



Innovation Technology in Health Care Management in the Context of Indian Environmental Planning and Sustainable Development

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ABSTRACT: Innovation technology in health care management is a significant challenge to the right to health and life. Access and affordability to healthcare have been a daunting task because of rising costs, case management, and adjudicating medical claims. We often contend to a status quo society that adopts proven systems and technologies and depriving ourselves of the potential benefits of innovative technology. India ranks in the 60th position at the Global Innovation Index (GII) 2017 in the adoption of innovative technology. It continues to import over 75 percent of medical devices. The innovation technology in health care management by our indigenous companies is a distant goal post in India. Therefore, it is high time to rethink to evolve a robust culture of innovation and new knowledge creativity in the era of knowledge economy by tapping the potentiality of the existing resources for sustainable economic growth. The innovation technology in health care management has shown commendable results in the referral and pre-certification services, digital imaging, and electronic medical records (EMRs). The ICT enabled e-healthcare model in primary health centers (PHCs) of some states in India heralded an innovative health delivery model. Taken as a whole, innovation and technology drivers have a marginal existence in the Indian healthcare delivery system and urgently need a paradigm shift to augur inclusiveness and sustainable development.

Keyword: Innovation technology, Information Technology, Healthcare Management, equity and inclusiveness, sustainable development.

Abbreviations: Global Innovation Index (GII), Information Technology (IT), Electronic Medical Records (EMRs), Intellectual Property Rights (IPRs), Sustainable Development Goals (SDGs), *Bureaux Internationaux reunis pour la protection de la propriete intellectuelle* (BIRPI), *Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS), Millennium Development Goals (MDGs), World Intellectual Property Organization (WIPO), National Institution for Transforming India (NITI Aayog), Primary Health Centers (PHCs).

I. INTRODUCTION

The Global Innovation Index (GII) 2017 ranks India at the 60th position in the adoption of innovative technology. It lags behind countries like Ireland (10), South Korea (11), and China (22). Switzerland tops the GI list, and the US is in 4th position. Innovation technology in health care management is a significant challenge to the healthcare industry in India [1]. The increasing health costs and goal for universal healthcare is a daunting challenge in Indian health governance and equity. In this situation, information technology (IT) and innovation have the potential to provide quality services, reduced cost, patient e-profiling, adjudicating medical claims, referral and pre-certification services, case management, digital imaging, and electronic medical records (EMRs) [2]. The technological innovation are becoming more predictable and manageable but facing the dilemma between the competitive advantage of cutting edge technology and the risk of uncertainty in healthcare. The nature of innovation technology in health care management is classified in to non-disruptive or disruptive. The non-disruptive innovation is an evolutionary, incremental, linear, and sustaining change that improves the current additional opportunities [3].

On the other hand, disruptive innovations bring about transformational and exponential innovations. This innovation fundamentally alters old systems, create new market constituents and new markets, and deliver value opportunities to the adaptors of change. Healthcare is likely to experience substantial disruptive innovation technologies; therefore, the innovations are more pertinent now. There is an inverse relationship between IT innovation and IT-enabled innovation in health care. The McKinsey study evidenced that the productivity of the U.S. healthcare industry dropped by 0.8 percent annually in the 1990 to 2007 period, while the richness of the U.S. computer and semiconductor industry grew by 7.6 percent each year [4]. According to the estimate, it predicted that from 2018-2022:

The electronic health records (EHR) market is expected to grow at an average compound rate of 6% per year. Providers and organizations continue to house fragmented technologies which create barriers towards collaboration and data sharing opportunities [5].

The socio-economic factors mandate a focus on innovation, and the paper focuses on innovation technology in health care management in the Indian policy perspective for sustainable development.

II. MATERIALS & METHODS

The paper surveys health policies and governance in the broader perspective of *Paris Convention for the Protection of Industrial Property*, 1883 and the *Berne Convention for the Protection of Literary and Artistic Works*, 1886 administratively created *Bureaux Internationaux reunis pour la protection de la propriete intellectuelle* (BIRPI, the French acronym) in 1893 [6]. The World Intellectual Property Organization (WIPO) and NITI Aayog have further persuaded innovative approaches. The canons of statutory interpretation [7] Brint and Williams' pragmatism [8], and Maxwell's qualitative research design in a techno-legal context are analyzed [9]. The study suggests that health technologies can sustain by a meticulous nurturing of methodological and technological innovations in the reduction of service costs and quality healthcare at affordable prices.

III. RESULTS

Despite the boom in IT-based innovation, India continues to import over 75 percent of medical devices. The indigenous companies manufacture low-cost commodity products like bandages, syringes, patient monitors, test kits, and stainless steel instruments. Most of the production components and devices manufactured abroad. It is only a handful of MedTech firms are engaged in the creation of novel products. The innovation technology in health care management is a distant goal post in India. Thus hurdles and hiccups in cost-effective delivery of state-of-the-art healthcare services to the masses remain elusive in their realization to right to health [10, 11].

A. Innovation in Health Technology & Intellectual Property

It is imperative to examine the innovation technology in health care management from intellectual property rights (IPRs), biodiversity access, and Sustainable Development Goals (SDGs) [12]. The *Paris Convention*, 1883 institutionalized IPRs. The need for the robust administrative framework fulfilled by the *Berne Convention*, 1886. The BIRPI, 1983, created an impetus to innovation technologies [13]. The World Intellectual Property Organization (WIPO) implored national IP strategies for the creation of an innovative ecosystem in health care management [14].

The post globalization phase witnessed the *TRIPS Agreement*, 1995. The United Nations Millennium Development Goals (MDGs), and Sustainable Development Goals SDGs with 17 SDGs and 169 targets further desired an innovation ecosystem [15]. The most blatant manifestation underpinned in Target 3.b of SDG 3 provides for access to affordable essential medicines and vaccines:

The Doha Declaration on Public Health affirms the right of developing countries to use to the full the provisions in the TRIPS regarding flexibilities to protect public health and, in particular, provide access to medicines for all [16].

The WIPO Committee on Development and Intellectual Property (CDIP) in 2016 also called for an enabling environment to support the innovation in technological

development, and diversity in creativity, which will be essential for achieving the SDGs [17].

B. Innovation in Health Technology & SDGs

The technological innovations within the ordinary business function with traditional management controls, necessitates hard choices for swinging into action and reform. They should nurture in an environment that is radically different from the existing business settings. Now it is easier to build a nexus of innovation, IPRs, and SDGs in fostering creativity and innovativeness in the health right discourse [18]. A perusal of the SDGs reveals adoption of innovative technologies directed towards zero hunger [SDG 2] healthy lives and wellbeing, [SDG 3] clean water and sanitation, [SDG 6] affordable and clean energy, [SDG 7] decent work and economic growth, [SDG 8] foster innovation, [SDG 9] sustainable cities and communities [SDG 11] and climate change [SDG 13]. At a policy level, innovation can assist in achieving other sustainable development Goals such as no poverty, [SDG1] decent work and economic growth, [SDG 8] life below water, [SDG 14] and life on land [SDG 15]. Moreover, certain SDGs are relevant to the settings of an innovation policy framework, notably gender equality, [SDG 5] decent work and economic growth [SDG 8] reduced inequalities [SDG 10] and responsible consumption and production [SDG 12]. Seen in this lens, one finds that an energetic imbalance exists in urban-rural areas in terms of the availability of doctors. According to an estimate, there are four times medical practitioners in urban areas compared to rural areas [19]. This compound the fact of the density of doctors, which is one per 1,000. In this grim situation, the only hope lies in the technological innovation in healthcare and medical infrastructure on a massive scale.

IV. DISCUSSION

The complex regulatory and policy framework, supportive ecosystem, innovation gap, and lazy approach to health care technologies in the diversity and vastness of the country can pose some of the hardest problems to tackle. With global revenues of an estimated \$2.8 trillion, the Indian healthcare industry is the world's largest industry. Therefore, the country's high population requires technological improvement in public healthcare delivery in general and rural people in particular [20]. India's efforts for innovation in this direction can be examined and the achievement of the multi-layered approach of SDGs under Indian policies and plan of Planning Commission, *NITI Aayog* and *Atal Innovation Mission* (AIM), *Atal Tinkering Labs*, *Atal Incubation Centers*, and *Self-employment and Talent Utilization (SETU) schemes* [21].

A. Five Years Plan & Innovation Planning

Peeping into the Indian planned approach to foster innovative health care technologies through five-year plans of Planning Commission as the most blatant articulation of our innovation policy seems in order. A careful perusal from the 5th Five Years Plan (1974-1978) to Twelfth Five Year Plan 2017 is undertaken in lines to come. For the First time, the 5th Five Years Plan (1974-1978) deals with the research priorities in innovations in developing food, nutrition, and health security [22]. The

6th Five Years Plan (1980-1985) heralded dissemination of knowledge and technological innovations by public and private enterprises [23]. While in the 7th Five Years Plan (1985-1990), adopted scientific and technological advances in transforming innovation [24]. The 8th Five Years Plan (1992-1997) emphasized innovation through in house research and development by the industry [25]. The 9th Five Years Plan (1997-2002) has been definite to the improvement of the technological competitiveness, enhancement of export potential, university-corporate R&D spending, lab to industry conversion, indigenous innovation, and IPR protection [26]. In line with the earlier plan, the 10th Five Years Plan (2002-2007) focused on technology development and transfer, innovations in patent and quality research publications and to address biotechnology-related intellectual property rights (IPR) issues holistically [27]. In 11th Five Years Plan focused on promoting creativity and innovation among individuals and industry. It runs as under:

Promoting and supporting industry for the development of new products, processes, and technologies; attracting venture capital funding; developing the consultancy profession; promoting commercialization of technologies in India and abroad; and creating awareness about the latest IPR regime on innovations created at the expense of considerable investment of resources would demand a matching intellectual property rights regime [28].

The Twelfth Five Year Plan strengthened the IP regime and systems for the creation of innovations in the industry. To fulfill the above goals, the need for a stable IP regime from a long-term point of view, the following steps need to be taken:

Improve IP management and protection mechanisms, develop global information database on IPs accorded, strengthen and modernize the process of patent examination, and according to patents. To leverage the benefits of IP, to build awareness of IP through education and training, create a national IP mission to evolve the IP strategy of the nation continually, encourage joint IP filings by industry, academia and research institutes, and encourage the formation of companies specializing in IPs [29].

It also strengthens the partnership between industry, academia, and other research institutes to create IPs domestically; innovation on a sustained basis by focusing on science and technology and R&D and patent filing and commercialization [30]. This plan comprehensively realized change by enhanced focus on innovation could have an impact much beyond the realm of S&T in diverse areas such as health delivery and governance [31].

B. Role of National Institution for Transforming India

The role of National Institution for Transforming India popularly known as NITI Aayog has been seminal in promoting innovation health technologies and management. The Government of India, on 1st January 2015, rechristened the Planning Commission of India as *NITI Aayog* to thrash out strategic and technical advice across the spectrum of policy [32]. *NITI Aayog* makes a three-year Action Agenda of India (2017-18 to 2019-20), which focuses on improving *the administration of the patent regime*. In furtherance to this objective, it

prioritized the development of productivity-enhancing technologies in agriculture to encourage innovations in health in an environmentally sustainable manner [33]. It strives to put in a robust legal system that incentivizes innovation in a country. The Atal Innovation Mission (AIM), Atal Tinkering Labs, Atal Incubation Centers, and Self-employment and Talent Utilization (SETU) are a pointer to this effect that strives to promote a culture of innovation and entrepreneurship [34]. Its objective is to serve as a platform of world-class Innovation Hubs, Grand Challenges, Start-up businesses, and other self-employment activities, particularly in technology-driven areas [35]. There is a need to have a trade-off between bringing an insufficient level of technological innovations to provide quality health services at a cost-effective method for equity and the greater common good [36]. India has a very healthy Healthcare start-up economy having the potential to represent the 'front-end' of what technology advancements in healthcare delivery management [37]. There is no Indian university in the top hundred what to talk of any medical institution in the country [38]. There is a need to integrate core IT infrastructure and innovative technologies for surgical, diagnostic, and therapeutic governance.

V. CONCLUSION

In its penultimate analysis, one finds that though India ranked third in the world in the number of science and technology, our ranking in the Global Innovation Index slides marginally from 66 to 60. The rise of patent filing and commercialization has shown steadfast during years, but much more will reflect in innovation in medical and health care technologies in the coming times. According to the genuine estimation in the coming years, the EHR market will compound and exacerbated because of technological innovations and Health apps by giant techno-savvy companies in public and private healthcare. India's R&D expenditure has increased, but R&D spending still lags significantly. The lack of transformative innovation across industries is something that India should be concerned about it.

VI. FUTURE SCOPE

It is high time to rethink to evolve a robust culture of innovation and new knowledge creativity in the era of knowledge economy by tapping the potentiality of the existing resources for sustainable economic growth. The Biocon Foundation ICT enabled the e-healthcare model in primary health centers (PHCs) of Karnataka, and Rajasthan heralded an innovative health delivery model in 2015. However, this is the tip of the iceberg in the vast ocean of mediocrity and sub standardization of health care delivery. Our health care system places more emphasis on conformance and reproducibility rather than innovation and novelty. That is why innovation and technology drivers are marginally in existence in the Indian healthcare delivery system. The biodiversity driven medicinal preparation and healthcare system in India is the pointer. There is an urgent need to dovetail innovation in health care technologies and the public health delivery system in the policy paradigm for inclusiveness and sustainable development.

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Conflict of Interest. No.

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