

WHAT DOES IT TAKE TO BUILD AND SCALE **DIGITAL** HEALTH SOLUTIONS FOR THE UNDERSERVED?

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Acknowledgements

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About Public Health Foundation of India

The Public Health Foundation Of India (PHFI), is a public-private initiative that has collaboratively evolved through consultations with multiple constituencies including Indian and international academia, state and central governments, multi & bi-lateral agencies, and civil society groups. PHFI focuses on broad dimensions of public health that encompass promotive, preventive, and therapeutic services, many of which are frequently lost sight of in policy planning as well as in popular understanding. Cutting across major disciplines of public health, PHFI is working through education, training, research, implementation, policy, and advocacy efforts. PHFI has a network of five Indian Institutes of Public Health (IIPH), five Centres of Excellence (Chronic Diseases, Digital Health, Environmental Health, Social Determinants of Health and Disabilities Inclusive Research), a training division to build capacity in public health researchers and practitioners, and a Health Promotion and Communications divisions that develops and implements settings based programmes and catalyse direct outreach through mass media. Structured as an Independent foundation, PHFI envisions to strengthen India's public health institutional and systems capability and provide knowledge to achieve better health outcomes for all.

About Sattva Knowledge Institute

Sattva Knowledge Institute (SKI), established in 2022, is our official knowledge platform at Sattva. The SKI platform aims to guide investment decisions for impact, shedding light on urgent problems and high potential solutions, so that stakeholders can build greater awareness and a bias towards concerted action. Our focus is on offering solutions over symptoms, carefully curating strong evidence-based research, and engaging decision-makers actively with our insights. Overall, SKI aims to shift intent and action toward greater impact by influencing leaders with knowledge. All of our content proactively leverages the capabilities, experience and proprietary data from across Sattva.

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Glossary

ABDM	: Ayushman Bharat Digital Mission
AI	: Artificial Intelligence
CHW	: Community Health Worker
CSO	: Civil Society Organisation
EHR	: Electronic Health Records
HMIS	: Health Management Information Systems
ICT	: Information and Communications Technology
IoT	: Internet of Things
ML	: Machine Learning
MO	: Medical Officer
MRI	: Magnetic Resonance Imaging
OOPE	: Out-Of-Pocket Expenditures
OPD	: Outpatient Department
PHFI	: Public Health Foundation of India

Executive Summary

With the growing digitisation of the healthcare sector in India, there is also a growing risk of excluding underserved populations.

Digital health has emerged as a potential game-changer for enabling accessible, affordable, and quality health care for all. The pandemic catalysed the adoption of digital health solutions among both providers and citizens and has shown great potential to bridge the gaps in the existing healthcare system. Globally, the digital health landscape is maturing rapidly, with investments in digital health reaching US \$57.2 billion in 2021. India too is experiencing a rapid maturing of the digital health ecosystem. Launching the Ayushman Bharat Digital Mission (ABDM) is a step toward the long-pending digital standardisation of the healthcare sector. Strong tailwinds, such as the changing patient and provider attitude toward digital solutions, burgeoning private sector investment, and an enabling environment created by government initiatives are helping India move towards a strong digital revolution. The benefits of which will enable greater accessibility and affordability of quality healthcare solutions for all. However, the existing gaps in digital infrastructure, as well as the disparities created due to socioeconomic factors such as a lack of digital literacy, affordability, gender biases, and age gaps among others, limit the reach and adoption of digital health solutions for a population that needs it the most.

There also is a fractured understanding within the ecosystem about what comprises digital health, how it is to be used, and what challenges and opportunities can stakeholders anticipate, especially to scale digital health adoption in underserved markets. Given the nascent space and latent understanding of digital health, its application in the underserved market requires addressing the following factors and challenges:

- As digital health starts to gain prominence, it is critical to ensure that **there is a common vocabulary that is all-encompassing** to effectively rally and align ecosystem stakeholders and ensure a collaborative approach towards key areas of need.
- **Proactively identifying solutions** based on target populations will ensure that, while we focus on the low-hanging fruits that can accelerate digital adoption among citizens and providers, we recognise that **solutions are not uniform across populations**.
- Given there are a number of approaches within the ecosystem towards the adoption of digital health, **prioritisation on where to start is crucial**. Among multiple factors, one must look at the target group, the specific challenge that is being solved, the existing consumer behaviour and the long-term sustainability of the solution.
- By **bringing in diverse stakeholders** who might traditionally be missed in conversations around digital health, and promoting **innovative approaches to incentivise end-users**, there is an opportunity to enable effective adoption of digital solutions for underserved populations.

A three-pronged approach to drive digital health adoption in the underserved market:

- **Driving digital healthcare adoption at the provider and citizen level.**

There is untapped potential for digital health, which can improve the access to quality healthcare for the underserved population. To enable this, efforts are needed to improve the overall health-seeking behaviour among the citizens and ensure effective communication of the value proposition of digital health for both citizens and providers. System-wide incentives can be introduced to drive greater adoption of digital health. For example, innovating newer models that reduce the cost burden on both citizens and providers, distributing the financing burden to incentivise adoption, removing disincentives such as duplication of effort, and investing in building digital literacy for frontline workers and citizens.

- **Reducing friction for solution providers to navigate system complexities.**

Advocacy efforts are needed for the creation and update of data privacy policies. For wider adoption of ABDM, the government can implement regulatory changes, offer meaningful incentives and impose penalties associated with non-compliance. Philanthropic organisations can support the solution developers in navigating the complex regulatory and procurement pathways, by providing legal and technical assistance. Philanthropic organisations can also provide initial risk capital to solution developers to encourage innovation and experimentation. Incubators in partnership with academic institutions, local civil society organisations (CSO), government or philanthropy can support the creation of a structured environment for solution developers to effectively test and validate their solutions on the ground.

- **Creating an enabling environment that can address business model challenges.**

A thorough understanding of funding flows and cost-bearing stakeholders is necessary to enable different stakeholders to mitigate any additional financial burden on underserved populations. Mainstream capital providers and philanthropic funders could collaborate to identify innovative financial instruments, such as blended finance and outcome-based financing, to encourage start-ups to expand in the underserved ecosystem.

About the Roundtable

The launch of ABDM has thrust the area of digital health into the limelight. There is, however, fractured understanding within the ecosystem about what comprises digital health, how it is to be used, and what challenges and opportunities can stakeholders anticipate, especially to scale digital health adoption in the underserved markets. This necessitates ecosystem players at the intersection of health and digital solutions to discuss, share perspectives and arrive at a common, clear understanding of the subject.

Sattva, in collaboration with the Public Health Foundation of India (PHFI), engaged with domain experts and industry leaders in a round table discussion on Building and Scaling

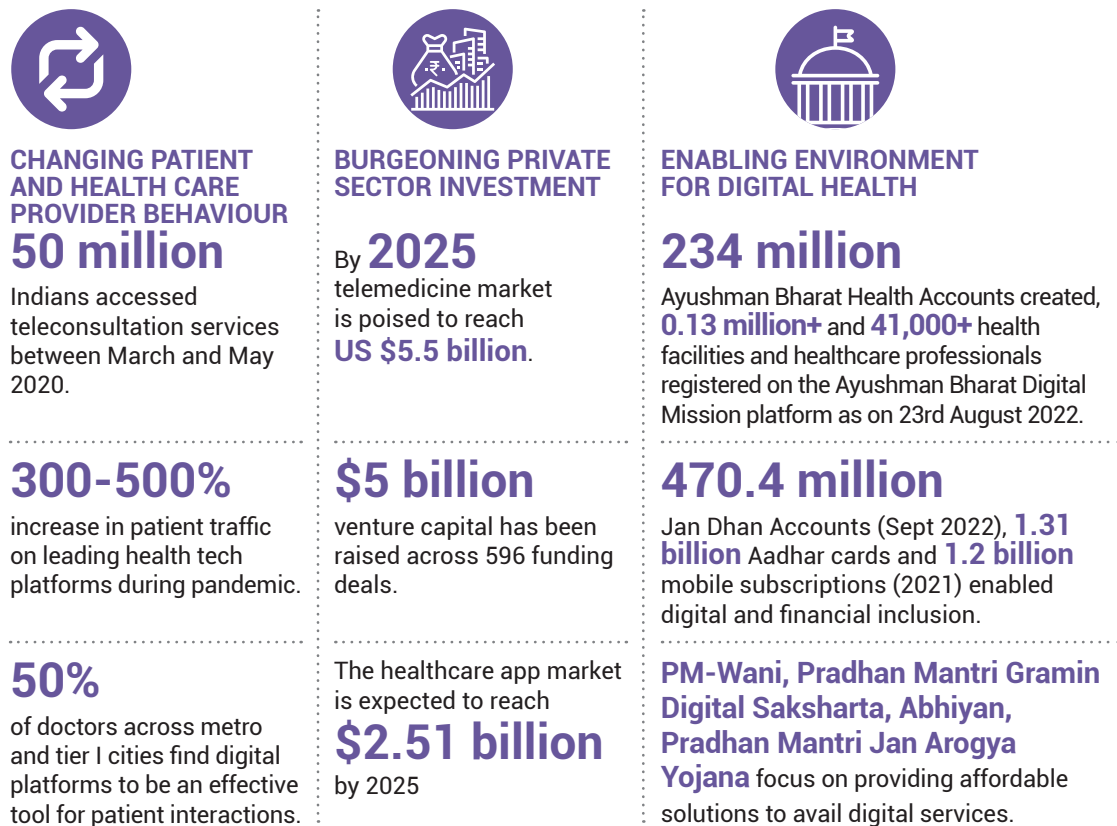
Digital Health Solutions for the Underserved, on August 24, 2022. This perspective condenses their insights in an initial attempt to obtain clarity about the digital health landscape, and explore how it can be made inclusive, scalable and sustainable.

Background and Context

Digital health refers to the use of digital, mobile, and wireless technologies to support achieving of health objectives. The inclusion of digital platforms, 'smart' wearable devices, artificial intelligence and machine learning (AI/ML), big data analytics, the Internet of Things (IoT) and blockchain in healthcare delivery, can enhance health outcomes. They will add value to improving diagnosis, pre-emptive care, data-based treatment and the development of evidence-based knowledge (World Health Organization 2021).

India is at the cusp of a digital health revolution, which is to be anticipated with the rising adoption of digital health solutions. This is being encouraged by changing patient and healthcare provider behaviour, private sector investments and a favourable policy environment.

Figure 1: Tailwinds supporting the digital health revolution



(Boston Consulting Group, Federation of Indian Chambers of Commerce & Industry 2020; EY-IPA 2020; HealthTech Alpha 2022; HTF Market Intelligence 2020; Ministry of Finance, GoI, 2022; National Health Authority, ABDM n.d.; Unique Identification Authority of India 2022; Deloitte 2022)

DIGITAL HEALTH SOLUTIONS FOR THE UNDERSERVED

These solutions can catalyse the achievement of health goals for the masses by supplementing service delivery at all points in the continuum of care, that is, prevention, screening and diagnosis, treatment and post-treatment. With the help of digital health solutions:

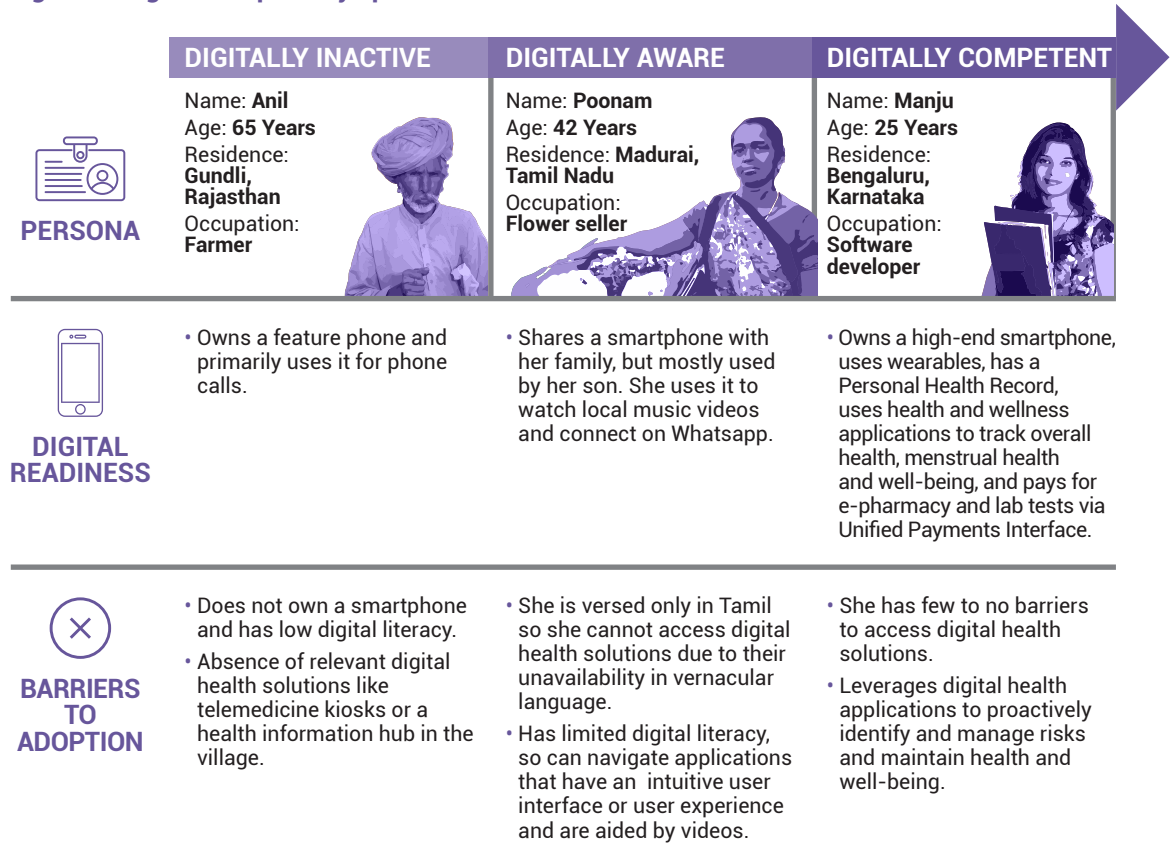
- **Individual and nationwide health emergencies can be tackled.** Timely information about hospitals and health registries and hospital records accessible through national databases can be life-saving in the event of pandemics and medical emergencies. Patients can avoid high out-of-pocket expenditure (OOPE) for treatment if they have insurance coverage facilitated by the digitisation of their records.
- **Health and well-being can improve** for the population at large. Disease outbreaks can be predicted and stemmed preemptively with the availability of statistically significant data. Healthcare providers can also preempt risks for patients with access to their longitudinal electronic health records (EHRs). Screening and diagnosis coverage can be expanded for larger populations with the availability of point-of-care devices.
- Solutions such as teleconsultation, e-pharmacy, home diagnostics, teleradiology, and so on, can contribute to increased access for all citizens by bypassing geographical and financial hurdles and achieving **universal health coverage**.

While this shows the great potential of digital health in augmenting care delivery and universal health coverage, there remains a high risk of exclusion of the population, particularly the marginalised and underserved, who would benefit the most from this technological integration. The adoption of such solutions is predicated upon the availability of a strong information and communication technology (ICT) infrastructure and equitable access to technology for all groups. Just over half of all Indians have access to the internet and use smartphones, but women are 20% less likely to use these devices than men. Smartphone usage is also heavily skewed towards younger populations, with less than 5% of smartphone users being above 55 years of age. The urban-rural divide also intensifies this gap, with only 25% of rural Indians having access to the internet as compared to over 60% of urban Indians. Availability of solutions, which are predominantly in English, also excludes nearly 96.6% of the population from using them comfortably (GSMA 2020; Joshi S, et al.; Mothkoo, V, et al. 2021; CMIE; Oxford University Press; Website (Lok Foundation), Livemint; 2019).

As a result of this digital divide, citizens and healthcare providers are placed at different points in a spectrum of digital competency.

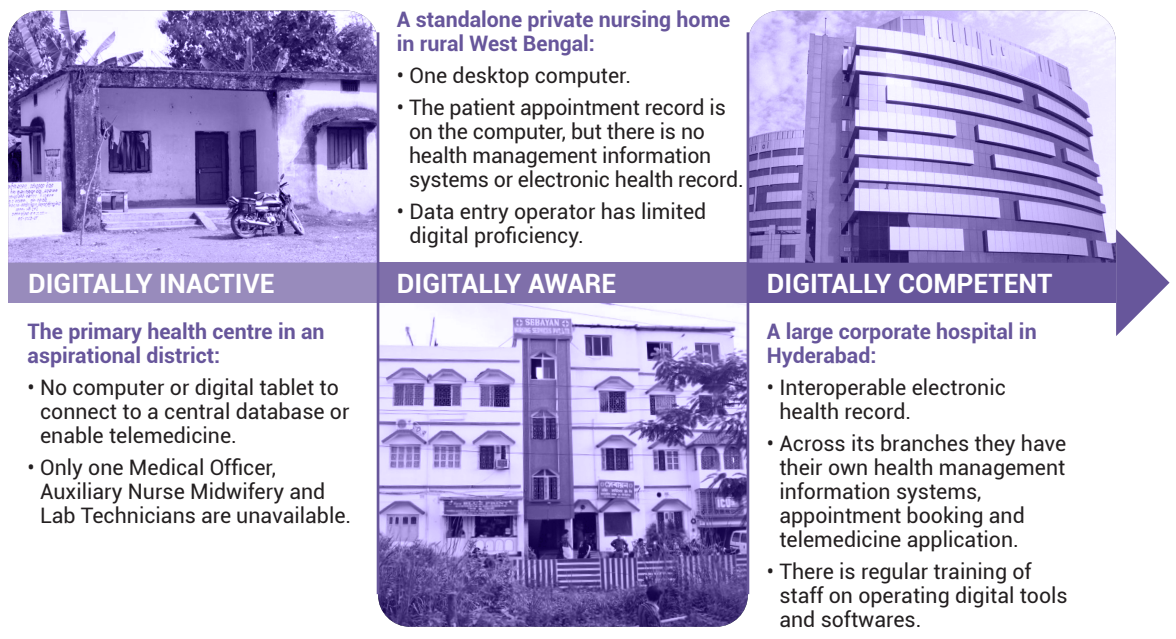
Access barriers for these groups of users, as well as interlinked systemic complexities should be addressed for the widespread adoption of digital health solutions. The following sections delve into potential areas of intervention to achieve this.

Figure 2: Digital competency spectrum: citizens



(Sattva 2022)

Figure 3: Digital competency spectrum: healthcare providers



(Sattva 2022)

Developing a Common Vocabulary for Digital Health

As digital health gains prominence, it is essential for the ecosystem to adopt a common, all-encompassing vocabulary to articulate it. The multiplicity of scope and definitions act as a bottleneck to stakeholders who could otherwise align themselves and intervene in key areas of need. Accounting for user groups on the lower end of digital competency, concepts in digital health should expand beyond the existing focus on AI, IoT and blockchain. An inclusive range of solutions should treat technology as a means to achieve better health outcomes, rather than as a stand-alone sole pillar. The new approach to defining digital health should, therefore, place diverse groups of consumers and the healthcare system at the centre, rather than technology.

“Digital health can be defined as software products and solutions which leverage healthcare information (clinical, administrative, financial) to improve healthcare quality, access and costs across individual care and public health continuum.”

– Rizwan Koita, Co-founder, Koita Foundation

In addition to establishing a common understanding of the concept, it is also crucial to clearly identify the kind of problems that solutions aim to address. For example, solutions for women's and children's health that involve breast and cervical cancer screening, activities to reduce maternal mortality rates, stunting and malnutrition among infants, would all have to be designed differently from those for broader public health challenges, like managing diabetes in rural communities.

A thorough understanding of the continuum of healthcare, and the existing gaps therein, is also important for effective solution design and implementation. Health outcomes can be achieved efficiently if digital health solutions are built for specific areas of need. Some ways to compartmentalise this are as follows:

- Covering acute and chronic disease management that requires prolonged or palliative support across care delivery touch points in primary, secondary and tertiary care.
- Creating spaces for interactions between patients, healthcare providers and health insurance payers for a better understanding of protocols and care plans, pathways for schemes, and patient journeys.
- Bridging the accessibility gap through remote diagnostics, delivery and administration of medicine, and use of medical devices, which would encompass data and interoperability.



Proactively identifying solutions relevant to underserved markets to accelerate digital adoption among citizens and providers.

Digital health solution design involves identifying funding and revenue generation streams. There are differing opinions in the ecosystem about who should fund health interventions. It is commonly acknowledged that doctors or hospitals bear a bulk of the investments, which places a disproportionate cost on them. On the other hand, it is also suggested that some end-users show willingness to pay for solutions if the value they can generate is communicated effectively.

Channels for investment and revenue, as well as the digital competency of the end-users, are both crucial factors to consider while developing digital health solutions. As a shift in the type of stakeholders involved would lead to different solution outcomes. Therefore, these should be developed with the target group(s) identified at the very outset.

“For underserved populations, the focus for digital solutions is not so much on apps and services that beneficiaries themselves can use, but rather on solutions that enable better logistics, strengthen and increase capacity of caregivers and make access to care less expensive.”

– Srinivas Ramanujam, CEO Villgro Innovations Foundation

A well-designed digital health solution clearly understands its end-user profiles. For certain solutions the end-user is the hospital itself, for some, it is digitally literate people who might download apps for their healthcare needs, and for others, the end-users are rural populations with limited knowledge of and access to technology. Therefore, it is crucial to take into account the specific user needs and user profiles and design contextualised solutions for them. Factors such as location, urban or rural, access to information, and ease of adoption also need to be taken into account while developing strategies for adoption.

Digital solutions can easily reach users in metro cities. But in rural areas, it is cheaper and easier to employ offline resources to reach the last mile, as the cost of employing human resources is low.

While developing products for low-cost private sector hospitals and doctors, solution providers must recognise that the actual cost for these end-users is not the cost of the digital tool itself. Instead, they need to invest in implementing and integrating the tech into their institutions' existing systems. In other words, solution providers should factor in the cost of change for their end-users, and their resulting reluctance, while designing products. Identifying and building the solution around it would ensure the development of products that see smoother adoption among hospitals of different sizes and locations. Perspectives also differ on the best approach for the adoption of digital solutions.

Some advocate for a **focus on deployment and acceptance of digital solutions among metropolitan, top-of-the-pyramid populations first**. The rationale is that these segments will be more likely to adopt innovations readily, after which the solutions tend to trickle down to late adopters. In this approach, therefore, the target is the low-hanging fruit, that is the digitally competent segment which can demonstrate the products' value proposition and facilitate adoption among the rest of the population.

An alternative approach suggests that digitally challenged populations need altogether different solutions, eliminating the need for solutions to trickle down from the digitally competent groups. The diversity among these groups, the cultural challenges, and the socioeconomic disadvantages they face require that digital health products are tailor-made for them, for easy use and economic viability.

Ensuring the Suitability and Sustainability of Digital Health Solutions

Given that there are different approaches towards the adoption of digital health, prioritisation on where to start is crucial. In addition to the aforementioned factors, providers should also investigate existing consumer behaviour and long-term sustainability for implementing the solution effectively.

Understanding patterns in the prevalent behaviour of intended customers, and helping them build comfort with digital interactions can ensure smoother adoption of new solutions. It is observed that users with established smartphone literacy demonstrate a higher uptake of digital health products. Products could find greater success by starting with similar groups which exhibit ease with, and openness towards digital platforms, as opposed to users from areas with limited internet penetration.

In areas where internet and smartphone use is limited, or users show greater resistance to new digital solutions, a *phygital* (physical + digital) approach could be effective. This approach leverages the social capital of existing community networks, involving Panchayats, Anganwadi workers, community health workers (CHWs) and school teachers, to spread awareness about the benefits of digital adoption. In this case, the trust and competencies of key community figures allow users to develop comfort with digital health solutions.

“The health sector is famed for pilots for tech products, innovations and digital applications. Products and applications need to be demonstrated at a certain level of scale, else we will continue to keep adding to the graveyard of pilots in digital health technologies.”

– Sameer Kanwar, Director, Digital Health, PATH

Advocacy efforts are key to ensuring the sustainability of digital health solutions. Stakeholders must push for deployment-ready solutions to be made available to the right policy-maker and decision-making authorities, such as the Ministry of Health and Family Welfare. This is critical for the adoption of solutions at scale, leading to proportionate impact.

Financing digital health to shift the burden of payments from end users is also crucial for the adoption of digital health.



Encouraging innovation and stakeholder diversity.

Even as scaling up of interventions requires government support, the private sector has the resources to help innovate and develop disruptive technologies, such as wearables, medical devices and software. Behavioural change among end-users can be incentivised by innovative methods such as bundling healthcare and affordable insurance, or pocket-friendly subscriptions for digital health management tools. Early adopters in remote or challenging geographies can be encouraged to adopt digital solutions by providing them with incentives such as free mobile data vouchers.

Taking digital health solutions to underserved populations would also entail including stakeholders who have hitherto not participated in conversations around digital health. Such stakeholders could help bridge existing gaps in the adoption of solutions at the last mile. For example, personnel at common service centres could be trained to assist users with scheme registration. Pharmacists could be involved to disseminate information about wearables and other health management tools. These could also act as touchpoints for gathering insights about user behaviour and needs, contributing to effective solution development. Communicating the value proposition of digital health solutions to mid-level bureaucrats could establish a cadre of ambassadors for awareness generation at the district and lower levels. Capacity-building of village and ward-level staff to enable access to digital solutions could ensure that end-users see immediate benefits, develop comfort with the technology, and eventually adopt some of the solutions.

A Three-pronged Approach to Drive Adoption

The present landscape calls for a nuanced approach to digital health adoption. Ecosystem enablers such as philanthropy, non-profit, government and private market players, need to address three key areas to drive penetration and usage of these solutions among underserved populations.



Driving digital healthcare adoption at the provider and citizen levels.

Community-level stakeholders should collaborate with other players to promote health-seeking behaviour and build trust among rural populations and smaller healthcare providers. Sustained digital adoption can be achieved only if end-users perceive value in maintaining and improving their health.

“In order for end-users to even be adequately incentivised, we as a population have to first value our own health, we have to want to invest and see value in investing in better healthcare which hasn't happened yet.”

– Manuj Garg, Co-founder, MyUpchar

Adoption could be encouraged by clearly communicating the value proposition, and **creating system-wide incentives** such as:

- **Incentivising adoption among healthcare providers and citizens by innovating newer models that reduce the cost burden on both.** For example, low-cost health management information systems (HMIS), solutions customised to the need of specific healthcare facilities, innovation in Outpatient Department (OPD) insurances and faster processing of e-claims over physical insurance claims. Such measures would enable the digitisation of hospitals, nursing homes and clinics.
- **Citizens can be incentivised to digitise health data for better preventive care as well as to access funds during curative care and health emergencies.** Including faster processing of e-insurance claims and access to credit for financing healthcare emergencies beyond insurance.
- **Distributing the financing burden to incentivise adoption.** This can be done by identifying new business models that reduce the cost burden on the citizens and smaller healthcare providers. Such as innovations in OPD-led insurance models, cross-subsidisation across various buyer profiles, and insurance payer-led models. This will ensure that hospitals that are compliant are not at a competitive disadvantage as compared to their counterparts who have not adopted digital solutions yet.
- **Creating a common philanthropic fund pool to promote provider and citizen adoption, through free trials and subsidised payments of digital health solutions.** This would give users enough time to understand the value proposition before complete adoption.
- **Eliminating disincentives, such as duplication of effort,** by removing the mandate of paper-based record keeping in digitised facilities.
- Investing in building **digital literacy for frontline workers and citizens** by partnering with academic institutions and local CSOs, to bridge the digital divide for last-mile adoption could also ensure uptake.



Reducing friction for solution providers to navigate system complexities.

Advocacy should be oriented towards the **creation and updating of policies** for data privacy and onboarding of new digital health solutions. By implementing regulatory changes, offering meaningful incentives and imposing penalties associated with non-compliance, the Government can facilitate wider adoption of ABDM guidelines for a range of stakeholders.

Philanthropic organisations can intervene to support digital health solution providers, as they navigate the complex policy and regulatory ecosystem. Since they have a **shared resource pool of legal and technical advisors**, they can mutually establish communication with policy and decision-makers, and create toolkits to build policy understanding.

Philanthropy, government grants and incubators can support solution providers with capital in the initial phases of innovation and experimentation. Solution providers must note, however, that a solution cannot be sustained at scale with philanthropy. Consumers' willingness to pay is crucial for the feasibility and long-term sustainability of any solution.

A structured environment in partnership with incubators and academic institutions can be created **for solution developers to effectively test their solutions**, such as a geographical micro-site in partnership with local government and CSOs to test digital health solutions in a real setting. This will enable startups to identify areas of convergence with the healthcare delivery system for long-term sustenance.



Creating an enabling environment that can address business model challenges.

A thorough understanding of funding flows and cost-bearing stakeholders is necessary to enable different stakeholders to mitigate any additional financial burden on underserved populations.

Self-sustaining solutions will have a higher chance of success. Clearly identifying uptake challenges and bundling complementary solutions is one way to ensure this. For example, Villgro supported the collaboration between 5C Networks and GenWorks, GE Healthcare's distribution hub which focuses on tier II and III cities. GenWorks struggled to sell their Magnetic Resonance Imaging (MRI) machines in tier II and III towns due to a lack of trained radiologist technicians. A capacity-building software by 5C Networks was therefore bundled with the machines, thus addressing the resource and skill gaps, and leading to higher sales.

Mainstream capital providers and philanthropic funders could collaborate to identify innovative financial instruments, such as blended finance and outcome-based financing, to encourage start-ups to expand in underserved ecosystems.

“Potential areas such as blended finance can play a key role in digital health. One key role is derisking in the form of guarantee through institutions such as NIIF.”

– **Aadit Devanand**, Principal, KOIS Invest

Conclusion

While the digital health ecosystem is nascent, it is poised to grow significantly over the next few years. Stakeholders are in agreement about the value of adopting digital solutions in healthcare for the underserved masses. It is also established that there is room for intervention at all points in the continuum of care, and governmental support is indispensable in realising the potential of digital health solutions at scale.

However, there are differing opinions about scope, approach and financing models. Continuous engagement, alignment on common principles and objectives, and convergence of initiatives are therefore essential. This harmony will enable stakeholders to arrive at effective action plans, to make digital health solutions available to the underserved and marginalised populations of India.

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