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Is the doctor *on*? In search of users for medical software in rural Himalayas

Payal Arora

The Indian healthcare sector provides ripe ground for development as access to high-quality and timely medical diagnosis remains unrequited among its vast rural populace. With an acute shortage of doctors in rural areas, medical diagnostic software has been created as a surrogate, propelling non-physician workers to step in. For diagnostic software to function effectively, it is paramount to identify the user. Using an intended pilot programme of RightChoice *software in the central Himalayas, the present article focuses on the political and economic complexities involved in identifying users of such software.*

Le docteur est-il disponible ? En quête d'utilisateurs pour les logiciels médicaux dans les zones rurales de l'Himalaya
Le secteur indien de la santé constitue un terrain fertile pour le développement, étant donné que l'accès à un diagnostic médical de qualité et opportun reste insuffisant parmi sa vaste population rurale. Étant donné la pénurie aiguë de médecins dans les zones rurales, des logiciels de diagnostic médical ont été créés comme moyen de substitution, ce qui a encouragé l'entrée en scène d'intervenants non qualifiés en médecine. Pour que les logiciels de diagnostic fonctionnent efficacement, il est essentiel d'identifier l'utilisateur. À l'aide d'un programme pilote prévu de mise à l'épreuve du logiciel RightChoice dans la zone centrale de l'Himalaya, cet article se concentre sur les complexités politiques et économiques présentes dans l'identification des utilisateurs de logiciels de ce type.

O doutor está? Em busca de usuários de software médico na região rural do Himalaia
O setor de serviços de saúde indiano oferece uma ótima base para o desenvolvimento pois o acesso a diagnósticos precisos e de alta qualidade permanece sem contrapartida entre sua vasta população rural. Com uma grande escassez de médicos nas áreas rurais, um software de diagnóstico médico foi criado como um substituto, estimulando a atuação de trabalhadores que não são médicos. Para que o software de diagnóstico funcione efetivamente, é fundamental identificar o usuário. Utilizando um programa-piloto do software RightChoice na área central do Himalaia, este artigo concentra-se nas complexidades políticas e econômicas envolvidas na identificação de usuários de tal software.

¿Está el doctor? A la búsqueda de usuarios de programas informáticos médicos en las Himalayas rurales
El sector de salud de India ofrece un amplio campo de desarrollo ya que para la inmensa población rural el acceso a diagnósticos oportunos de alta calidad es limitado. Como alternativa a la escasez

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de médicos en el área rural, se han diseñado programas informáticos de diagnóstico médico que pueden ser utilizados por personas sin preparación en medicina. Para que tales programas funcionen bien, el requisito indispensable es la identificación del usuario. Este ensayo destaca las dificultades políticas y económicas que surgen a la hora de identificar a los usuarios del programa informático piloto RightChoice en los Himalayas centrales.

KEY WORDS: Social sector; Technology; South Asia

Introduction

Currently, about 512 million people in India do not have access to a physician, particularly in rural areas (eHealth 2007). The migration of doctors to the cities is increasing exponentially, given the socio-economic promises of the city in this new emerging market. Most of India's 650,000 rural villages, where two-thirds of the population resides, have few options but to seek diagnosis from healthcare providers with less than a high-school diploma. (Banerjee, Deaton, and Duflo 2004). Seventy-five per cent of allopathic practitioners reside in cities, leaving space for a crop of un- or under-qualified practitioners to serve the rural public. For example, it was found that among rural general practitioners, only 29 per cent knew the exact composition of oral rehydration solution (ORS) for diarrhoea – an often fatal yet easily preventable malady among the poor – and none knew the right method of preparing the ORS package (Patil *et al.* 2002). The goal of access to healthcare, in rural India and elsewhere, is not just about consulting a physician but also about getting quality diagnosis and treatment.

To address this chronic *brain drain* of doctors to the city, governments have tried numerous policy initiatives across the decades to retain practitioners in villages, but with little success (Goel, Bali, and Singh 2007). In recent years, however, the government has seriously been considering new technologies as a means to address this formidable challenge. To do this, private–public partnerships (PPPs) have emerged. The present article focuses on one such initiative created to test a novel medical software product intended to deliver accurate diagnosis and treatment in rural India. The article examines how the interests of these actors intersect in the choice of user for this software, and the implications for the dissemination of this product.

The article starts with a brief overview of the healthcare system in India, before going into the specifics of the *RightChoice*[1] software and its capabilities. We then explain the methodology of the pilot project in Almora, central Himalayas. Following this, we explain the local healthcare institutional set-up, and assess different healthcare workers as potential users within this system. Overall, the article serves to provide insights and guidance to healthcare and development actors engaged in similar pursuits of launching new technologies to improve rural healthcare, emphasising the political dimensions of choosing the software users.

Healthcare in India

Healthcare in India is both celebrated and criticised. While India enjoys one of the world's largest government healthcare systems, 75 per cent of the population are also served by private healthcare providers (National Rural Health Mission [NRHM] 2005). While a new wave of medical tourists patronise India's state-of-the-art hospital facilities and qualified doctors at low cost, much of the rural population has little access to such services. Furthermore, the health issues that plague urban India are often not the same as those in rural India, although people below the poverty line (particularly women and children) suffer from common maladies of severe malnutrition and lack of

access to basic treatment for curable diseases, whether they are urban or rural residents (Patil *et al.* 2002). For instance, nearly half of all women in India are anaemic. The extent of such maladies in rural areas often far surpasses that in urban areas. Recognising these issues, the Government of India launched the NRHM in 2005, to be taken through to 2012, with a focus on innovative measures in facilitating delivery of healthcare services particularly in rural areas. The goal of the NRHM is to *'improve the availability of and access to quality healthcare by people, especially for those residing in rural areas, the poor, women and children'* (NRHM 2005: 1). These goals are familiar and resurface constantly with each new healthcare policy plan. However, in recent years, the government has started to take seriously the usage of new technology as a potential solution to what is looked upon as an intractable problem:

> *Advent of powerful medical electronics coupled with latest tools of IT and communication technologies are bringing opportunities for advanced healthcare services including – faster and more accurate clinical diagnosis, efficient emergency response, complex health analytics, wide area disease surveillance, remote patient assistance, rural health solutions, along with quality enhancement in services through online and integrated health insurance solutions, healthcare financing, extended care management and awareness.* (eHealth 2007, p.19)

Already, there are some initiatives in motion. Telemedicine is one such project, using video chat in specialised consultations for diagnosis and treatment of diseases at a distance (Mishra 2005; Singh *et al.* 2006). Another seemingly simple, yet highly valuable, information and technology tool is the digitalising of the hospital information system or health management information system (HMIS) that is making inroads into government healthcare hospitals. This is aimed at replacing the manual processing of the medical data generated by India's vast populace. Less in the limelight but gaining increasing attention are integrated diagnostic and data management healthcare software packages that promise to behave as both secretary and doctor. These software packages have gained notice from several stakeholders including large global health philanthropy foundations, governments, and private agencies. From complex data management to diagnosis, treatment and education on the latest medical advances in the field, these kinds of software aim to wrap multiple services through a single platform. The present article focuses on one such product, called *RightChoice*.

What is *RightChoice*?

RightChoice is a software suite that is designed especially for developing countries' healthcare needs. It is created and owned by an American-based private medical software company, backed by venture capital funding. Accurate and rapid diagnosis, portable and accessible medical information, and informed public healthcare planning and implementation are their key selling points. The software guides non-physicians to ask the right questions to patients regarding their illness and, with the patient's input, it delivers a diagnosis for the specific malady. It is designed for use by even minimally trained healthcare workers in remote clinics in rural areas. Its medical database has been customised for the region of use, with a comprehensive rural disease listing and data in multiple languages. This medical software product has been clinically tested and proven to have a 90–98 per cent accuracy rate of diagnosis and treatment within a laboratory setting.

First, a patient profile is created; a list of complaints show up from which the healthcare worker is meant to choose based on the patient's main complaint. Next, the system guides the user to ask relevant and in-depth questions about the patient's symptoms. Finally, after clicking on the choices provided by the software, it leads the healthcare worker to the possible diagnosis. A choice of diseases and the confidence levels come up, showing the percentage of accuracy alongside each diagnosis.

In theory, this sounds ideal. However, as with all new technologies, its efficacy is revealed through usage. It is no surprise that for the government to consider using this tool on a wide scale, they require that the company test this software at a pilot level. If initial tests work, the government will sign a memorandum of understanding (MoU) with the company, which serves as a political foothold and the starting stage of a potential sale. To secure a government contract and funding from prominent global health foundations, this company needed to demonstrate that their product functions effectively in a real life scenario. This is meant to create buy-in by governments with the hope of nationalising the tool across states to enable national access to quality diagnosis and treatment. To do so, the US company established a six-month partnership with Grassroots Project Developers, an NGO in Almora, central Himalayas. The author served as a liaison between the US company and the Almora NGO in facilitating the pilot.

Methodology in piloting the project

To test this product in a live setting, six villages were chosen by random sampling. An extensive survey was conducted on the healthcare status of the villagers to gauge whether any diseases, symptoms, or lifestyles needed to be added to the software database to enable a more effective prompting method for improved accuracy. Three women with undergraduate degrees were hired. They had technical skills and some exposure to the medical field. The idea was that these women would become expert users of this software, and then be able to train more government healthcare workers who would be the ultimate users of this software if this were to be scaled up. These women took their laptops to the waiting rooms of the public hospital and some private clinics, and tested the software with several patients. They followed up with the doctors' diagnoses and prescriptions to see how greatly the software diverged from the local doctor's prescriptions. Simultaneously, we surveyed the range of healthcare centres wherein this software could be launched. We studied all possible users so as to train them accordingly to use this product. For the purpose of the present article, we focus specifically on this aspect. Initially we assumed this would be the least of our worries, but it became a pressing problem. To make this pilot a success, our primary task was to address who should be the user of this software. To decide this, we asked two questions:

(1) What are the minimum requirements for the user of this software?
(2) Where would this intermediary fit within the government healthcare system?

While these two questions seem simple, answering them is difficult, as there are serious economic and political dimensions to this issue. These are the key concerns of the present article.

Almora: settings for the pilot study

Almora is a picturesque district in the Kumaun region in Uttarakhand State in North India. According to the 2007 Uttarakhand State Government statistics, 90 per cent of Almora's 632,866 people reside in villages. Males constitute roughly 47 per cent of the population and females 53 per cent (Arora 2010a). Ninety per cent of the population is engaged in subsistence agriculture. Villagers in Almora struggle with certain survival basics including access to quality healthcare, clean water, electricity, good education, and regular transportation, particularly as households are scattered across this mountainous region. Further, 60 per cent of the rural population lives in areas that are more than 5km from larger towns where access to most of the markets, hospitals, colleges and other services reside. Uttarakhand is a newly created state, and aspires to be a leader in e-readiness as it actively engages in creating connectivity across the state, including within hospitals. Initiatives for digitalising data across government agencies are in motion in its health sector. This state was, therefore, an ideal platform for piloting this new software.

Investigating the healthcare set-up in Almora

In our investigation, we discovered that Almora's healthcare system is organised hierarchically as follows (bottom to top): (1) village level – midwives, *asha* (community health) workers, and *anganwadi* (nursery school) workers; (2) semi-rural level – auxiliary nurse midwives (ANMs); (3) rural-town level – primary health centres (PHCs) and community health centres (CHCs); and (4) town level – district hospitals (DH). *Asha* workers constitute the bulk of the healthcare staff. They are women volunteers appointed by the local *panchayat* (village chiefs) and are responsible for health education and community mobilisation in areas of immunisation, common ailments, sanitation, maternal and child health, and basic patient records (see Table 1). They are purely commission-based, dependant on the services they provide for an income. ANMs on the other hand are full-time government staff, supervising healthcare workers for eight to ten villages, holding similar responsibilities to those of the *asha* workers. It is important to note that the services of both the *asha* workers and ANMs focus on preventive measures through education and awareness. They are not legally entitled to diagnose or treat patients. However, at the PHC and CHC level, there are supposed to be two doctors with a supporting staff of two ANMs per centre. Here, the staff functions at a more curative level and, depending on their facilities, conduct deliveries, surgeries, laboratory tests, ultrasounds, x-rays, and the

Table 1: Potential users for diagnostic software

Healthcare worker	Qualification	Responsibilities
Asha workers (government volunteers on commission)	VIII standard	• Primary medical care for common ailments • Sanitation • Education and awareness of health issues, timely access to health facilities at village level • Hold ORS, IFA, chloroquine, DDK, oral contraception and condoms, etc. • Counselling regarding maternal and child health, pre-natal information through post-natal follow-up • Record birth and death information
Anganwadi workers (nursery-school teachers, full-time)	High-school degree	• Regular health and nutrition check-up of children at nursery level • Immunisation • Health education
ANMs (full-time government staff)	Nurse	• Supervise *asha* workers, overlap with *asha* tasks • Healthcare information record-keeping on their respective villages, through 17 registers per week, for chief medical officer's centre
Doctors (PHCs)	MBBS	• 24 × 7 availability • Deliveries, various kinds of vasectomy, post-partum sterilisation
Doctors (CHCs)	MBBS	• Deliveries, caesarean sections, vasectomies, post-partum sterilisation
Doctors (DHs)	MBBS	• Specialised consultations and surgeries

Notes: ORS, oral rehydration solution; IFA,; DDK,; ANM, auxiliary nurse midwife; PHC, primary health centre; CHC, community health centre; DH, district hospital; MBBS, Bachelor of Medicine and Bachelor of Surgery

Source: National Rural Health Mission (2005)

other medical examinations. In reality, updated medical facilities, medications, treatments, and qualified doctors are available only at the DH level, in Almora town.

In terms of service utilisation in Almora, the number of patients seen at a DH per month is about 10,000, versus 9,000 at a CHC and 6,150 at a PHC. Patients admitted to the DH number approximately 300 per month, compared with 180 at the CHC and 41 at the PHC level. The services in Almora, much like the rest of India, function like a pyramid with the greatest weight of human resources at the village level where the bulk of healthcare workers reside: *ashas*, trained midwives, and *anganwadi* workers. However, in terms of the government's financial investment and usage of different healthcare centres and services by the vast rural populace, the pyramid is completely reversed. Much of the pressure falls at the curative, emergency level with heavy investment in lab equipment and specialists. A chief reason for the extraordinary burden on the district hospital system is partly because of patient help-seeking behaviour primarily at the stage of emergency. This is attributed to factors of poverty – negligible disposable income for ongoing diagnosis and treatment, poor education, lack of access to qualified healthcare professionals at the PHC and CHC level, and village distance from towns (Murti *et al.* 1995).

Besides government services, there is a thriving private practice in Almora as well as alternative medical outlets often used by the poorest. For instance, there are 51 Ayurvedic practices reported by the District Ayurvedic Officiator in the villages and 66 allopathic practices, as reported by the Chief Medical Officer. Private healthcare is consumed extensively, even among the poorest, often plunging them into heavy debt. Further, there are other actors who provide a spectrum of medical services, the two most dominant being local pharmacists and *jhad fook*, local shamans. In fact more villagers visit these two providers over the other health providers, including *ashas* and ANMs. While this can be seen as driven by cultural preferences, it is also a manifestation of their low expectations of, and loss of faith in, government healthcare workers (Arora 2010a). In fact, few villagers knew the names of their local *asha* and ANM workers in the areas surveyed for this pilot study. This disconnect is reported as being because of the following reasons: *asha* and ANM workers are limited in their skills and authority to diagnose and treat patients; their lack of access to most medication; high absenteeism among ANMs at their sub-centres; and distrust of the purely commission-based *asha* workers (who are incentivised to advance agendas based on the commissions received). For example, *asha* workers have become notorious for pushing pregnant women, even at a late stage of labour, into the ambulance to deliver at the hospital. Their incentive for such action lies in the 600 rupees (about US$15) commission that they get with each hospital delivery. Of course, rather than demonise *asha* workers, we should view this as desperation to earn a livelihood and survive.

Another issue is the usage of pharmaceuticals and medical equipment. These fields are highly lucrative and are deeply influential in the functioning of the healthcare sector. While the government's multi-*crore* (billions of dollars) budget is directed towards free medication for the poor, only a small percentage actually reaches these needy beneficiaries. Corruption is the most common reason for this: much of the medication, once having reached the district level, gets siphoned off into the black market, creating parallel and underground agencies and economies (World Bank 2008). Further, recommending ultra-sounds, x-rays, and other laboratory tests indiscriminately is tied to high monetary incentives for doctors. This practice has unfortunately created an expectation among the poor where they now associate such tests and a high dosage of medication with good-quality diagnosis and treatment.

Searching for the right user

For medical diagnostic software to be deployed in a rural area, what is most needed for it to succeed? The present article focuses on the search for the most appropriate user of this software.

This is critical as the software is only as good as its usage, which needs to be frequent, systematic, and accurate. In starting to investigate what we mean by *user*, we need to examine why it is economically beneficial to identify them in the first place. In most user–interface parlance, the user of a product, in particular a new technology, is a person who interacts with that technology. But more importantly, they are also considered the current or future consumers of that technology (Cohen 2005). While people can no doubt engage indirectly at a discourse level with technology (Arora 2008), the focus of attention is on those who have the financial ability and interest to consume the technology directly. They provide a natural economic incentive for the private technology sector to focus on them. On this basis, products are designed and re-designed to satisfy this consumer base.

But what happens when a software product is designed for a population that may not necessarily be direct consumers in an economic and practical sense? In this case, with massive state investment in new technologies for rural development, there is high incentive for private companies to make the rural population their prime users. Fascinatingly, a recent convergence has taken place between private technology agencies engaged in rural markets, and the development sector, as they both view their new beneficiaries in more proactive terms of consumers (Prahalad 2004). The consumer can be both the villager and the state. In this case, the diagnostic software company must heed the demands of the state and their perceptions of the needs of the rural base as well as that of the rural base itself.

There is also another consumer on the horizon. Any new technology, especially a complex diagnostic software package, however intuitively built, requires some basic training, education, familiarity, and access to computers. Most of the rural populace does not have the privilege of access to and knowledge of computers; other issues include low literacy, lack of time, and low confidence in self-diagnosis. Clearly, there is a need for an intermediary to step in to facilitate software use. Thus, the user here is the intermediary between the rural villager and the diagnostic software. And considering we are dealing with the government healthcare sector, this intermediary is an actor from within the government healthcare system.

So, there are three contenders for the role of user here – state government officials (user with the purchasing power); the rural populace (end user); and state healthcare workers (user as intermediary) – who will interact directly with the software to provide diagnosis and treatment to the poor. From a political angle, the rural base has little say on the actual momentum of technology for development as these plans for digitalising the village arena do not reflect a demand from the village level but rather a collation of national, transnational, and international policy decision-making on bridging the digital divide and escalating mobility through key technologies. The financial viability of private companies entering into the domain of designing diagnostic software for rural areas means their prime customer is the state. However, if they are to succeed long term and scale widely, it is essential to get the rural population to use their software regardless of endorsements from the state.

While the state may be the prime customer, it is often tied to a host of interests from a range of influential players in the information and communication technology and health fields, including international and transnational bodies such as the World Bank, The Bill & Melinda Gates Foundation, UN, and others. This makes the state eligible for external funding as part of a larger global effort of digital equity and poverty eradication. Private diagnostic companies need to sell their ideas and software by appealing to the interests of the state but must also keep in mind the range of actors in this complex game. Several diagnostic companies have gone down the private route, but given the competition in the private arena, as well as the fact that a substantive profit can be made in dealing with the government, some diagnostic software companies seek the public healthcare sector route. Also, there may be a (mis)perception among these companies

that dealing with the government sector provides a quicker and easier exit strategy after the sale of the software.

In the case of Almora and *RightChoice*, general consensus was reached among key NGOs, local private and government hospitals, transnational agencies, and officials of Uttarakhand State on the healthcare needs of the rural populace, and their receptivity in the use of this software. There was, however, a serious need to convince them (and ourselves, as this software had never been piloted before) of the real efficacy of this diagnostic software to function in the absence of a doctor. In designing the pilot, we needed to identify the user who would go about diagnosing patients with the help of the software.

RightChoice claims that a non-physician healthcare worker that is *'minimally trained'* can use this *'intuitive'* software. By *'minimal training'*, they mean twelfth-grade education or equivalent, bilingualism in English and Hindi, and respect within the community. The need for bilingualism stems from the fact that even when medical data are translated, there is still a tremendous amount of English clinical terms that seep in. This makes *asha* workers and ANMs both equally qualified for this position of user. However, there was a distinct bias because the US company has incentives to focus on *asha* workers for the following reasons:

- A good amount of funding is being diverted in the direction of *asha* village healthcare workers and is becoming a trend across emerging markets.
- Use by low-level healthcare workers (i.e. *asha* workers) emphasises the usefulness of the software by adding tremendous *value* to these healthcare workers – a good selling point.
- The wide outreach in villages through *asha* workers will facilitate scaling-up of this software.

Interestingly, these interests of the private sector go hand in hand with those of the Government in India. The *asha* scheme is a distinguishing feature of the relatively new NRHM policy. However, this scheme seems to be failing, at least in Almora, as few villagers know or trust their *asha* workers (Arora, 2010a). This pet scheme needs to be reinvented and revitalised. There are a few possible ways this could take place: *asha* workers using cellular phones or other technical data-collecting devices in the field to capture symptoms and communicate these to the hospital, where the diagnostic software is used; or manual data-collection by *asha* workers, who then take the information to the ANMs for diagnosis with *RightChoice*.

Even if this was possible, current healthcare policy legally prevents *asha* workers and ANMs from providing diagnosis or treatment. However innovative these ideas, they still require a policy change at the national level before being implemented. Even if this policy does change, other significant barriers remain:

- *Asha* workers and ANMs have low credibility in the community.
- Given their training, *asha* workers do not have the capacity to produce follow-up questions on symptoms or make decisions, even when guided by the software.
- Patients are generally not comfortable with the idea that a computer and an untrained staff can diagnose and treat them.
- Even with an alleged 92–98 per cent accuracy rate, what are the legal implications when the software is wrong? Most governments would likely be very wary of this risk. Diagnosis is not a data-collection and treatment procedure; much follow-up is needed, with tests conducted to confirm diagnosis. Diagnosis is a multi-step process and not a simple symptom–diagnosis–treatment solution as it may be advertised.
- Cellular phone platforms are still too young to handle such complex operations, and even when it does get technically sophisticated enough, private telecom companies need

incentives to participate in this process. In this case the government telecom system might conduct this, but it still requires a politically driven leadership for this.

Even if these hurdles are overcome, only diagnosis, and not treatment, will not be accepted by the patient. Diagnosis without access and affordability of medication is meaningless. Even if *asha* workers were to deliver the correct diagnosis, villagers often cannot afford the treatments prescribed, cancelling out these diagnostic efforts. What of ANMs? ANMs have a nursing degree and can be trained in the usage of this software. However, the legal and policy hurdles still apply in this case. But even were the legal issues are overcome, the question of service quality still looms large. They are government employees and are part of the union, so they cannot be fired. So how does the private sector engage with employees of the government sector unless the private sector exits soon after the sale of the software? In short, training has to lie in the hands of the government or perhaps an NGO, both of whom are of variable quality.

It comes down to the staff at the PHC, CHC, and DH. But here, doctors are present. To look at users here immediately changes the mission of the private diagnostic software company, moving away from the grand claim of healthcare diagnosis at the village level by non-doctors, to the more modest aim of improving accuracy and quality of diagnosis and treatment by doctors and expanding their capacity in this sector. While this last option sounds less impressive, it is perhaps the most realistic and most feasible, given that many doctors outside the urban areas are often not well-qualified and can, through misdiagnosis, suggest treatments that may be fatal to their patients. This software can be used as follows:

- As an educational tool to update doctors on the latest medical advances and new, simpler, cheaper, and better treatment for the poor
- As a second opinion for doctors on complex cases to provide further accuracy
- To serve more patients effectively by managing their medical data including their history and past treatments.

However, this would require incentives for doctors to treat villagers well for no additional financial remuneration.

Conclusion

If this diagnostic software becomes dependant on the presence of a doctor with these revised claims of it being a second opinion and educational tool to enhance quality of healthcare, this product will no longer evoke the kind of attention and profit that private medical research companies are seeking. It would also not propel governments to see it as an urgent policy tool to gain political ground. And of course, we need to keep in mind that often the way to better healthcare is making the villagers self-reliant by providing them with preventive healthcare, which often is more grassroots and non-technologically driven. However, this takes a tremendous amount of time and effort and a heavy investment in human over technical resources, with perhaps hard-to-measure changes over long periods of time. This often does not gain the necessary financial attention of governments, as it is hard to sell it as novel and different from prior healthcare strategies. It is likely, then, that while we will see lip-service paid to preventive care, most of the capital will still be diverted to curative care.

The present article highlights the critical political and economic challenges to launching new technological solutions in the development sector. It shows how new technology usage is determined by factors outside the user–technology interface: it is driven by considerations of profit, policy agendas, and partnerships. As for the status of this particular software package, the US company failed to gain the government MoU and the partnership fell through with the NGO,

owing to the lack of agreement on the *user* in this process. However, the US company has now procured funding from an international philanthropic organisation and has moved to another more friendly state in India that will grant permission for this pilot study. The challenges explored here still remain unaddressed, and if genuinely intended to create serious change, the issue of the user will again become central.

Note

1. Pseudonym created to protect the actors involved.

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