siemens, Philips
- Telecommunications equipment providers – VTEL, Cisco, Ericson
- Videoconferencing equipment provider – Polycom, SONY

Latest GOI Initiative: E-way to health: Govt. bets big on telemedicine

Skype, biometrics, M-health (use of mobile phones) and E-health are all set to make an entry into India's primary health centers (PHCs) and sub-centers as the health ministry plans to go hi-tech.

The steering committee on health said that in the 12th plan (2012-17), all district hospitals would be linked to leading tertiary care centres through telemedicine, Skype and similar audio visual media. M-health will be used to speed up transmission of data.

India will also put in place a Citizen Health Information System (CHIS) - a biometric based health information system which will constantly update health record of every citizen-family. The system will incorporate registration of births, deaths and cause of death. Maternal and infant death reviews, nutrition surveillance, particularly among under-six children and women, service delivery in the public health system, hospital information service besides improving access of public to their own health information and medical records would be the primary function of the CHIS.

Case study: Apollo Hospitals and Aravind Eye Care leading the way in telemedicine

Apollo Telemedicine Network Foundation (ATNF): ATNF, part of Apollo Hospitals, offers customized telemedicine support for primary, secondary and tertiary healthcare. ATNF set up its first telemedicine center in center in Aragonda, Andhra Pradesh, in 1999, and since its inception, it has established nearly 150 telemedicine centers in India and a few selected Asian countries. ATNF offers a broad range of telemedicine services such as tele-radiology, tele-pathology, remote ICU monitoring, ambulance monitoring and EHRs. Furthermore, ATNF has developed its own web-enabled telemedicine application called Medintegra WEB, which enables doctors,

nursing homes and hospitals to collect vital health data of patients living in inaccessible areas and converts this data into a secure EMR.

Aravind's tele-ophthalmology network: Aravind Eye Care Hospital has set up a tele-ophthalmology network that diagnoses ophthalmic diseases by viewing still images. Aravind's eye clinic provides basic tools for diagnosis as well as advanced satellite-linked telemedicine trucks that travel regularly to remote locations, perform eye exams, teach eye care and telemedicine trucks, doctors at Aravind's hospitals participate in taking decisions and making diagnoses when required. At the tertiary level, medical specialists at Aravind provide medical consultations to patients examined at different hospitals.

Key Players:

Medisoft Telemedicine Pvt. Ltd.(Ahmedabad, Gujarat)

Is a research based development company established with the objective of improving health care delivery by setting the highest standards in the field of public health with the help of telemedicine and ehealth. Medisoft Telemedicine is established in year of 2001 in India. Medisoft is the fastest growing company in telemedicine / ehealth field and is poised to achieve even greater heights cross the globe. Our goal is to provide accessibility of medical practitioners to the remotest regions through state of the art technologies with optimal economical outcomes.

Clientele in India:

- Gujarat Cancer & Research Institute
- Wockhardt Hospitals
- Nanavati Hospital
- Rotary Club Telemedicine Project
- Institute of Preventive Cardiology Heart Care Centre
- International Centre for Cardio Thoracic and Vascular Diseases (A unit of Frontier Lifeline Pvt. Ltd.)
- Dr. Jivraj Mehta Hospital
- Health Seva Telemedicine Project
- Socio Economics & Education Development Society (SEEDS)

Services:

- Software Development: Packaged and Customized software and product development in healthcare sector.
- Web Conferencing: Medisoft web conferencing where you can broadcast your webcam, share your desktop, show slides, websites, chat & talk.
  USP – Absolutely no download required for presenter & attendees; 100 percent web based solution & 0 percent complication
- E Healthopinion: Via e Healthopinion we try to provide innovative way to connect patient with doctor and referring doctor with expert doctor.
  www.ehealthopinion.com is classic web 2.0 application
- Mhealth: use of mobile devices in health solutions

Apollo Telemedicine Networking Foundation (ATNF)

Is a not-for-profit organization, is a part of the Apollo Hospitals Group. It is credited with being the first to setup a Rural Telemedicine centre in 1999 in Aragonda (in Andhra Pradesh). Today, ATNF has emerged as India's single largest turnkey provider in the area of Telemedicine with over 125 peripheral centers including 10 overseas.

More than 71,000 teleconsultations in 25 different disciplines have been provided Patients have been evaluated from distances ranging from 200 to 7500 km. Commissioning the world's first VSAT enabled, modern secondary care hospital in a village, at Aragonda, Andhra Pradesh, India on 24th March 2000, Bill Clinton, the then president of the USA, said

Apollo Hospitals, Asia's largest health care provider, and Cisco form an alliance to help transform health care through information and communications technology (ICT

Desktop Telemedicine:
ATNF is initiating a new concept in Telemedicine namely facilitating Telemedicine consultations wherever the consultant is. With this solution, consultants need not come to the Telemedicine room but will be connected to wherever they are, through the Internet, from any PC, where dedicated software is available. This consultant friendly move, is expected to considerably increase the availability of consultants for teleconsultations. Simultaneously, it has become cost effective and relatively simple to setup new Telemedicine "Units" worldwide. This includes many convenient locations including homes.

The Telemedicine enabled Electronic Medical Record in addition to storing history, clinical findings investigations, operation notes, medications; follow-up notes etc. will allow digital manipulation of images. Every patient using the system will have a unique ID number and hence records of multiple visits can be easily retrieved. Using this system one can keep track of all patients, who have had teleconsultation.

Virtual Healthcare @ Home
Through this innovative solution, a patient can have a teleconsultation with a specialist, from the comfort of his own home. A Telemedicine kit is taken to the patient's house by a member of the Telemedicine Department and connectivity established. In addition to videoconferencing, the system enables review of all records. Peripheral medical devices from the patients end can be connected enabling the teleconsultant to check the patients' BP pulse rate, temperature and to listen to heart and respiratory sounds. If necessary even a 12 lead ECG can be taken at a patient's home and evaluated by the consultant.

Pre Hospital Management:
It is proposed to provide telemonitoring and teleadvice as part of pre hospital management on board a moving ambulance/mobile medical unit.

American Heartcare Limited (AHL)

Is a one source company catering to different needs for telemedicine and information technology with technology at its best. Asia's leading telemedicine company, representing following companies from around the world for revolutionary products and services.

AHL business activities focus on the following areas

- Telemedicine - Project selling on Turn Key basis for Transtelephonic Cardiac Monitoring System - Cardiostation and Cardiac monitors to hospitals, nursing homes and clinics. Providing LIVE facilities to Doctors to discuss medical case over Video Conference through V-Sat or ISDN lines by exchanging the diagnostic quality medical data which can contain X-Ray, MR imaging, CT Scan, Ultra Sound, Pathology Slides, Live Presentations and conducting CME's (Continuing Medical Education) and connecting them with our network of specialized Doctors and hospitals in India, Europe and USA making best use of technology for Telemedicine.
- Video Conference - To be used specially by Hospital and Nursing Homes for diagnosing, LIVE consulting and networking with different Doctors in India, Europe and USA. Also sale of Video Conference equipment to general clients - Corporate Houses, Government Sector, Business Establishments, Schools, Universities and Hotels. AHL is creating an ever increasing network of eminent Doctors and Hospitals around the World for treatment and consulting via Video Conference.
- Software Development - Although specialization will be in the medical field for Hospitals, Nursing Homes and Doctors AHL is in a position to service customers in a wide variety of industries including marketing, legal, education, investor relations, training, financial, hospitality and hotels and telecommunications. They provide expertise for software development and customization for the specific needs of client. .
- Networking Solutions – With expertise in the field of Networking Technologies they deliver the most comprehensive and complete infrastructure and solutions for all kinds of networking requirements.

Centre for Development of Advanced Computing (C-DAC)

Is the premier R&D organization of the Department of Electronics and Information Technology (DeitY), Ministry of Communications & Information Technology (MCIT) for carrying out R&D in IT, Electronics and associated areas.

C-DAC has been working in the area of Health Informatics since early 90's. It has developed several solutions till date in this area. C-DAC has the ability to deliver appropriate solutions to address a wide spectrum of the country's current and future Health Informatics needs.

C-DAC's Current Activities in Health Informatics

C-DAC is carrying out the following activities in Health Informatics at its various centres:

- Deployment of Telemedicine services in various states of India
- Development of Medical Standard Libraries (DICOM & HL7)

- Support activity for on-going telemedicine projects
- Tele Health and Medical Education project Kerala
- Web based Image processing and Telemedicine system for Cancer Institute, Adyar, Chennai
- Data Management System for Oncology
- Rural Telemedicine for Primary Health Centres
- Low cost Mobile Telemedicine facility
- ICT Based Distance Education Facility for Special Educators and other Rehabilitation Professionals
- Medical Endoscopic Camera PoC
- Motor Wheelchair for physically handicapped
- Development and Implementation of TeleOphthalmology Application for the state of Punjab
- Development of eSanjeevani
- Development of the Software Development Kit For Biomedical Equipments
- Identifying Low cost equipment
- Cephalometry

C-DAC Products in Health Informatics

The products developed by C-DAC are:

- E-Sushrut – a Hospital Information Management System (HMIS)
- Mercury – Comprehensive EHR/EMR and Telemedicine Solution
- SDK for DICOM – Software Development Kit for DICOM PS3.0-2004
- SDK for HL7 – Software Development Kit for HL7 v2.5
- Sanjeevani – a Telemedicine Solution
- Tejas – a software suite for Oncology
- Ayusoft – a Decision Support System for Ayurveda
- e-Chavi – a Picture Archival Communication System (PACS)
- Digital Programmable Hearing Aid

Initiatives by Department of Information Technology

The DIT, Ministry of Communication & IT had initiated some successful pilot projects to build framework for telemedicine and health IT. Further, most of the telemedicine platforms both in public and private health sector in the country have been launched by ISRO and DIT. Some of the selected projects by DIT are as follows:

- Development and application of tele-radiology-West Bengal
- Diagnosis and monitoring of tropical diseases-West Bengal
- General Telemedicine system-various states
- Standardization activities in e-health/Telemedicine
- Prepared an outline for IT-infrastructure for health
- Design and Development of Electronic Portal Imaging Device (EPID) for radiation therapy by CSIO, Chandigarh and TSG, Integration, New Delhi.

• Design and Development of Multileaf Collimator (MLC) for use in Medical Linear Accelerator machine
• Deployment of indigenously developed 6 MeV medical linac for cancer treatment – Jai Vigyan Phase II

Build Up by the Ministry of Health and Family Welfare

The Ministry of Health and Family Welfare has taken keen interest after some of the major Telemedicine projects were initiated by DIT and ISRO. A taskforce for Telemedicine in India by the Union Ministry of Health and Family Welfare has been constituted in 2005 for the implementation of Telemedicine projects. This taskforce includes members from the concerned ministries; technical agencies like; ICMR, ISRO and MCI; academic medical institutions and corporate hospitals practicing telemedicine actively. One of the motives of the taskforce is to draft a national policy on "Telemedicine and Telemedical education" and to prepare a central scheme for the 11th five year plan. The ministry is working towards a defined framework for interoperability and scalability in today's health scenario.

Furthermore, the Ministry of Health and Family Welfare had suggested a National Health Portal proposal at the International Conference on Medical Electronics in June, 2011, which has been approved by the Finance Ministry. The portal could be an interoperable network, with all the information regarding health care.

Opportunities for IT in health care

Emerging IT trends in the Indian health care industry have taken a different form. IT addresses the three key factors of accessibility, affordability and inadequate domain knowledge. New technologies in health care management systems consist of electronic data storage, data maintenance and exchange.
Technological processes, when implemented, make the health care management process more effective. The technology-driven health care model of the future is likely to undergo a paradigm shift from the symptomatic to the predictive.
The role of IT in health care in the development of proactive wellness software has gained similar traction in the sphere of bio surveillance, which helps in detecting early signs of the epidemic by delving into real-time data and identifying patterns of any imminent epidemic risk. Initiatives today are focused on digital health records, telemedicine and the mobile delivery of health care information.
Another growing trend is "patient-centric," which includes social networking, wellness and information transparency, which enables the comparison of prices and the quality of medical providers.
There are several technologies that are triggering change in the Indian health care industry:
Digital health records
Electronic medical records (EMRs)
EMRs allow individual patient records to be stored and managed electronically, thus considerably reducing the time, money and space that gets invested in maintaining patient records in the form of paper. The major advantage of data management through this method is that data can be easily transferred between locations on the same network. Therefore, if the

patient is unable to visit a previously attended location for treatment, any other location nearby can instead be visited; as the patient's medical history can be accessed there.

Personal health records (PHRs)

PHRs are a part of the patient-centric trend; where patients participate more actively in the health care process. However, PHRs, together with other digital health records that predate those— EMRs that are used within a single medical provider and electronic health records (EHRs) that can be shared among multiple providers — serve beyond the information repository function. They are also used as monitoring tools, which can trigger alerts to patients, families or providers. The data in these records is mined to evaluate the performance of medical practices. PHRs are expected to play pivotal role in simplified billing, decision support and comparative effectiveness research, which aims to determine the most effective treatments at a given cost for a given condition. PHR platforms such as Google Health and Microsoft Health Vault allow members to access and store personal health information online.

e- Prescription
Another emerging technology in health care is the concept of e-Prescription, wherein prescribers (doctors) can send their prescription through a computer network to a medical store. This eliminates the need for patients to carry their prescriptions to the medical store. This helps avoid errors that can occur due to various reasons such as ambiguity in the prescription due to illegible handwriting.

The privatization of medical insurance will become a major driver of HIT adoption in the future, which will create a big push for comprehensive patient information and consequently the use of HIT. Information technology professionals, necessary hardware and software, and the emerging technology of grid computing have enabled India to afford terrestrial telecommunication network and infrastructure. The tele-linking of all health centers and augmenting them with latest and robust infrastructure comprising ECG, EMG , patient monitoring, imaging facilities etc. will create enough demand for entire chain of Health IT Players.

Looking at the brighter side, in India many Telemedicine programs have been actively supported by Department of Information Technology, ISRO, Apollo Hospitals, Asia Heart Foundation, State Governments and NEC Telemedicine program for North-Eastern states.

Current Exemplars

Private Sector
• The private sector has seen the entry of established HIT vendors like GE and Siemens, and homegrown vendors have begun implementing IT solutions in private healthcare facilities such as Wockhardt Hospitals, a tertiary care hospital group throughout India.

• The Apollo Hospitals group, the leading private hospital group in India, plans to integrate all its systems across 42 hospitals with a common platform. It is introducing HIPAA standards across all its EMR implementations and has a core IT team of 30 people and a growing IT budget that makes up about 4.5% of its operational budget

Government

• The central government has announced projects to build a national disease surveillance system called the Integrated Disease Surveillance Project (IDSP) sponsored by the World Bank, making it the largest such project in the nation. Two of the authors (SK, VK) directed the design of an informatics engine behind a shortlisted proposal for IDSP.

• The Indian Space Research Organization (ISRO) has taken the initiative to establish telemedicine centers across India.
(http://pacifichealthsummit.org/downloads/HITCaseStudies/Economy/IndiaHIT.pdf)

HMRI Model:

It leverages information and communication technologies as well as public-private partnerships to provide the highest quality care at the lowest cost to the greatest number of people. Its solution can be broken into three programs:

Health Information Helpline provides medical advice 24×7
Mobile Health Services provides screening and follow up services for maternal and child health and chronic disease conditions
Telemedicine connects remote patients with urban doctors to deliver specialist care HMRI's pioneering health technologies maximize operational efficiency, eliminate human error and cut costs. HMRI's latest technology, Dox-in-Box®, supports our telemedicine offering.

Dox-in-Box®
HMRI designed Dox-in-Box® specifically for remote areas with difficult terrain. Integrated with HMRI software, Dox-in-Box® digitally captures, stores and transmits eight vital signs. It emphasizes general physician functionality and is easy to use. This reduces the need for highly skilled health workers where they are scarce. By virtually connecting doctor and patient, Dox-in-Box® bridges gaps in distance and time. HMRI will use Dox-in-Box® extensively through a diabetes management program in Assam.

eSwasthya
It uses a microfranchise model to deliver the services of a doctor to the doorsteps of rural populations. Female health workers rigorously trained in healthcare, technology and business invest in setting up a clinic from their homes. When patients visit with a complaint, the health worker uses mobile phone technology to connect to centrally-located paramedics and doctors who triage the call, identify illnesses and recommend treatment. Patients pay a nominal fee. eSwasthya has 51 centers and has treated 45,000 patients across three districts in Rajasthan. Piramal Healthcare Ltd. launched eSwasthya in 2008. The program was integrated into HMRI services in 2011.

Mobile Health Services: MHS tackles barriers rural people face accessing primary healthcare. It HMRI deploys mobile health units – vans equipped with technology, medical devices, medicine and health workers – to villages that the public health system does not serve.

Mobile Health Services aims to extend the services of the public health system by using public health resources, where possible, to screen, refer, mobilize and follow up with all people at risk for chronic diseases and chronic diseases and those requiring maternal and child health services. This helps to redirect patient flow and quality at public health facilities. Mobile Health Services creates and fortifies linkages among the public health system.

HMRI has run two fleets of mobile health units in partnership with state governments:

Sanjeevani in Assam (February 2011 – present)
104 Mobile in Andhra Pradesh (August 2008 – December 2010) (After successfully establishing operations, HMRI transitioned 104 Mobile to district administration.)

Together these programs have provided services to 12 million people across 25,000 service points.

HMRI's Telemedicine Services©: Services brings much needed specialist healthcare to remote areas where there are few, if any, healthcare workers. We focus on both the beneficiary and the doctor – delivering the most accessible and affordable care by providing high quality specialists with the medical data they need in settings that make both beneficiary and doctor comfortable. We utilize medically-validated equipment and digitally interface with software for easy and accurate dataflow.

HMRI's telemedicine solution has the ability to serve all basic primary and secondary healthcare needs of the population.

HMRI has partnered with philanthropic organizations to run several telemedicine initiatives throughout Andhra Pradesh . These initiatives have reached 25,000 beneficiaries.

Asara©
In 2010, HMRI launched Asara© in partnership with MacArthur Foundation. Asara© works to decrease maternal mortality among tribal people in Araku Valley, Andhra Pradesh. Tribal Araku Valley has very little infrastructure, including poor road connectivity and a lack of electricity and running water. Most tribal families generate a meager average income of USD 23/month through agricultural activities. Education facilities are unavailable or inadequate, resulting in a 22.70% female literacy rate, compared to India's national average of 65.46%. . Moreover, the area's MMR is 800 and IMR is 150. These ratios are roughly three times India's national averages.

In order to decrease maternal mortality among tribal people in Araku Valley, Asara© trains traditional birth attendants , raises awareness, conducts village outreach using Dox-in-Box® and connects pregnant tribal women with an OB/GYN in Hyderabad through telemedicine services which are hosted at HMRI's Asara© Telehealth Centre. Asara© also provides for home-based neonatal care by training local ASHAs, traditional birth attendants and new mothers. Through 31 December 2011, Asara© has enabled nearly a 47% decrease in maternal mortality and a 59% decrease in neonatal mortality
(www.hmri.in)

M-HEALTH:

Mhealth (aka Mobile health) leverages mobile devices and information communication technology (ICT) to deliver health services and information exchange which can increase access, affordability, and quality of healthcare significantly.

One of the first major mHealth interventions was introduced by Apollo Hospitals, using telemedicine to make secondary and tertiary medical expertise available to rural and peri-urban India through an audiovisual enabled delivery system. As qualified doctors are scarce in these areas, telemedicine has filled an important need. From the year 2000 to 2009, over 57,000 tele-consultations were performed across various disciplines, from sexual health to neurology. Apollo is now offering 24/7 consultations for just Rs 45, the equivalent of $1, and has 71 telemedicine centers across India. Due to the success of the program, the Delhi government is looking to expand the program in the near future in a public private partnership.

This work has paved the way for other mHealth initiatives, but is far from serving the country of 1 billion.

mDhil – This Bangalore start-up provides healthcare information to the general Indian public mainly through text messaging, but increasingly through mobile web and digital content. With a paid subscriber list of over 250,000 users, mDhil is becoming somewhat of a WebMD for the Indian market.

Sana – Based out of MIT, Sana's team of students and volunteers creates open source mobile apps to guide community health workers on how to screen and diagnose patients and link that data to doctors through OpenMRS, the open source medical records system which is widely used in the developing world.

mPedigree – Started in Ghana and now also operating in India, mPedigree has created a mobile platform to track and check the validity of medicines in order to combat the rampant practice of drug counterfeiting.

E Healthpoints – Operating currently in Punjab, E Healthpoints is creating a network of modern clinics that offer telemedicine, clean water, diagnostics, and safe drugs to peri-urban Indians. They recently partnered with Proctor & Gamble to scale 2000 E Healthpoints across five north Indian states.

World Health Partners – This non-profit has created a multi-level service delivery network which leverages the latest in telemedicine and point-of-care diagnostic technology to improve access and quality of care to rural and peri-urban India. They are scaling from Uttar Pradesh to Bihar through funding from the Gates Foundation.

ZMQ Software Systems – This technology for development company has developed mobile games to combat HIV in India by trying to change adverse health behaviors. This fusion of digital entertainment, specifically games and health has massive growth potential to influence healthy behaviors and change adverse ones.

NETRA – Still in the research lab at MIT's Media Lab, NETRA (Near-Eye Tool for Refractive Assessment) combines an external eye piece with software loaded on a smart phone to measure refractive conditions (i.e. near/far sightedness and astigmatism) on site at an extremely reduced cost. Optometrists in the US pay up $8000 for a similar device, and which is always located in optometrists' office. This technology could be a game changer for rural India.

Along with the growth of mHealth entrepreneurship in India, groups like the mHealth Alliance, which is a partnership between the Rockefeller Foundation, United Nations Foundation, Vodafone Foundation, GSM Association, and PEPFAR, plan to spread the mHealth gospel by setting up an India branch, as well as lead specific projects related to maternal health that already in the planning stage. Health 2.0, which puts on conferences in the US around the latest IT-enabled health solutions has plans to come to India in the next year to start stoking the Indian mHealth flame. Mhealth India is gaining momentum.

(http://www.triplepundit.com/2010/11/mhealth-india-mobile-health/)

ACCENTURE IN HEALTH CARE:

1. Accenture Health administration services-payer
Service offering:
Health CRM (NA)
Medicaid management Information System (NA)

2. Accenture Health back off Services:
Service offering:
Revenue Cycle (NA)

3. Accenture connected health:
Helps client plan, design, implement and operates workflow solution that enable exchange of hospital information
Define new collaborative and virtual care solution that deliver improvements in health outcome, lower cost and improve quality.
Service offering:
Service transformation

4. Accenture health management service: help client design, build and run high performance

5. Accenture clinical services:
Service offering:
Medical imaging (non NA)

Competitors in Healthcare IT in India:

Several multinational companies like GE Healthcare, Siemens, McKesson, Microsoft, IBM, Computer Sciences Corporation (CSC), Perot Systems, TCS, HCL and Cognizant, to name a

few, have entered the services side of healthcare industry. Anthelio as a company is solely focused on the healthcare providers.

TCS in health care:

Tata Consultancy Services, a leading IT services, business solutions and outsourcing firm, has launched Provider Performance Insight, business intelligence (BI) solution built on SAP Business Objects software for hospitals and other healthcare providers.

TCS is a top company in the IT sector in India and the cloud computing service offered by them is called as ITaaS, following IaaS+SaaS type of clouding. TCS is offering ITaaS service to five different sectors namely professional services, education, healthcare, retail and manufacturing sector.
http://entrance-exam.net/top-cloud-computing-service-providers-in-india/#ixzz1sHKuHEaP

Hyderabad-based Razi Healthcare, which has 50 primary care hospitals across India, has adopted iON – a branded on-demand cloud computing offering from Tata Consultancy Services – to digitize patient-care profiles with electronic medical records (EMRs) for easy access and more accurate treatment

TCS offerings

CORE SOLUTIONS:

- System Integration & Application Support
- Application Development and maintenance
- Assurance and QA services
- Interoperability and Clinical infrastructure Solutions
- Clinical Intelligence
- Web based Solutions
- Portals
- Mail-order prescription fulfillment
- Specialty Pharma fulfillment

ADAPTIVE SOLUTIONS:

- RFID Systems, Bar Coding Solutions
- HMS, EMR, CPOE
- Fraud and Abuse Alert Solutions
- Mobility EMR Solutions
- Quality Monitoring Dashboards
- Revenue Assurance & Management
- Triage and Care Plan Solutions

Sample Customers:

Payers & PBM	Providers	IT / Product Vendors
Cigna Kaiser Permanente BCBS Humana	NHS (UK) Mt. Sinai Hospital **Multiple Hospitals in India**	GE Healthcare, IDX Misys Healthcare QuadraM

(TCS Healthcare Presentation, Presented at Nashville India Virtual Trade Mission May 7, 2009)

TCS for Tamil Nadu: The Tamil Nadu Government has allotted Rs 5 crore to Tata Consultancy Services (TCS) to develop a suitable solution to maintain electronic medical records (EMR). The system will start functioning in all the 26 district headquarters hospitals, 162 taluka hospitals and 77 non-taluka hospitals and some of the Primary Health Centers (PHCs) managed by the Government(O'Buyonge and ChenLeida). This application created by TCS is web-based; wherein each patient will be allotted a unique ID. All related data will be fed into the system. The system, being centralized, can be accessed from anywhere, making the clinical history of the patients handily available. ICT is employed in medical college hospitals in Tamil Nadu to manage in-patient and out-patient details, medical records, office automation, and lab and Pharmacy services. Such electronic dataflow lends accuracy. Tamil Nadu State AIDS Control Society (TNSACS) has successful web based management information to cover 1100 VCTC, Blood bank, ART centers, STD clinics, ANC, NGOs. Number of HIV+ cases, age sex breakup, ART stock, VCTC kits stock is monitored by Chennai head office. Data privacy, authentification (Lele, 2008) is used for aids. Final decrease in aids prevalence in Tamilnadu speaks about success of e-governance and ICT applications.

WIPRO:

Healthcare is a very strategic industry segment for Wipro. Wipro has a comprehensive presence in the Healthcare Industry across payers, providers, healthcare distribution, healthcare services, e-health and government-funded programs. Consistently ranked in the Healthcare Informatics Top 100, Wipro has been rated as one of the "Fastest Growing HIT business" by them. Wipro helps its customers to do business better by transformation through innovation.

Some of its focus areas include:
- HIPAA 5010/ICD-10
- Legacy system modernization
- Remote health monitoring
- E-health initiatives
- Payer CRM initiatives
- Health insurance exchanges
- Health information exchanges

Wipro Services in Indian healthcare:

Customized Clinic Management Software Solution developed by Wipro Healthcare IT Limited in The Apollo Clinic.

Wipro brings the innovative "Pay per Use" model for the small hospital and nursing home community where traditionally investing heavily in buying hardware software and maintenance was a deterrent towards IT automation. The traditional model not only required a substantial commitment of financial resources, it also needed manpower, space, power and air-conditioning. In the "pay per use" model the hospitals have to pay just a monthly user based subscription fee and hence even very small hospitals with few users can use the service which aims at addressing the challenges faced by the healthcare provider community. The system will help doctors maintain patient data efficiently, provide better care and diagnosis to their patients, reduce patient waiting time by managing the services and billing processes better. It also drives profitability in the hospitals through strong MIS and business intelligence and provides integration among all departments of the hospital.

Wipro for Delhi Municipal Corporation (DMC): Wipro provided Hospital Information System (HIS) to six hospitals of DMC. This HIS has 28 modules meeting the hospital needs, like Patient registration, demographic details, outpatient visits, doctors' appointment scheduling, Admission/ Discharge/ Transfer, Order Entry, Laboratory/ Radiology/ Cardiology Result Reporting, Operation Theatre Management and Pharmacy etc. Automating these functions has helped DMC in handling large numbers of patients and helps them in providing better patient care. An Electronic Patient Folder with details of each visit would be available at all of these locations once the implementation is done at all six hospitals. This will enable the doctors to have ready access to past episodes and information of the patient, thus ensuring efficient patient care.

Wipro Infotech, the India, Middle East and Africa, IT Business unit of Wipro Ltd and a leading provider of IT and business transformation services, successfully implemented the Employees' State Insurance Corporation's (ESIC) Project Panchdeep, a unique healthcare administration program aimed at automating healthcare services to over 6 crore beneficiaries spread across the country

WIPRO'S SOLUTION

ESIC decided to automate the entire process to ensure medical services reach the intended beneficiaries. Titled Project Panchdeep, ESIC invited bids on a Built-Own-Operate-Transfer (BOOT) model through a global tender. After a detailed scrutiny of all tenders, ESIC awarded the six-and-half-year project worth INR 118.2 million to Wipro in March 2009.

Project Panchdeep is divided into five important components namely, Pehchan Milap, Pashan, Dhanwantri and Pragati.

Project Pehchan comprises all services related to identification, authentication and verification of Insured Persons (IPs). The objective is to provide a pair of smart cards to all IPs – one for the IP and another for his family members. With this Pehchan card, an IP or his family members can step into any ESIC facility across the country and avail medical facilities. The Pehchan card will have the photographs of all the family members along with their biometric details stored in the central database. Wipro was expected to rollout around 20 million Pehchan cards under this project

21st Century's Health NET in Goa: The Government of Goa in association with 21st Century Health Management Solutions implemented a Rs-2.5-crore Hospital Management Information

System (HMIS) called Health NET in Goa Medical College (GMC) Hospital. The objective is to improve the availability and quality of healthcare delivery process and give Goa a fully computerized healthcare system by providing good quality healthcare services to all segments of society, especially the poor in remote locations. It includes Patient Management Systems, Hospital Management Systems, the Laboratory Management System, Blood Bank Management System, the Advanced Imaging System Library and Academic Section Management System, and Management Information System

Intel's World Ahead: The World Ahead Programme is an initiative launched by Intel to provide education and healthcare service in India. In the healthcare sector, Intel has carried out tele-health projects in Baramati, Maharashtra and Trivandrum, Tamil Nadu, and child health monitoring in Chandni Chowk, Delhi. Rui hospital connected with Aurobindo Eye hospital Madurai and Narayan Hrudayalaya Bangalore for getting tele-health service for Heart and eye patients. Later a Trivandrum hospital acquiring clinical support from Shankar netryalaya Chennai has become possible by ICT. Intel also provided a school health monitoring system, developed by TCS, in St Philomena Girls' Higher Secondary School, Trivandrum .The Web-based solution introduces schoolchildren and faculty to benefits such as digitalized health records and health camps with participatory and action-based health learning. The child health monitoring system in Chandani chowk in NewDelhi for poor needy urban children, to check for under nutrition as per WHO guideline. Intel has experience in ICT application in Health sector in Mexico, Brazil, China and South Africa.

HP in Maharashtra: In January 2007 with 100 Cr. funding automation project of 19 Govt. hospital and 14 medical colleges started. HP healthcare solution and Amrita Technology worked together for system integration and doctor's training. HP services used at JJ hospital (Grant Medical College), where the registration desk deals with 5 lakh OPD patient and 30 thousand in-patients annually. There has been remarkable change in patient experience towards e-healthcare and computerization

CMC LTD: India Healthcare Project in Andhra Pradesh: Hand held mobile computing devices like Personal Digital Assistants (PDAs) are being provided to Primary Health Centers (PHCs) and Auxiliary Nurses and Midwives (ANMs). While nursing or counseling the beneficiaries, the ANMs collect data using the PDA in the villages. At the PHC they transfer the data from PDA to the desktop. All data that is available on the desktops at various PHCs is transferred to the district level and State Health Commissioner's office using available network. Data compilation and report generation could now be done at the PHC level, district level and State level. Application of ICT at grass root level covering 459 ANM in 67 PHC in Nalgonda district of Andhra Pradesh.
(*Subash Chandra Mahapatra et al. / Current e-Governance Scenario in Healthcare sector of India)*

RELIGARE TECHNOLOGIES

It is a global Healthcare IT products and services company, has been closely following the developments in the Healthcare space and has been delivering provider specific IT products and solutions that enable them to deliver quality patient care while achieving quick RoI on their investments. RTECH's foray into HIT commenced with its acquisition of SRIT's Healthcare IT division. SRIT was a known name in the HIT space for its Magnum Suite of products that

encompassed enterprise class Hospital Information System (HIS) solutions to Medical Imaging Solutions (RIS & PACS) to Self Help Solutions (Patient Portal, Kiosk, etc.) that allow patients to interact and communicate with their healthcare providers.
Religare Technologies quickly consolidated the SRIT acquisition with a centralized leadership team and established new businesses and clients while not losing focus on existing customers. Clear focus and long term strategic direction backed by realistic goal setting ensured effective and successful transition

HCL:

HCL today has India's largest vertically integrated computer manufacturing facility with over three decades of electronic manufacturing experience & HCL desktops is the largest selling brand into the enterprise space. With India's largest ICT services network that reaches to every corner of India, HCL's award winning Support Services makes it the preferred choice of enterprise and consumers alike. HCL Infosystems has a 100% subsidiary that addresses the physical security technology system integration market. The subsidiary leverages technology to build a security framework called 'Safe State' that safe guard's life, infrastructure & society

Healthcare Offering @ HCL

HCL offer end-to-end turnkey solutions to our customers in the 'Healthcare' domain. Listed below are the areas on which we provide our services as a System Integrator.

- Hospital Management Information Software (HMIS) Application:
    - Design, Development & Customization of HMIS application as per approved SRS & BPR document.
    - Deployment of Integrated HIS with Data mining tool.
    - Data Migration/Porting from Existing/Legacy Application (HIS)
    - Support during Warranty
- Integration with HIS application
    - Picture Archival Communication System (PACS)
    - Telemedicine Solution
    - Digital Radiography System (D R System)
- Health Portal Creation for Internal and External Users
- Setting up of the Infrastructure
    - Data Centre Creation
    - Clients installations
- Networking and Security Solution
    - LAN Enablement
    - Wi-Fi
- Provide Comprehensive System Training and post-implementation support and maintenance of hardware/ software under the gambit of Facility Management

- PACS & Telemedicine
- HCL has designed & defined fully loaded Service Lines (FLSL) for healthcare firms, which focus on addressing the specific pain points of various segments of healthcare ecosystem.

    - Claims Transformation for Payers
    - Fraud Waste & Abuse Analytics
    - Integrated CRM Platform
    - Unified Development Platform for Clinical Services
    - Commercial Transformation for Pharma Firms
    - RWE Data Analytics

HCL Infosystems launches HCL O'zone- Cloud Enabled Services Suite to provide end-to-end solutions to its customers
HCL O'zone service offerings are customized to meet Business Automation requirements of Retail, SMB and Enterprise customers
HCL's new cloud infrastructure consists of reliable services delivered through modern data centers and high performance servers
Pioneers the next generation cloud framework with the joint launch of "Infrastructure as a Service (IaaS)" and "Software as a Service (SaaS)"
Launches HRMate - bilingual web based solution to cater the need of Human Resource and Payroll Department of any organization
To roll out India's first Healthcare Information Exchange Platform on the cloud Offers cloud-ready hardware

ANTHELIO:

Anthelio is the largest independent provider of information technology and business process services to hospitals, physician practice groups and other healthcare providers. Anthelio is a healthcare services company that has 'end-to-end' services expertise, including admission/registration, IT, medical records, EMR implementations, clinical transformation, coding, ICD- 9 & 10, transcription and revenue management services. Using its extensive clinical and operational expertise, combined with technology and business process re-engineering, Anthelio helps healthcare providers bend the cost curve while improving delivery of patient care, quality and operational efficiency.

Anthelio is exploring and is ready to pilot IT services in the Indian market. Anthelio as a company is solely focused on the healthcare providers. Currently they are talking to a few of the large and upcoming hospitals to test their appetite to implement sophisticated IT systems. As THEY get better at this they plan on introducing low cost simpler hospital management systems for the Indian market. (http://www.expresshealthcare.in/201204/itathealthcare03.shtml)

IBM:

IBM provides the technology, services, consulting and e-business experience you need to meet those demands and realise new opportunities in the ever-changing healthcare environment. A pioneer in healthcare information technology, IBM remains at the forefront of improving how healthcare organisations deliver efficient, high quality care. IBM, in combination with global network of business partners and strategic alliances, delivers powerful e-business technology and comprehensive services that help healthcare organisation achieve success.

IBM India offerings for Healthcare Enterprises

The following illustrative functional architecture depicts different components of Information Technology deployed by hospitals at various levels of maturity. These components are classified in the following layers:

- Infrastructure
- Middleware
- Patient Management
- Hospital ERP
- Clinical Management
- Performance Management

IBM provides solutions for all of these layers as described in this portal. The stage for deployment of Hospital IT solutions depends on various factors, such as maturity of market, competition, complexity of services provided by the hospital, and sophistication of the customer segment.

IBM has teamed up with the Apollo Hospital Group, a large hospital chain in India, to offer hosted software applications for mid-size hospitals in India. This is a largely untapped market in the country, and the market opportunity is at least $300 million over the next four to five years, said Mohammed H. Naseem, vice president for healthcare at IBM India, IBM will offer its hardware, middleware, and services infrastructure, while Apollo will offer its healthcare domain expertise, Naseem said. The applications will come from Apollo and independent software vendors (ISVs), he added. In the first phase, IBM is doing about 20 pilots across the country. These will not be hosted centrally, but will be implemented at customer sites.

PWC:

As–Is Assessment of health care services offered by government and related infrastructure. National & International Best Practice Study. Business Process Re-engineering (BPR) and designing the To-be Processes. Design of Solution Architecture. Change Management Strategy & Plan. Preparation of RFP for selection of Implementation agency for the proposed e-Health plan.

Definition of future business processes w.r.t. Retail Sales (Services including Laboratory, Clinical procedures, Pharmacy, Over the counter product sale, consultation, Supply chain management (domestic & international material sourcing), customer relationship management

(Loyalty management, campaigns and promotions, corporate schemes), Finance and accounts and related management & operational reporting Implement Microsoft Dynamics - Navision (including "LS retail" - retail vertical) to automate the future business processes. (Design, Configure, Test, Train, Deploy, Support, Enhance). Integrate Microsoft Dynamics - Navision with Clinical software application for seamless business process flows.

CSC (INDIA):

Location: Chennai
Solutions:

- End-to-end services across Assessment and Consulting, and Systems Integration
- Services across Applications, Infrastructure, ERP and Testing
- Electronic Medical Record – EMR
- Patient in your Pocket (PIYP)
- CSC Partner Solution - Medical Records Management
- Enterprise Content Management - FirstDoc® and FirstPoint®
- Enterprise Management from iSOFT includes:

Enterprise management, enterprise scheduling, medication management, patient management, clinical management, business management, pharmacy, laboratory, radiology, dietary, linen and laundry, billing and inventory, emergency, interoperability and operating theatre.

PRODUCT VENDORS:

GE Healthcare and Siemens Healthcare are the two leading companies in the hospital information systems market and together account for 24% of the total market. GE Healthcare is the market leader with 12.9% of the market share, followed by Siemens Healthcare and Cerner Corporation with 11.7% and 8.9% respectively. The GE centricity package of software is the most comprehensive and successful HIS product in the market. It caters to all segments of HIS and therefore avoids the problem of a lack of interoperability between various segments of hospital information systems

COMPANY	**Aarogya Infotech & Management Systems**
LOCATION	INDORE
PRODUCT	HIS/LIS/RIS/EMR/mini PACS System Requirement Specification Workflow Design and Resource Mapping Documentation Planning and Design Business Process Reengineering Accreditation and Certification (NABH/NABL/ISO15189) IT Systems Planning and Design (Network/Hardware/ Technology) Document Management and Digitization

TARGET VERTICAL	Mid size and large hospitals Small Hospitals Nursing Homes Medical Colleges and hospitals Government Hospitals Pathology Labs Diagnostic Centres Polyclinics Doctors/Clinics Blood Banks Retail Pharmacy Wellness Centres

COMPANY	**Acuity Information Systems Pvt Ltd**
LOCATION	New Delhi
PRODUCT	AcuVena™ —Blood Bank Software AcuMeda™ —Hospital Management Software

COMPANY	**AOSTA SOFTWARE TECHNOLO GIES INDIA Ltd**
LOCATION	Coimbatore
PRODUCT	Backbone Health Information Systems BackBone covers various Clinical, financial & Operational aspects • Support ICD - 10 CM ,ICD - 09 and CPT Codes • Equipped with Insurance Module • Electronic Medical Re cords - Basic • Flexible Scheduling • Interface with CIIMS ***USP:*** Patient-centric application integrated with the management INFORMATION

COMPANY	**MediIT Health Solutions (India) Pvt Lt d**
LOCATION	Mumbai
PRODUCT	• Motion® Computing Tablet PCs • Powering Mobile Point of Care and Improved Workflow

USP	To develop total automated Healthcare Delivery System i.e. : Simple, Effective and Proactive for the end-users

COMPANY	**Napier Healthcare Solutions**
LOCATION	
PRODUCT	Napier Hospital Information System (HIS) • Napier Telemedicine (TM) • Napier Laboratory Information Management System (LIMS) • Napier Picture Archiving & Communication System (PACS) • Napier Public Health Solutions (PH) • Napier Practice Management System (PMS) • Napier Electronic Medical Record (EMR) • Napier Specialty Care Management • Napier Mobile Solutions
ASSOCIATIONS	The relationships with IT majors such as IBM, INTEL, HP, Microsoft, Hitachi, Oracle and a few others have helped Napier in Positioning as a total solutions provider.
ACHIEVEMENTS	Winner of Frost and Sullivan Healthcare IT Application Company of Year 2011 Award • Winner of IBM Beacon 2011- Global Award for Innovation and Achievement in Healthcare IT • Winner of Frost and Sullivan Indian HIS (Hospital Information System) Company of Year 2010 Award • Key member of Intel World Ahead Alliance, a USD 1 billion initiative by Intel in health and education field • Napier Healthcare Solutions is ISO 9001:2008 and ISO27001:2005 certified • Napier Healthcare EMR is HIPAA compliant • Napier Hospital Information System is IBM HIF (Healthcare Integration Framework) validated

USP	***USP:*** One-stop solution provider of Healthcare IT Products catering to the complete continuum of care

COMPANY	**PCS Technology Lt d**
LOCATION	Mumbai
PRODUCT	PCS PRODOC GOLD – HIS attuned for mid-size segments • PCS LAB Plus - Suitable for standalone labs • PCS Link - Integration to medical equipment • PCS Web Link - Online web access to key users i.e. patient, doctor, senior management
ACHIEVEMENTS	Successful implementation of complete Oracle Based Hospital ERP at Sundaram Medical Foundation in a record time of 7 months • Implementation at prestigious institutions like Care Institute of Medical Sciences (Ahmadabad), Goenka Research Institute of Dental Sciences (Gandhinagar), Bhagwan Mahavir Cancer Hospital (Jaipur), Dr Mehta Hospital (Chennai), etc. • Successful integration with SAGE ACCPAC, SAP B.1, TALLY and other Financial Accounting Modules with necessary customization • 3 year contract for Maintenance & handling support of Hospital Management Information System(HMIS) software & drug & equipment management system software in state government hospitals from the government of West Bengal
USP	Unmatched Service: Only HIS provider to give one year resident engineer support, after go live, at no extra cost!

COMPANY	**SAI INFOSYSTEM (INDIA) LTD**
LOCATION	Ahmadabad
PRODUCT	Turnkey solutions: Hospital Management and Information System

	Telemedicine Modules Covered — Electronic Medical record (EMR) — Tele-Cardiology — Tele-Radiology — Tele-Pathology — Tele-Ophthalmology — Tele-Dermatology — Tele-ENT VFONE - Video Phone
ACHIEVEMENTS	Largest Total Solution Provider - DQ Award • Best System Integrator – GESIA • Best Emerging Convergence Company Award – CMAI • Excellence in Providing Total Solutions – CMAI • Gold OEM Hardware Partner - Microsoft
USP	***USP:*** Convergent solution, Total solution Provider

COMPANY	**Akhil Systems Pvt. ltd**
LOCATION	
PRODUCT	HIS,EMR,LIS,RIS,PACS.PIS
Associates:	Microsoft (Healthcare ISV Partners) Inter Systems Intel Soflab Systems Pvt. Ltd. IBM TSG Integrations HCL Infosystems Ltd. IT Pro**.**

CLIENTS	• Apollo Group • Sri Balaji Action Medical Institute, New Delhi • S.K. Soni Hospital & Institute of Medical Sciences, Jaipur • Aashlok Hospital, New Delhi • Yashoda Hospital , Ghaziabad • Vinayak Hospital, New Delhi • City Hospital, New Delhi • Privat Hospital, New Delhi • Teerthanker Mahaveer Hospital & Research Centre, Moradabad, U.P. • Regency Hospital, Kanpur, U.P. • Tarni Cancer Hospital, Alwar, Rajasthan • Bhagwan Mahavir Cancer Hospital , Jaipur • Jaipur Golden Hospital, New Delhi • Narinder Mohan Hospital & Heart Institute • Paras Hospitals, Gurgaon • Tirath Ram Shah Charitable Hospital, New Delhi • Shri Moolchand Kharati Ram Hospital Super-Specialty Hospitals • Pushpawati Singhania Research Institute for Liver, Renal, New Delhi • Magadh Heart Hospital, Patna, Bihar

COMPANY	**Birlamedisoft Pvt. Ltd**
PRODUCT	Super speciality hospital management Hospital management Laboratory Management X-ray and Sonography management Diagnostic centre management Pharmacy Management

Healthcare IT solutions	•Healthcare Software Solutions •Healthcare Planning & Consultancy services •Hospital , Laboratory, Blood Banks commissioning services •Project & feasibility report on Hospital commissioning •NABH & ISO Accreditation of Hospitals •NABL & ISO Accreditation of Laboratories & Diagnostics centres •Medical Instrument Supplies •Complete turnkey project preparations for Hospitals, Blood Banks, Laboratories, Diagnostic centres
Partnership and Alliances	HCL Biocon Trivitron Trans Asia Ranbaxy laboratories Intercol
Clients	City hospital, Jaipur Alam hospital, Ranchi Sunflag hospital,Fariabad IT Hospital, Mysore Punjab kesari ,Charitable Trust, Mumbai Dr.Lal Path labs ,Gurgaon MediPathlab,Hyderabad Pyramid group lab, Mumbai Jankalyan blood bank, Nasik Hitech blood bank, Mumbai

Table 1.5 COMPETITORS ANALYSIS A.

	Cnsulting	product development	Customization of Product	Implementation	Support	Cloud Computing
TCS	NO	YES	YES	YES	YES	YES
WIPRO	NO	YES	YES	YES	YES	YES
21st Century	NO	YES	YES	YES	YES	No
Intel	NO	NO	NO	YES	YES	No
HP	NO	NO	NO	YES	YES	No
Religare technologies	NO	YES	YES	YES	YES	No
HCL	NO	YES	YES	YES	YES	No
IBM	YES	NO	YES	YES	YES	No
CSC	YES	NO	YES	YES	YES	No
PWC	YES	NO	YES	YES	NO	No
Dell	YES	YES	YES	YES	YES	YES
% of companies providing	36%	55%	82%	100%	91%	18%

Table 1.6 COMPETITORS ANALYSIS B:

States	Govt Healthcare IT Projects	Cost of the Project	IT Companies	Services	
Tamil Nadu	To develop a suitable solution to maintain (EMR) 26 District hospitals 162 Taluka Hospitals 77 Non taluka hospitals	5 crore	TCS	• Manage in-patient and out-patient details • Medical records • Office automation • Lab and • Pharmacy services	
Delhi (MCD)	HIS in 6 hospitals of		Wipro	28 modules: Patient	

	MCD			registration,demographic details outpatient visits, doctors' appointment scheduling, Admission/ Discharge/ Transfer, Order Entry, Laboratory/ Radiology/ Cardiology Result Reporting, Operation Theatre Management and Pharmacy	
Goa	Hospital Management Information System (HMIS) called Health NET in Goa Medical College (GMC) Hospital	2.5 crore	21st Century Health Management Solutions	• PatientManagementSystems • Hospital Management Systems • Laboratory Management System • Blood Bank Management System • Advanced Imaging System Library and Academic Section Management System • Management Information System	
Maharashtra	19 Govt. hospital and 14 medical colleges	100 crore	HP		
AP	Application of ICT at grass root level covering 459 ANM in 67 PHC in Nalgonda district of Andhra Pradesh.		CMC	Hand held mobile computing devices like Personal Digital Assistants (PDAs)	

Healthhiway:

HealthHiway is an industry initiative towards building a National Health Data Network. "HealthHiway", a joint venture between Apollo and IBM India. It is a cloud-based Health Information Network which hosts value add applications and enables seamless exchange of information between patient, doctors, hospitals and Insurance companies.

HealthHiway provides service infrastructure for Healthcare Providers, Physicians, Practitioners and Clinics to facilitate better collaboration within the healthcare ecosystem and collate patient data on a unified platform as a step towards building the Health Data Network. HealthHiway provides a diverse set of software solutions for the healthcare segment on an Easy to Deploy, Easy to Use and Easy to pay system. HealthHiway's dynamic solutions built on Software- as -a-Service (SaaS) Model offers healthcare global best in class software solutions on a hosted platform that saves on all the attached costs of developing solutions by an individual provider. As an industry initiative, HealthHiway is working closely with leading players from the healthcare industry (Apollo, Greylock) to develop standard based solutions that will ensure and enable continued growth of the industry. An Industry advisory board has been formed to provide guiding strategy ensuring that the solutions are in line with Global standards and best practices. The Board comprises of key industry leaders across the Healthcare Industry, Insurance and Technology companies.

HealthHiway offers solutions for Hospitals, Insurance and TPAs, Clinicians and Physician & Practitioners segment. The range of solutions includes ClaimsConnectTM (Electronic Claims Management), ClinicConnectTM (Practice management & patient Administration Solution) ImageConnectTM (Teleradiology and PACS solution). More products like HIS, Learning Management etc are in the pipeline. HealthHiway currently has a network of over 250 hospitals and will also connect over 1000 clinics and Physician practices over the next few months

UPCOMING TECHNOLOGIES IN HEALTHCARE IN INDIA:

Real-time locating system

Apollo Hospitals Chennai, India's largest health-care facility, is employing an Icegein Real-time locating system (RTLS/RFID) called "Patient Mantra" to move 250 patients a day through a series of up to 26 diagnostic procedures. Apollo Hospitals is interested in minimizing delays associated with moving patients from one check point to other. In the department-centric world of hospital management, however, one department's needs are not necessarily compatible with another department's priorities. A patient's length of stay depends on effective patient tracking software and Orchestration of their resource plan of care. Length of stay, in turn, has a direct bearing on capacity management and, ultimately, hospital costs and revenues.
ICEGEIN's scalable Patient Tracking solution "Patient Mantra" helps in automating above said systems and also in resolving the current bottlenecks.

(http://www.icegen.net/testimonials.htm)

Cloud Computing in Hospitals:

Fortis is setting up its own private cloud in collaboration with group company Religare Technova and HCL Infosystems

The Fortis private cloud offers the following services

- Infrastructure as a Service: A robust data center provides virtualized hardware and connectivity for all Fortis locations with full disaster recovery and back-up infrastructure. This service provides end users the hardware as per their requirements without them having to own, store, or maintain hardware.
- Platform as a Service: This service enables Fortis IT and Fortis software vendors to develop, maintain, deploy, and deliver software applications for various Fortis functions. Software development teams can use the cloud to develop applications using the platform provided, deploy self-created applications and finally publish these applications for use of business users in their respective organizations. The main business platform 'Cache' and middleware platform 'Ensemble' are hosted on the cloud.
- Software as a Service: A cloud can host applications for various business purposes and domains. An application is hosted as a service and provided to customers across the internet/intranet. As part of the cloud, Fortis has centralized its Hospital Information System-Trakcare from InterSystems-and created a central analytics and MIS platform. There are plans to host additional applications like the corporate HR system on the cloud as well.

Cloud Benefits Fortis

The cloud phenomenon has proved beneficial for Fortis Healthcare in various ways:

- Patients are provided a unique identification number which enables Fortis hospitals across geographies to access patient data. No longer does a patient need to carry his/her medical records while moving from one Fortis hospital to another. This certainly provides uniform and pleasant patient experience
- Electronic Patient Records are accessible from all Fortis locations. This leads to fewer errors, quick response time in emergencies, and patient convenience
- Medical practitioners can access patient records on their handheld devices
  Radiology images are available to doctors across Fortis locations; thus eliminating the need of expensive film and physical transportation of reports. This drastically brings down cost, and a patient no longer needs to travel distances to see specialist doctors
- Cloud has also enabled Fortis to provide telemedicine to remote locations
- Central patient data opens up the possibility of processing information for various research purposes while complying with prevailing regulations
- By viewing cloud computing as a healthcare perspective, Fortis hospitals across geographies have experienced improved performance, lower maintenance costs, high availability and disaster recovery made easy.

(http://dqindia.ciol.com/content/top_stories/2011/311032806.asp

MAX Healthcare:

Dell Services has converted the information technology infrastructure of all eight Max Healthcare facilities into a private MPLS (Multi-Protocol Label Switching) cloud running remotely from Dell Services Data Centre in Noida. This cloud infrastructure deployment now has the capability to add more hospitals/facilities to their network as and when required. Max Healthcare's Health Information System (HIS), which forms its business backbone as well as all other software applications are now operating on a private cloud.

In September 2009, Max Healthcare and Dell Services, entered into a 10-year agreement valued at US $20 Million under which Dell Services provides infrastructure management and EHR implementation to Max Healthcare. Dell Services manages all IT operations for Max Healthcare, including infrastructure management, data hosting, applications portfolio management, project management office, service desk and clinical adoption of Vista EHR system (an EHR platform developed by the U.S. Department of Veterans Affairs).

Pervez Ahmed, CEO and MD Max Healthcare stated "As a next step, we are looking forward to rolling out electronic health records (EHR) to bring an enhanced patient care. (http://www.cxotoday.com/story/max-healthcare-deploys-private-cloud-across-eight-facilities/)

Succeeding in the India healthcare market

Fundamental Differences between the markets in India relative to the developed markets

1. India is a small healthcare market—roughly 65 billion in spending today, a small number, but with tremendous growth prospects.
2. Penetration is very low. Across any segment, India remains grossly under-penetrated. This could be in number of hospital beds, this could be in insurance penetration; this could be in the infrastructure, the number of doctors or the overall healthcare spending in India.
3. The third fundamental difference is the industry structure. The industry structure is highly skewed toward the organized sector. So the organized sector makes up the belly of the market, and the premium segment--the organized segment—is a very small segment of the overall healthcare landscape.
4. The fourth difference is that the market is quite nascent, so the regulations, standards, and different parameters of how the health system is set up are in their infancy and are being created. That's a big difference compared with the western world.
5. And the last thing is that there is a tremendous amount of price sensitivity in this market, so the point of affordability is absolutely paramount. Given that you are going to service a large middle class population, having a product [priced], or pricing the service, at a very affordable rate is absolutely critical.

As a result, companies enjoy extremely rapid growth rates. The leaders are growing at very high double digits. The second characteristic is that the leaders are also enjoying extremely attractive profit margins. As a result of this, the valuations of players in India, especially the leaders, have

been very attractive. And this is also a function of why financial investors—like the PE-investors, the private equity investors—are pouring a lot of money into healthcare in India. Against this backdrop we are seeing companies deploy very bold strategies when it comes to developing markets and healthcare in India.

They are focused on two fundamental aspects: penetrating the markets in the larger geographies, in the larger cities and market creation as new segments emerge and as a market starts to mature.

Avoid Pitfalls in Emerging Markets:

The first pitfall is about not taking a portfolio approach to markets like India. We need to think about a near-term strategy, but also makes bets for the longer term, so a portfolio about near- and long-term.

The second big learning here—and a big watch-out—is to make sure the products are localized. A gold-plated offering may not be the right solution when you're going after the large, mid-market in India and China.

The third big learning here is not being overly seduced by the big numbers in terms of population. Indian rural market is—the number of people there is very large. You're talking about 600 million to 700 million people. Going after and cracking that market is extremely difficult and complex.

The other big learning here is to understand the complexity in the market and have the right business models to go after different opportunities in the right manner.

Going it alone can often be a big mistake, especially as you think about creating distribution footprints, which could be quite complex in markets like India. But having said that, I think it's very important to do the right due diligence, given the data on many of the companies and partners is not very clean. So doing the right level of due diligence to make sure you partner with the right kinds of players is going to be very important.

And the last factor is not investing in the talent base. There is a huge war for talent in markets like India. It's all about attracting the right talent base, but also regaining and growing that talent base. That can become a core differentiator and a core source of competitive advantage. So not investing in the right talent base can be a big issue.

(http://www.bain.com/publications/articles/succeeding-in-the-india-healthcare-market.aspx)

CHAPTER 2: DATA AND METHODS

Study Methodology

Type of Study:

The study is an exploratory study. Indian Healthcare system is studied; health IT in public health, hospitals and health insurance markets in India is studied and described. The business opportunities available for Accenture in these markets in India are being explored and analyzed.

Study duration:

The study is conducted from February 2012 to April 2012.

Type of Data:

Secondary data: Through review of websites of hospitals, insurance companies, public health websites, new releases and review of articles, journals, Reports etc.

Method of Analysis:

Statistical analysis methods like SWOT, Michael Porters five force model and Brainstorming technique is used to analyze qualitative data.

CHAPTER 3: RESULTS AND FINDINGS

SWOT: Accenture

Strength: • Brand value • Strong financials • Global reach and scale • Experience in Global healthcare Industry in providing services • Experience in consulting services. • Healthcare Domain SME's: Accenture's superior brand image and its multiple touch points with global companies place it in a prime position to recruit the best talent from around the world	**Weakness:** • Not in Product development. • No collaboration with Product vendors in India.
OPPORTUNITY: • Privatization of hospitals and Insurance • Government initiatives for adoption e-health Initiative. • Positive outlook for healthcare IT spending • Positive Growth Trends in healthcare market • Increase in spending on health care by government. • Growing Demand for EMR, HMIS, Telemedicine in India. • Investment Plans in hospital sector are High and chains of hospitals expanding. • Corporate Hospitals adopting new technologies like patient tracking system and cloud computing. • Rapidly Growing medical tourism industry in India further increases the demand for electronic data exchange and interoperability of information exchange. • Increase Indian hospitals need for medical equipment and devices provide Opportunity to partner with medical device companies to increase market	**Threat:** • Multinational companies like GE Healthcare, Siemens, McKesson, Microsoft, IBM, Computer Sciences Corporation (CSC), Perot Systems, TCS, HCL and Cognizant, to name a few, have entered the services side of healthcare industry • IBM and Wipro are collaborating with product vendors in India. • In field of telemedicine-Cisco alliance with Apollo telemedicine centre. • Dell providing cloud computing services in Max healthcare and **Fortis** is setting up its own private cloud in collaboration with group company Religare Technova and HCL Infosystems

share in under-penetrated markets. • M Health gaining momentum in India	

Michael Porter's Five Forces

Michael Porter's five forces is a model used to explore the environment in which a product or company operates to generate competitive advantage.

Five forces analysis looks at five key areas mainly the threat of entry, the power of buyers, the power of suppliers, the threat of substitutes, and competitive rivalry (advantage).

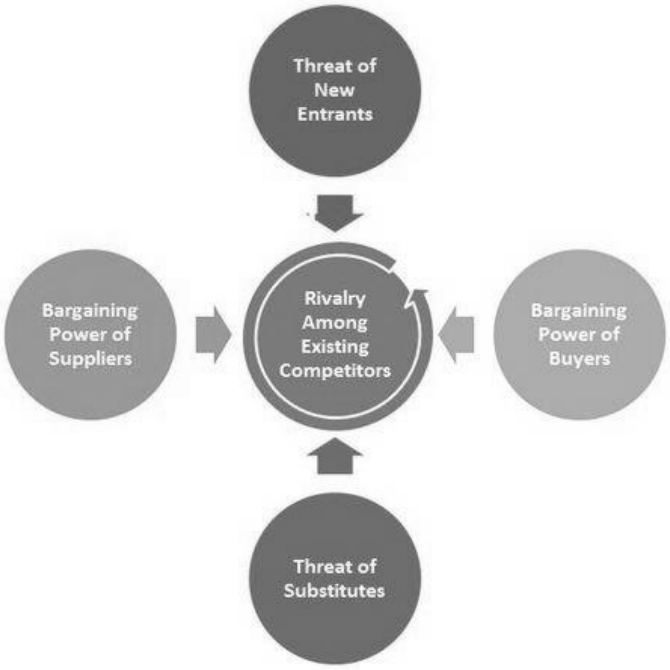


Fig 3.1 Michael Porter's Five Forces Model

Factor 1) Threat of New Entrants

The easier it is for new companies to enter the industry, the more cut-throat competition there will be. Factors that can limit the threat of new entrants are known as barriers to entry.

Barriers to Entry:

- High capital requirement
- High fix cost
- Brand equity

- Entry Protections(patents, rights)
- Switching costs or sunk costs

Factor 2) Power of Suppliers

This is how much pressure suppliers can place on a business. If one supplier has a large enough impact to affect a company's margins and volumes, then they hold substantial power

- Product importance for Accenture: As Accenture is not in Product Development so for giving services they require supplier's product
- Forward Integration by suppliers as many product vendors started providing implementation and support services by their own. Like e-symphony,iSoft

Factor 3) Power of Buyers/ Customers

This is how much pressure customers can place on a business. If one customer has a large enough impact to affect a company's margins and volumes, then they hold substantial power.

- Customers are Price Sensitive
- Backward Integration as Hospitals like Ramchandrani medical college and hospitals, Chennai has its own inbuilt HMIS, fortis chain has in built cloud.
- Availability of Existing Substitute services in the market.

Factor 4) Availability of Substitutes

What is the likelihood that someone will switch to a competitive product or service? If the cost of switching is low, then this poses to be a serious threat

- Technology Changes and Product/service environment.
- Perceived level of service differentiation
- Relative Price Performance of substitute services

Factor 5) Competitive Rivalry

And last but not least, this describes the intensity of competition between existing firms in an industry.

- Number of competitors
- Rate of industry growth
- Intermittent industry overcapacity
- Diversity of competitors

CHAPTER 4: CONCLUSION AND RECOMMENDATIONS

OPPORTUNITIES FOR ACCENTURE:

1. Trend: New Hospitals are coming in tier II and tier III cities.

Description:

1.As per union Budget 2012, for The new hospital with at least hundred beds deduction has been stepped up to 150 %(from last year's 100 %)of the capital expenditure. However, this amendment will be effective from 01st April 2013. If implemented, this provision would set a precedent for hospitals to mushroom in tier-II and tier- III cities.

2. Over five lakh beds are required in Tier II and Tier III cities. Columbia Asia Hospital has recently constructed hospital in Ghaziabad and will start its development in Lucknow, Thiruvanthapuram and Jalandhar

2. Trend: Major Investments plans are coming up to set new hospitals by Private key players in Indian hospital industry.

Description:

- Wockhardt Hospitals plans to invest up to US$ 158.32 million to double its bed capacity to 2,000 by 2013.
- Max Healthcare India plans to develop 4 hospitals to increase 2,000 beds
- Manipal Hospitals plans to invest US$ 45.23 million in the next three years to double its capacity to 8,000 beds.
- The Rockland Group is establishing five multi-speciality hospitals in Delhi and is coming up with a 250-bed multi-speciality hospital in Manesar
- The Hiranandani constructions are planning to set up a chain of hospitals in Chennai, Pune, Nasik, Panvel and Kolkata. It will be having a capacity of 100 beds with the investment of over INR 5000 million.
- Narayana Hrudayalaya P Ltd (NHPL) has announced plans to establish 5,000-bed health cities in the major state capitals of India. The total investment used would be of USD 100 million

Area Of opportunity: We analyzed that Accenture can focus on the blooming opportunities in tier 2 and tier 3 cities as there will be a high demand for quality healthcare services in these cities and healthcare providers would look for low cost models and high patient turnover models. Accenture can partner with the vendor and provides various services described below. Partnering with the local vendor is the best market entry strategy as service provider.

How Accenture can help:

- Healthcare Consulting
- Information system strategic Planning and software selection
    - Accelerating application package planning and implementation
    - IT strategy and business alignment
    - IT governance & organization
    - IT cost and performance management
    - Sourcing and offshore advisory
    - Business process management
    - Integration strategy and roadmap
    - Project and portfolio management
    - Data center and computing as well as virtualization technologies
    - IT asset, service and capacity management

- Project management services
    - Professionals are experts in all aspects of project and portfolio management
    - Experience in implementation projects, which is an asset for the delivery of PMO projects
    - Multidisciplinary capacity: strategy, security issues or contingency plans
- Collaboration with software vendors to provide Software Implementation and support services

3. Trend: Increase in Diagnostic services

Description: As per Union Healthcare budget (2012-13) with the provision for deduction of up to Rs 5000 for preventive health check-ups in place, one can be assured of an increase in the demand for diagnostic services as well. More Diagnostic Labs will be implementing LIMS software to make their work processes effective and efficient

- Metropolis Healthcare, announced to launch 15 Greenfield laboratories in tier II and tier III cities across India after the success of its second such lab in Indore. The company was likely to make a total investment of around Rs 15 crore in this fiscal year. These well-equipped labs will be located in cities like Gorakhpur, Jalandhar, Amritsar, Lucknow, Allahabad, Udaipur, Agra, Bhopal, and Ranchi.
- GE Healthcare will invest US$ 50 million to set up more facilities for developing diagnostic services

- IBM is providing project management services to Dr Lal Path labs in implementing Star LIMS software

How Accenture can help:

- Project Management services
    - Professionals are experts in all aspects of project and portfolio management
    - Experience in implementation projects, which is an asset for the delivery of PMO projects
    - Multidisciplinary capacity: strategy, security issues or contingency plans

- They can partner with the vendor company or with labs.

4. **Trend:**
As per union budget 2012, Under Pradhan mantri swasthya suraksha yojna: Up gradation of existing government medical college

How Accenture can help:
Healthcare consultancy
Information system strategic Planning and software selection
Process Optimization & analysis of IT requirements

- Creation of working groups to carry out the reengineering
- Delivery comprises business process reengineering and an analysis of requirements

5. Trend: Launch of National Urban health mission (Union Budget 2012)

As they already have HMIS in NRHM they may Require HMIS Portal in NUHM

How Accenture can help:

- Management of IT Projects/Programs

- **Creative Idea**: Conversion of paper based medical records into electronic format and applying business intelligence tool to generate reports which helps in strategic decision making for healthcare organization. (Mainly hospitals)(copywriter)

6. Trends: Govt. focuses on telemedicine Market.

Union Budget 2012-Increase NRHM budget by nearly 15% from Rs.18,115 crore(2011) to Rs.20,822 crore. The DIT, Ministry of Communication & IT had initiated some successful pilot projects to build framework for telemedicine and health IT. Further, most of the telemedicine platforms both in public and private health sector in the country have been launched by ISRO and DIT. Development and application of tele-radiology-West Bengal. Looking at the brighter side, in India many Telemedicine programs have been actively supported by Department of Information Technology, ISRO, Apollo Hospitals, Asia Heart Foundation, State Governments and NEC Telemedicine program for North-Eastern states.
The tele-linking of all health centers and augmenting them with latest and robust infrastructure comprising ECG, EMG , patient monitoring, imaging facilities etc. will create enough demand for entire chain of Health IT Players.

- Healthcare major Apollo Hospital tie up with IT giant Cisco for providing Telemedicine services in the country

How Accenture can help:

- Accenture can tie up with telemedicine vendors to provide implementation and support services.
- Tie up with hospitals to provide telemedicine services.

7. Trends: Chains of hospitals Expansion plans and looking forward for new technologies

- Opportunity for Accenture :Cloud Computing in Hospitals

Industry Examples:

- Dell Services has converted the information technology infrastructure of all eight Max Healthcare facilities into a private MPLS (Multi-Protocol Label Switching) cloud running remotely from Dell Services Data Centre in Noida.
- Hyderabad-based Razi Healthcare, which has 50 primary care hospitals across India, has adopted iON – a branded on-demand cloud computing offering from Tata Consultancy Services.

Accenture can also come up with KPO for Cloud computing in Healthcare.

8. Trend:

Health insurance market is expected to grow at a CAGR of 43 per cent between 2011 and 2015The privatization of medical insurance will become a major driver of HIT adoption in the future, which will create a big push for comprehensive patient information and consequently the use of HIT

- HealthSprint has a growing customer base of providers, such as Wockhardt, Manipal, and Payers, such as TTK, MediAssist, Anyuta, Spurthi, UHC, and DHC. The major customer base is Tamil Nadu Chief Minister Kalaignar's insurance scheme, Government of Karnataka – Vajpayee Aarogyasri Health Insurance Program, SAST, Dharmasthala Temple Trust –SKDRDP Micro Health Insurance program and Government of Uttarakhand-RSBY Health Insurance. The relationship is through Star Health and Allied Insurance where Star is the leading insurer for Tamil Nadu Chief Minister scheme and for government of Uttarakhand-RSBY Health Insurance. HealthSprint is a partner with HCL infosystems for deployment and implementation of IT solution for the Suvarna Arogya Suraksha Trust for Karnataka government

- Accenture can also go for Partnership with vendors and help with Implementation and support services

9. Trend:

As India is facing double Disease burden so various Health programmes are started at State and national Level.

- Accenture can collaborate with state governments and can provide Consulting services for Implementation, monitoring and utilization of these to run effectively.

Accenture can enter Indian healthcare industry by collaborating with the state government. The progressive and proactive state governments are:

1. Tamil Nadu
2. Andhra Pradesh
3. Gujarat
4. Kerala
5. Uttaranchal
6. Bihar
7. Orissa
   Like Center for Public Health Informatics (CPHI) has developed 1st NRHM portal for prevention of Dengue.

10. Trend: Increase Indian hospitals need for medical Imaging and medical technology and devices

- These provide Opportunity for Accenture to partner with medical device and PACS vendors to provide consultancy and implementation support and also evaluation of medical devices.

11. Trend: M-health gaining momentum in India,

ZMQ Software solutions, mpedigree Platform, NETRA etc introduced in this segment

Health 2.0 puts on conferences in the US around the latest IT-enabled health solutions has plans to come to India in the next year to start stoking the Indian mHealth flame. So there is Opportunity for Accenture to Provide IT solution and support in this sector.

- Accenture can Collaborate with vendors like Airtel and Aircel to give services for Triage software
- They can Collaborate with software vendors in mhealth to provide consultation and Implementation support
- They can come up with KPO for m Health.

CASE STUDY

OBJECTIVE

To study the Healthcare IT status in different hospitals including both private and public hospitals.

METHODOLOGY

Sample survey was conducted February 2012 to April 2012. Sample size of 25 respondents was taken. The different respondents taken for the study are as follows:

- Private Hospitals - 15
- Public Hospitals - 10

The scheduling method via questionnaire was used for data collection from the respondents. A well structured questionnaire in English was used for the purpose of primary data collection. Close ended questions were included in the questionnaire.

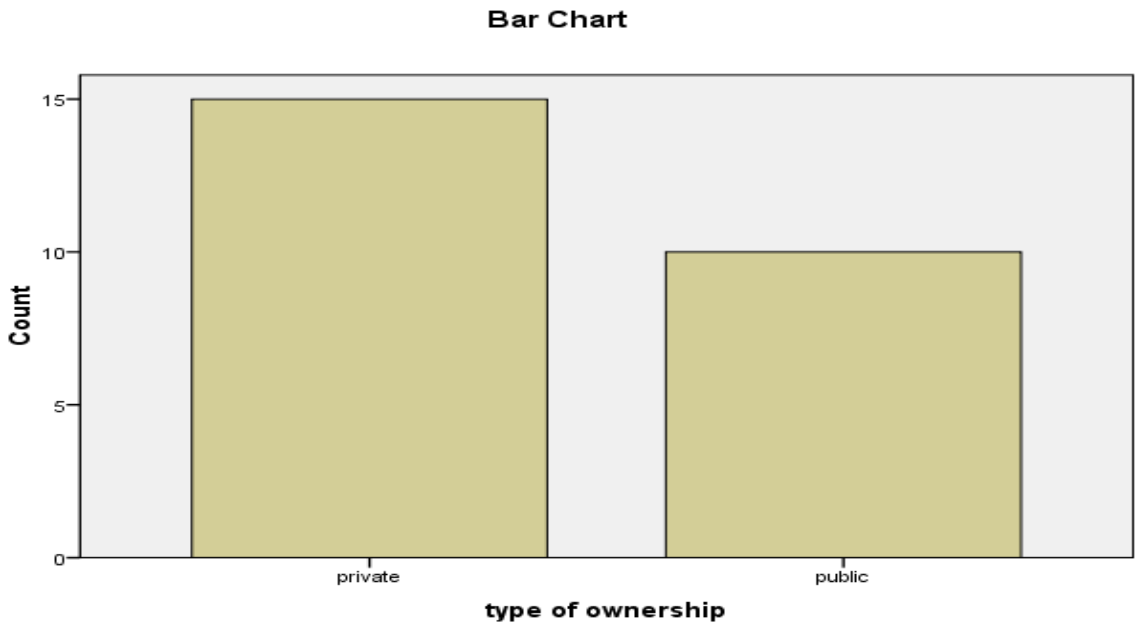
Quantitative analysis was carried out after data collection has been completed.

The data obtained was coded and analyzed using SPSS version 16 and MS Excel.

OBSERVATIONS

By analyzing the responses of the respondents the following observations were made:

Computerization of Departments



Graph 1.14: *Graph showing computerization of admission and discharge department both in public and private hospitals*

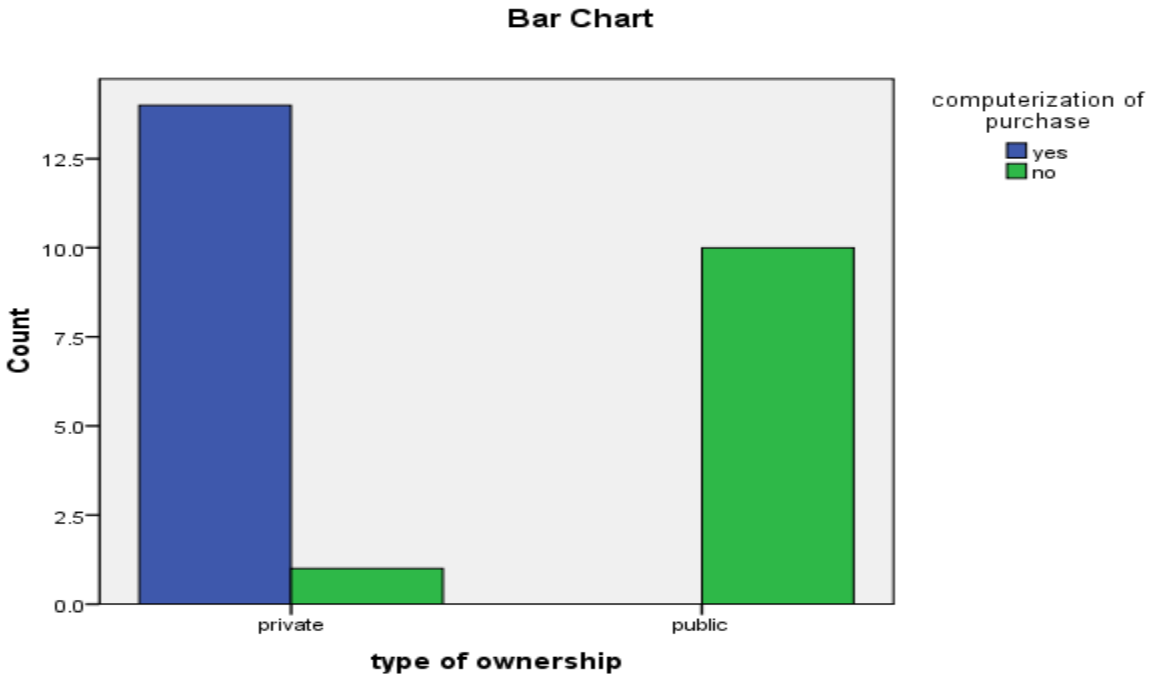
Almost all public hospitals included in this study have fully automated registration department.

According to this study, Admission and discharge in government hospitals is 100% computerized mostly for the IPD patients. This admission and discharge information is managed by Medical record department (MRD). They are following ICD 10 coding.

Some government hospitals have billing module but these modules are standalone and they are not integrated with any other department. These hospitals are under some insurance scheme.

Computerization of Purchase Department

Most of the work in the purchase department is done on paper and only some government hospitals are using Microsoft Excel for maintaining the records of purchases.



Graph 1.15: Graph showing computerization of purchase dept in public and private hospital.

Data warehouse

All hospitals both private and public have a data warehouse. As Indian courts are yet to admit EMR as evidence in medico-legal case, thus most hospitals have to maintain both paper and electronic records.

Application of wireless network

Public hospitals: Only research department have this facility.

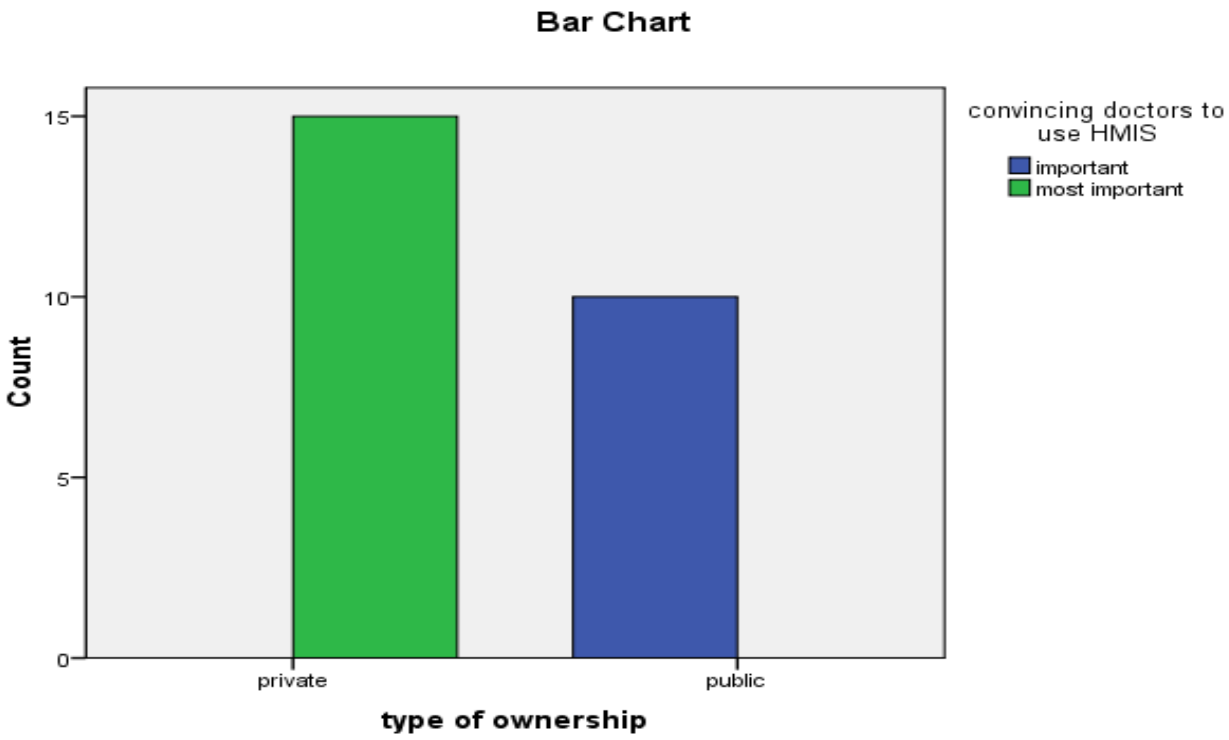
Private Hospitals: most of the hospitals have Wifi connection as they are using web enabled software applications.

Challenges faced by the hospitals during implementation of Hospital Management Information System

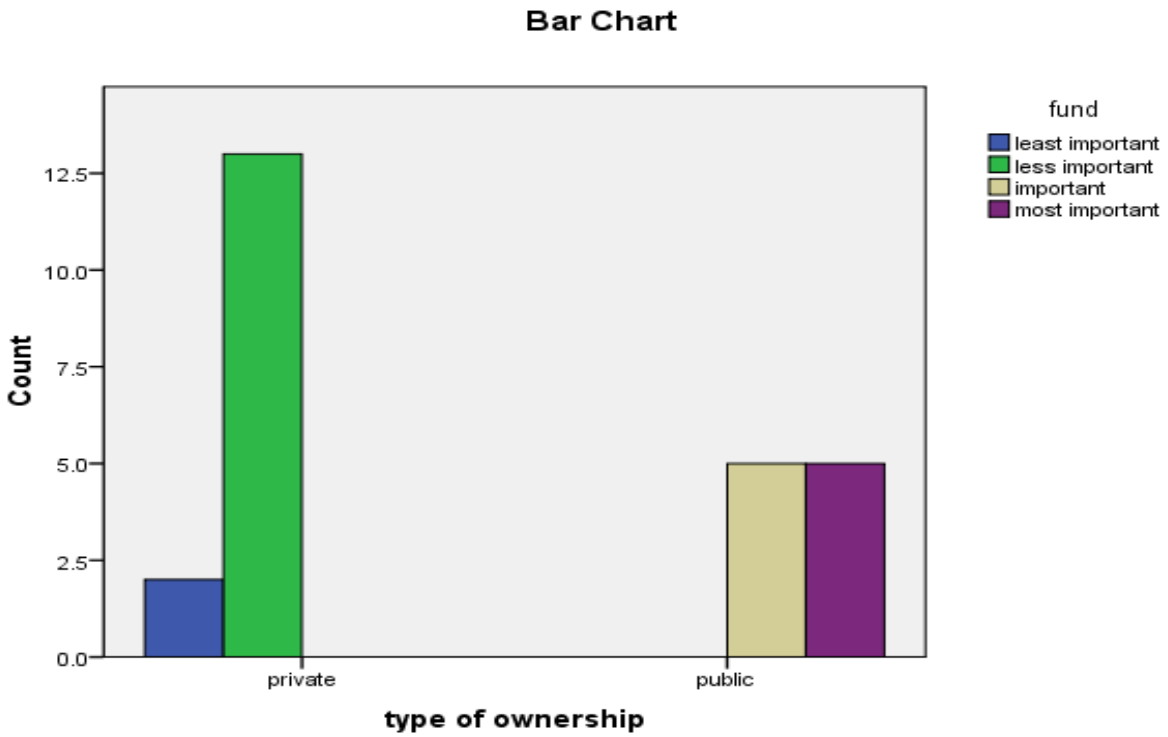
During the implementation of Hospital management information system (HMIS) in hospitals, the hospitals have to face a lot of challenges. Major Challenges faced by them are following:

1. Allocation of funds
2. To convince and motivate clinicians, nurses, and other personnel to use HMIS
3. Recruitment of IT personnel
4. Training
5. Infrastructure

According to this study, in public hospitals, allocation of funds was the major challenge after that training and infrastructure were other challenges. In private hospitals the major challenge was to convince and motivate clinicians, nurses, and other personnel to use HMIS, after that training and funds were other challenges.



Graph 1.16: Graph showing importance of challenge that is convincing doctors to use HMIS in public and private hospital.



Graph 1.17: Graph showing importance of allocation of funds for implementation of HMIS in public and private hospitals.

DISCUSSION:

The survey gave an insight in to the status of Healthcare IT in both public and private hospitals. The study showed that the private hospitals are using Information Technology softwares to improve clinical and financial processes. These IT application softwares help in exchange of information effectively in seconds inside the hospital.

On the other hand, public hospitals are using Information Technology for admission processes only. In some government hospitals billing is computerized. These public hospitals are only concerned with the reports regarding number of births, deaths, IPD admissions, length of stay, disease profile etc. these reports are send to the Ministry Of Health and Family Welfare. They are not concerned with the automation of clinical records that is EMR.

RECOMMENDATIONS

- Government should allocate funds for the public hospitals to implement Hospital Management Information System.

- Government should provide guidelines for maintaining patient records.

- As most of the hospitals go for the automation of administrative processes but real automation is achieved when clinical processes are automated.

- Small and medium sized hospitals should go for cloud based solutions as they are cheaper than complete packaged products.

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ANNEXURE