



## Review Paper

# Innovative Approach in Healthcare Service Delivery System in India, Brazil and South Africa: A Literature Review

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### Abstract

*This paper presents a literature review of innovation in healthcare service delivery system with reference to India, Brazil and South Africa. We briefly review 100 references among these, 55 articles were classified by year of publication and journal. Innovation is considered to be a critical component in the quest to balance cost containment and health care quality. This paper starts by defining innovation in healthcare. Following part of paper, describe health status of India, Brazil and South Africa. Innovation, such as public-private partnership, marketing innovation, financial innovation, technology innovation and operational introduced. A particular attention paid to analyze the impact of innovation to improve efficiency and effectiveness of health delivery system. Through review of literature, the paper describes the examples of innovation based health delivery system. Innovation supported health delivery system enables to provide accessible, affordable and quality health services to all individual.*

**Keywords:** Innovation, healthcare service delivery system.

### Introduction

The health delivery system is an important measure that affects country's health status<sup>1</sup>. Moreover, these are increasing evidence of the association between health and socioeconomic status from the studies conducted throughout the world<sup>2</sup>. The healthcare service delivery system is the mode to combine inputs, allow the delivery of a series of interventions or serviced actions in order to improve the health condition of people<sup>3</sup>. In many countries<sup>4</sup>, reducing inequalities in health has been identified as key target of health delivery system<sup>5</sup>. This paper gives an insight into the existing innovation supported health service delivery system with reference to India, Brazil and South Africa.

As per view of the economist Rupa Chanda, the healthcare sector is one of the most rapidly growing sectors in the world economy<sup>6</sup>. Although, the health sector in developing countries are facing so many challenges. These challenges are huge health status gap between urban and rural areas, low level of health awareness, lack of sanitary and hygienic condition, cost of healthcare, scarcity of specialty care and under-resourced infrastructure<sup>2</sup>. In recent years, these health sector problems are become more serious and higher priority has been given to delivering health service and meeting the needs of the poor<sup>7</sup>. It is recognized to strengthening health delivery system as a priority for countries to be able to meet the basic health needs of their people, especially for poor and vulnerable populations. A challenge in developing countries is find out ways that enable to address this basic health needs more effectively<sup>8</sup>. In this regard,

innovation in health delivery system act as driving force of transforming available health resources and technology to make accessible, affordable and quality health services.

### Objective

The purpose of this paper is to determine how innovation in health service delivery can improve care for the poor. The paper analyzes and examines the impact of innovative approach to provide accessible, affordable and quality health service with supportive examples through review of literature review.

### Definition of innovation

The Advisory Committee on Measuring Innovation in the 21st Century Economy defines innovation is the implementation of new or significantly improved product<sup>9</sup>, services, process, system, business practices for the purpose of creating new value for customers and financial returns for the firm<sup>10</sup>. In line of this definition, innovation in health delivery system is define as new service and/or new ways of delivering of service through new technology and management concept<sup>11</sup>. From the patient point of view, the intended benefits are improved health condition of patient at right time<sup>12</sup>.

### Health status of India Brazil and South Africa

With a combined population of 1.46 billion people, India, Brazil and South Africa have remarkable economic growth rates and high growth potential in international comparison<sup>13</sup>. Although

these countries health indicators are still deplorable and adverse health consequences have been linked to poor socio-economic growth and development. India is leading position for total population and population growth as compare to Brazil and South Africa and other countries of the world<sup>14</sup>. India has emerged as one of the powerful nation which drives of global economic and social change. Despite of this rapid economic growth, India is ranked 136 out of 185 countries in the Human Development Index. India has great social and economic inequalities<sup>15</sup>. There are marked disparities among different geographical regions, between social groups, among different income levels and between the sexes<sup>16</sup>. India has rural population is 69 percentage but majorities of healthcare service facilities are available at urban areas. In addition to this, the contribution of private sector in healthcare expenditure is around 80 percent that lead to most of people has to go for out of pocket expenditures for healthcare services<sup>17,18</sup>. The percentage of out of pocket health expenditure in India is highest than Brazil and South Africa.

As a member of BRIC group, Brazil come under one of the world's faster growing economic<sup>19</sup>. In 1988, Brazil health care system was reform<sup>20</sup>. It was organized in three-tier federation system composed of the central government, state and municipalities<sup>21</sup>. As per Sistema Único de Saúde (SUS) or Unified Health System has recognized health as a universal right and state duty<sup>22</sup>. This health system is being founded on the principles of universal coverage<sup>23</sup>, integral care and equity which enable to create an inclusion of at least one third of the population that was not covered by previous system<sup>21</sup>. Despite of this, Brazilian health system facing many problems are high health service cost<sup>24</sup>, a scarcity of resources which has always has the biggest obstacle to provide consistent level of care and limited access to service to all individuals<sup>23</sup>. Also, the health expenditure per capita in Brazil is highest than the India and South Africa. On the other hand, social, cultural and environment related factors are also influence health care use<sup>17</sup>. The lack of knowledge about disease prevention and lack of innovation in Brazil health delivery system must also be considered, which affects performance of health delivery system<sup>25</sup>.

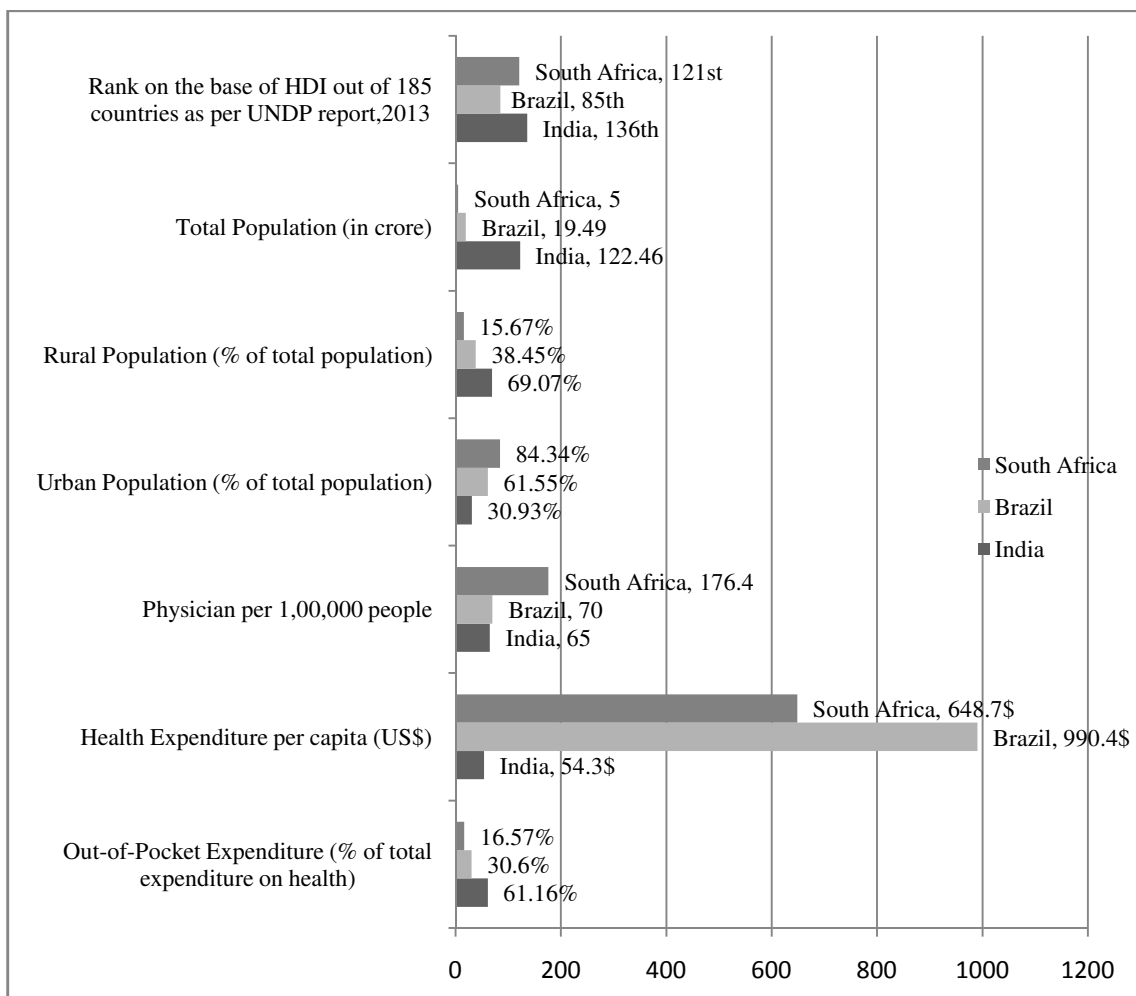


Figure-1  
 Health Status of India, Brazil and South Africa (2010)

**Table-1**  
**Journal list and article count**

Journal Name	Article count	Year
Annual Review of Public Health	1	1992
R and D Management	1	1994
Telemedicine Journal	1	1995
European Journal of Public Health	1	1996
Health Service Research	1	1996
Social Science and Medicine	1	1997
Health Policy	1	2000
European Management Journal,	1	2000
The Lancet	1	2000
Social Science and Medicine	1	2001
Journal of telemedicine and telecare	1	2001
Telemedicine Journal and eHealth	1	2002
The Milbank Quarterly	1	2004
Health Research Policy and Systems 2004	1	2004
Health Policy	1	2004
American Journal of Public Health	1	2005
Cadernos de Saúde Pública	1	2005
Health Promotion Practice	1	2005
Journal of Medical Systems	1	2005
Cost Effectiveness and Resource Allocation	1	2006
Community Eye Health Journal	1	2006
Globalization and Health	1	2006
Elektrotechnik and Informationstechnik	1	2006
Acta Commercii	1	2007
European Journal of Health Economics	1	2007
Federal Register	1	2007
American Journal of Medical Quality	1	2008
GIM Case	1	2008
Journal of Evolutionary Economics	1	2009
Human Resources for Health	1	2009
The Wall Street Journal	1	2009
Health Services Research	1	2009
BMC Medical Informatics and Decision Making	1	2009
Teled J Health	1	2009
Innovations: Technology, Governance, Globalization	1	2009
BMC Health Services Research	1	2010
The Economist	1	2010
Health Research Policy and Systems	1	2010
MC Medical Research Methodology	1	2010
The Innovation Journal: The Public Sector Innovation Journal	1	2010
Indian Journal of Pediatrics,	1	2010
Human Resources for Health	2	2011
BMC Proceedings	1	2012
South Africa Medical Journal	1	2012
BMC Medical Informatics and Decision Making	1	2012
Research Journal of Management Sciences	3	2012
BMC Proceedings	1	2012
BMC Family Practice	1	2013
BMC Health Services Research	1	2013
Electron Markets	1	2013
Research Journal of Management Sciences	2	2013
<b>Total</b>	<b>55</b>	

World Bank Development Indicators, CD-ROM Database, WHO (2010)

South Africa is one of the largest and most developed economies in Africa and accounts for about a quarter of the entire GDP of the continent<sup>26</sup>. In South Africa, Primary Health Care (PHC) is the basic mechanism for providing health care<sup>27</sup>. PHC is providing health care service provision with the implementation of two policies, "Free health care for pregnant mothers and children under the age of six years" as well the "Universal Access to PHC for All South Africans"<sup>28</sup>. In spite of this, there are some gap in implementation include resource constraints<sup>29</sup>; migration of professionals; the unequal distribution of personnel in public and private sectors; low skills levels; poor staff motivation and the lack of managerial capacity<sup>30</sup>. In rural areas, health services are often not available or purchased at a high social and economic cost<sup>31</sup>. The key challenges facing South Africa health system includes 'financial, optimal use of available resources, human and material commitment, changing management practices and community involvement and intersector collaboration'<sup>32</sup>. Under these situations, there is need to reform and strengthening health system with the implementing innovative approaches. We have briefly reviewed 100 references among these, 55 articles were classified by year of publication and journal as table-1.

### Innovation in Healthcare Service Delivery System

Innovation in health system is viewed as execution of advance technology and management practice to deliver health services to individual and public health. This would lead to economic growth and generation of wealth<sup>33</sup>. Health innovation is a complex bundle of new technology, management techniques and health services emerging from highly distributed competence base<sup>34</sup>. Health delivery system is the organization of all health services to meet the needs of the all targeted population<sup>35</sup>. In order to achieve this objective, five different concepts of innovation in health delivery system are considered in this paper. In the first, the innovation in health system is seen as public-private participation and in the second, as a set of marketing innovation concepts. In the third, the innovation is making out as financial innovation, in the fourth, as a technology based innovation and in the fifth, as operation innovation. These approaches make it possible to extend the model of health delivery system to incorporate new form of innovation in order to deliver accessible, affordable and quality health service.

### Public-Private Partnership in Health Delivery model

Public-Private Partnership (PPP) is being increasingly encourages as an important aspect of inclusive<sup>36</sup> and sustainable health delivery system<sup>37</sup>. The need of public-private partnership arose against the backdrop of inability and inadequacy of the public health delivery system<sup>38</sup>. The public sector is unable to deliver health service in an effective and efficient manner in

their own because of lack of resource and management issues<sup>39</sup>. These considerations have necessitated contract between public and private sector that brought together with that they have mandated to deliver health service. On the other hand, private sector could facilitate this goal through the provision of resources; technical expertise<sup>40</sup>. This partnership creates a powerful mechanism to overcome different challenges by public and private health sector leveraging on their strength<sup>41,42</sup>.

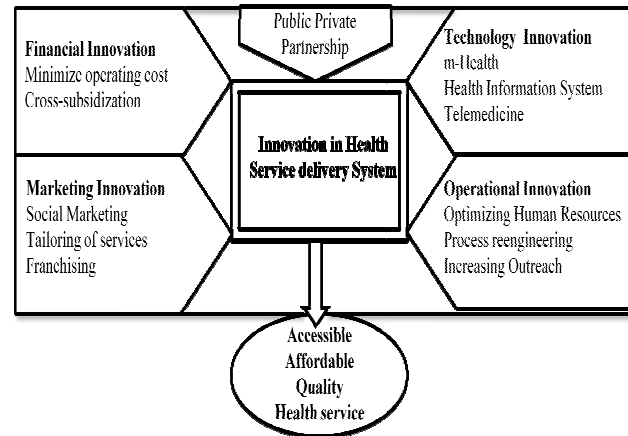


Figure-2  
 Innovation in Health Service Delivery System

The paper describes public-private partnership based successful four health system of Gujarat, Tamil Nadu and Meghalay states of India. Gujarat is one of the industrially developed states in India. Although, the infant and maternal death rate in Gujarat is higher as compared to other states in India. The Department of Health and Family Welfare launched Chiranjeevi Yojana with involvement of private sector<sup>43</sup>. As per the term and condition of the partnership; the private providers have to provide affordable health service to BPL women and children<sup>44</sup>. The state government reimburse the service charge to the private provider as per the tariff. The success of the PPP model can be credited to address the larger issue of reducing maternal and infant deaths<sup>45</sup>. Tamil Nadu has encouraging public-private partnerships to provide health care access in tribal areas. It has collaboration with Private sector and NGOs for clinical and ambulance services<sup>46</sup>, facility maintenance, medical equipment, blood banks and provision of training and support for community health workers in remote areas<sup>47</sup>. This innovative approach helped to decline maternal mortality and infant mortality rate in Tamil Nadu.

Meghalaya, a hilly tribal state in northeast India, has adopted Public Private Partnership (PPP) approach involves the management and operations of poorly performing health centres located in remote areas. The PPP based health system improves in outpatients care and in-patients care in the health centres<sup>48</sup>. Sao Paulo city's hospitals in Brazil, operating under a Public-Private partnership has been successful to improve health services. The use of management tools, intensive use of installed capacity, novel medical reimbursement models help to

increasing patient turnover and reduce average cost per patient<sup>49</sup>. In South Africa, Lesotho hospital is first Public-Private Partnership health model for Africa health sector. There is one joint committee of government and private operators, which review the performance of hospitals and develop mechanisms to provide quality health service at affordable cost<sup>50</sup>. Public-private partnerships (PPP) based tuberculosis (TB) treatment project in South Africa is capable of delivering important improvements in the affordability and efficiency of TB treatment<sup>51</sup>.

### Marketing Innovation in Health Delivery System

Marketing innovation is the process of implementing marketing strategy in such way to signified product and service attributes<sup>52</sup>. However, the main aim of marketing innovation is addressing customer needs, opening up new markets, or newly positioning of firm’s product/service in market and increases the firm’s sales<sup>53</sup>. There is need to implement marketing innovation that promote health services and also design these health services to meet the needs of the poor people.

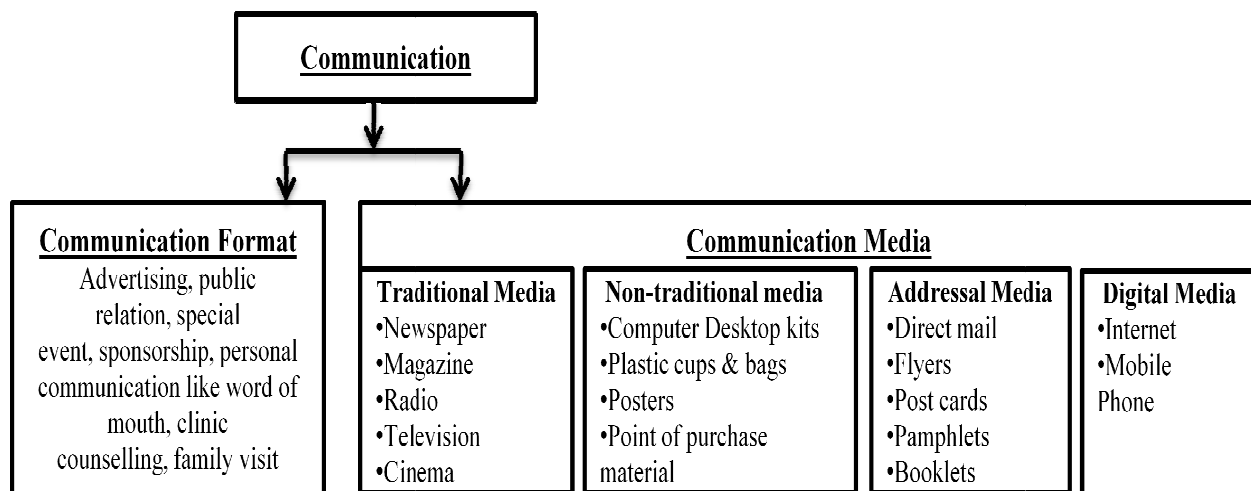
**Social Marketing:** Social marketing is the process of applying marketing principles and techniques, to create communication, and deliver value in order to achieve behavioural change to the target people, and that benefit the society<sup>54</sup>. In health delivery system, social marketing is mainly focus on health promotion<sup>55</sup>. That could help to combat various chronic diseases, fight child abuse, reduced AIDS risk, good nutrition, childhood immunization and oral rehydration therapy<sup>56</sup>. The effective and efficient communication media is the main core of the implementing social marketing strategy in health delivery system<sup>57</sup>. Population Service International (PSI) and PROFAMILIA have applied social marketing to improve reproductive health of youth in South Africa and India<sup>58</sup>.

**Tailoring services to the poor:** Tailoring is one of the marketing strategy uses to design the product and services as per the need of people. In India, Bhagwan Mahaveer Viklang Sahayata Samiti (BMVSS) have developed the Jaipur Foot<sup>52</sup>. It is an artificial lower limb prosthetic intended to meet the need of amputees in rural areas. BMVSS provide a novel product, 24/7 hrs services to the poor for check up and free board and meals for poor patient at clinic<sup>60</sup>. The tailoring service distributed more than two lakh artificial limbs in India and more than 13,000 in 18 other countries<sup>61</sup>.

**Franchising:** The franchising is the business model in which the decentralization of different activities is done. It can enable to scale and replicate the product and service delivery model to penetrate the rural area<sup>62</sup>. Franchising is an effective model to deliver healthcare services to low income community and particularly rural area where health services are not available. In Bihar and Jharkhand, the NGO Janani uses franchising techniques to provide healthcare and family planning services to rural people<sup>55</sup>. The Janani reduced prices of health product and service by purchasing government subsidized health commodities in bulk and simultaneously increase the volume of patients utilized its franchised services<sup>59</sup>.

### Financial Innovation in Health Delivery System

Financial system is defines as the collection of markets, institutions and regulation through which the health services are produced and delivered to the needed people. The healthcare system cannot be sustainable without effective and efficient financial system. Financial innovation is generating revenue level over medium to long term that improves financial performance<sup>61</sup>. It also bring down out-of-pocket funding for service users by redesigned cost structures in such ways that allowed services to be more accessible and affordable for the poor people<sup>63</sup>.



**Figure-3**  
**Communication Media Use in Social Marketing**

**Minimization of operational cost:** In healthcare service delivery system, operating cost is the sum of cost of healthcare products and all healthcare operating expenses. The operation cost minimized by simplified medical services and operation advantage from construct technology in health delivery process<sup>64</sup>. In this regard, Narayana Hrudayala has built a chain of hospitals that will carry out heart surgeries at cheaper rate in world<sup>65</sup>. NH emphasis to perform more operations done by per cardiac surge doctor and they work on a fixed salary instead of per operation. This help to decrease the operation cost, when the number of patients increases. The hospital has rent machine for blood tests instead of purchasing new machine and pays only for reagents, which reduce operation cost<sup>64</sup>. On other hand, NH reduces operation cost by relying on digital X-rays rather than expensive films which save recurring cost of film and reducing inventory and processing times by using comprehensive hospital management software<sup>66</sup>. The innovative approach of NH focus on high volume service delivery with tiered- fee strategies which make them enable to provide affordable quality heart surgery for poor people.

**Cross-subsidization:** Cross-subsidization is the strategy to charging higher price to one group of consumers in order to subsidize lower price for another group<sup>61</sup>. The Arvin Eye Care system has successfully implemented this strategy for eye care service by providing free services to 70% of its patients come under below poverty line<sup>67</sup>. The subsidy cost of free service financed by the full-fee service users who are wealthier<sup>68</sup>. Another example is 1298 Ziqitza Healthcare Limited provides a leading network of ambulances services on principal of cross subsidy healthcare services<sup>69</sup>. In this ambulance service system, rich people pay higher amount and poor pay less and for very poor, accidents, emergencies, the service is fee of cost<sup>70</sup>. In Brazil, Dentista Do Bem is a largest organization having the largest chain of skilled volunteers' provides dentist service<sup>71</sup>. It is a form of charity in which poor patients paying "subsidizing" cost of dental services<sup>61</sup>.

**Technology Innovative in Health Delivery System**

Technology innovation is defined as to conceive and develop new solution from technological and scientific knowledge, and

successfully implement to reach the needs<sup>72</sup>. The health system in developing countries have limited access to health services due to increasing demand for health services, limited resources and shortage of health professional<sup>73</sup>. The adoption of information and communication technology (ICT) is a key strategy to meet the challenges facing health system and establish a model of service delivery which provides rapid, safe, effective and affordable health service<sup>74</sup>. ICT can support to health delivery system to achieve novel model which produce measurable improvement and sustainability, within health workforce and resource constraints.

**Mobile Health (M health):** mHealth is define as a subset of ICT based technology which used mobile device with capability to create<sup>75</sup>, store, retrieve and transmit data in real time between end users for the purpose to deliver health services to patient<sup>76</sup>. There is widespread enthusiasm for the mHealth in many parts of the developing countries<sup>77</sup>, as they are low-cost, easily available, commonly used in every day, and relatively low level of literacy required to use them<sup>71</sup>. India has implemented National AIDS control program, providing antiretroviral treatment (ART) by using mobile phone<sup>78</sup>. This trial report indicates a positive impact on improving adherence of first line ART in India.

In South Africa, the opportunity for implementation of mHealth includes widespread availability of mobile phones, a well developed ICT industry, a supportive policy environment for eHealth, successful use of mHealth for community based health services (CBS) in a number of projects<sup>73</sup>. Mobile phone technology can be used as data collection tool<sup>70</sup>. The mobile technology is better than personal digital assistants (PDA's) in term of data loss and uploading difficulties, make mHealth need to be further explored. mHealth can be implement for empower people to monitor their personal health<sup>74</sup>. In addition of this, mobile telephone is used as a healthcare intervention for chronic, non-communicable diseases such as cardiovascular disease, diabetes, depression, and for chronic, communicable diseases such as HIV and TB<sup>75</sup>.

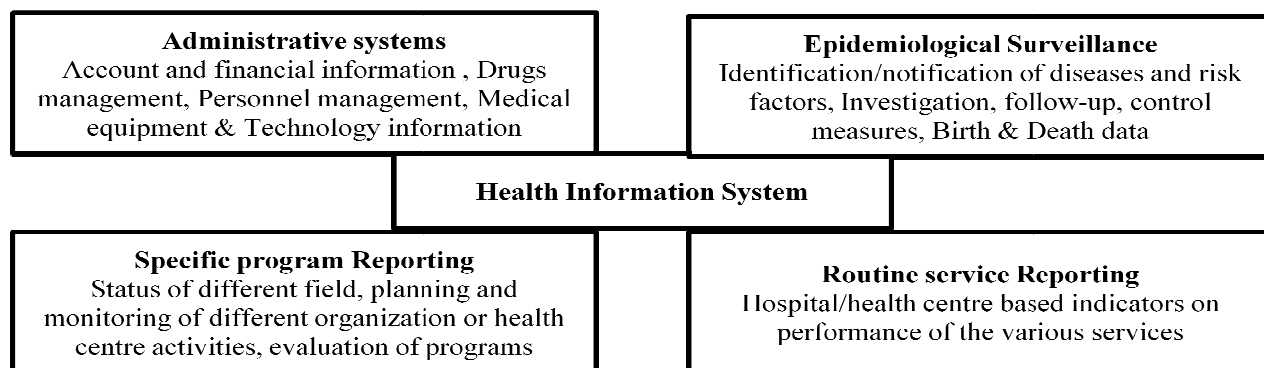


Figure-4  
 Health Information System

**Health Information Systems:** Health information system provides a platform that can record, store, retrieve and process the health data via the electrical Person Healthcare Information (ePHR) and help for clinician health record solutions (eCHR)<sup>79</sup>. HIS provide accurate and timely patient data that help to access and improve quality of healthcare services. Also, physician and hospital administrator can use HIS for monitoring and evaluating of all daily activities of health system<sup>80</sup>. The developing countries are moving from paper-based health information system to the “second generation” Health Information System, which provide new data sources and opportunities for policy formation and improve healthcare service at the point of service<sup>81</sup>.

**Telemedicine:** Telemedicine can be defined as the usage of Information Communication Technology with medical science<sup>82</sup>, to provide healthcare and the exchange of healthcare information across distance<sup>83</sup>. It has been used to reduce patient transportation costs<sup>84,85</sup>, to reduce hospital and clinic wait times<sup>86</sup>, and to provide services available at urban, super speciality hospitals to rural and remote setting<sup>87,88</sup>. The Indian Space Research Organization (ISRO) initiated SATcome based Telemedicine program in 2001 for reaching healthcare to the un-served and the under-served population<sup>89</sup>. In India, telemedicine programme has been implemented in many medical search centres like Sanjay Gandhi Post Graduate Institute (SGPGI), Apollo Hospitals, Sri Ramachandra Medical College (SRMC), Narayana Hrudayalaya, Sankara Netralaya, Arvind Eye Hospital Asia Heart Foundation, Tata Memorial Cancer Hospital, etc. As per study done by Telemedicine centre at PGIMER, Chandigarh, telemedicine can be use to solve the health problem of children in Indian rural and semi-urban setting<sup>90</sup>.

In South Africa, a national telemedicine system was planned in 1998. The initial application modules of this telemedicine system are teleradiology, tele-ultrasound for antenatal services, telepathology and tele-ophthalmology<sup>91</sup>. The Santa Catarina state department of Health has developed integrated telemedicine network in Southern Brazil. The telemedicine implemented at primary, secondary and tertiary levels in the public health care network. Its aim to reduce care cost and improves health service in remote areas<sup>92</sup>.

## Operational innovation

Operation innovation is the process redesigning and controlling of all organizational activities in order to increase the availability of services at remote areas and make judicious use of human resource in the context of widespread shortage of skilled labour.

**Optimizing Human Resources:** In healthcare system, the operation cost is reduced by improving skill and efficiency of human resource by training<sup>61</sup>. This would help to use lay health workers into health sector in remote area that increase

availability of staff and empowered the local community<sup>67</sup>. Aravind Eye Care System provides training to high school graduates from rural areas focus on simple diagnostic procedures, optical technicians and patient flow management strategy<sup>68</sup>. VisionaSpring also train laypeople from rural area into eye examination, oral contraceptives and business operation that help to access affordable healthcare services to rural people<sup>61</sup>.

**Process and product reengineering:** Reengineering is the continuous improvement process through redesigning and evaluating of new operation activity enjoin to achieve enhancement in contemporary measures of performance such as cost and quality of service<sup>3</sup>. In this view, VisionSpring is working to design U-specs com- prises in such way that make mass production easier, reduces costs and offers an alternative to the traditional customized construction of eye-glasses<sup>59</sup>. Aravind Eye hospital have implemented reengineering approach for improving efficiency of operation room service through allowing surgeons to work on two tables in alternation by shifting from one case to another<sup>61</sup>. The South Africa health council has implemented the primary healthcare reengineering concept to achieve the goal of long and healthy life for all South Africans<sup>84</sup>. In this regard, reengineering approach of primary healthcare service by outreach team for each electoral ward; strengthening school health services; and district based clinical specialist teams with an initial focus on improving maternal and child health<sup>93,94</sup>.

**Increasing outreach:** The mass media advertisement, rural healthcare programme and campaigning are outreach strategies to access health services in rural areas<sup>61</sup>. Narayana Hrudayalaya Heart Hospital organise camps focus on cardiac diagnosis services with transportation facility to the hospital for require patients<sup>64</sup>. Aravind eye hospital has set up internet kiosk in remote villages, which operate by community member<sup>95</sup>. These Kiosk help to reduce time and expense for health service to rural area without hospital visit<sup>68</sup>.

## Conclusion

The health system of India, Brazil and South Africa are facing so many challenges includes huge health status gap between urban and rural areas, low level of health awareness, lack of sanitary and hygienic condition, cost of healthcare, scarcity of specialty care and under-resourced infrastructure. Moreover, there health system is unable to deliver health service in an effective and efficient manner because of resource constrain, lack of managerial practices and technology. In this situation, the innovation acts as supportive tool to overcome from all these challenge of health system. The different innovation concepts give positive impact on the performance of health delivery system and improve health outcome. Therefore, there is need to implement innovation base health delivery system enable to provide accessible, affordable and quality health services to all individual. The paper discussion different innovation include

marketing, financial, technology and operation innovation, and partnership in health sector has an important function to improve efficiency and effectiveness of health delivery system within constrain resource setting. The innovation is adding values or rectifies delivery process through implementing technological and management techniques to deliver inclusive health services. This also gives activist impact on economic growth and generation of wealth. Innovation based health delivery system perform as novel model of inclusive, sustainable and scalable health service delivery system.

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