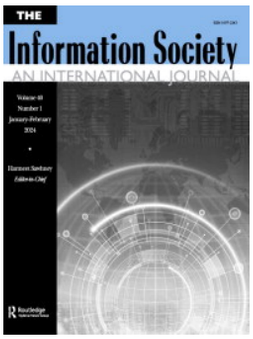

The Information Society
An International Journal

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/utis20

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To cite this article: Sundeep Sahay (2024) What role does "hope" play in ICT4D research?, The Information Society, 40:1, 54-64, DOI: 10.1080/01972243.2023.2279966

To link to this article: https://doi.org/10.1080/01972243.2023.2279966

THE INFORMATION SOCIETY
2024, VOL. 40, NO. 1, 54–64
https://doi.org/10.1080/01972243.2023.2279966

Routledge
Taylor & Francis Group

PERSPECTIVE

What role does "hope" play in ICT4D research?

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ABSTRACT

In this research commentary, I develop the notion of hope, and argue for its relevance to inform Information Systems (IS) and ICT for Development (ICT4D) research and practice. Moving beyond lay meanings of hope, as reflecting a future positive orientation, often laced with optimism, I will develop a more theoretically informed understanding of hope based on Arjun Appadurai's articulation of the "capacity to aspire" and Ronald Stade's Conceptual Map of the Capacity to Aspire, which brings together four concepts: capabilities (Amartya Sen), hope (Ernst Bloch), voice (Albert Hirschman), and culture of poverty (Oscar Lewis). I discuss how it can be made relevant for ICT4D research, based on a theoretical understanding of how information can serve as both a basis and carrier of hope. Drawing from a case study of more than a decade of ongoing research and practice around digitization of public hospital information systems in India, I critically discuss the value of this framework for informing ICT4D research and practice, and how this can be further developed in the future.

ARTICLE HISTORY
Received 21 July 2023
Accepted 1 November 2023

KEYWORDS
Hope; Aspiration; ICT4D; Capabilities; India

Introduction

Hope is a term which we invoke all the time in our everyday social and work lives. We hope for our kids to have good education, we hope for Manchester City to win the treble, we hope tomorrow will be a sunny day, we hope that digital intervention will be successful this time around, and much more. Given the centrality of the usage of this term, I think it is important to understand it better and to interrogate what role it can play or not to inform ICT4D research. I focus on ICT4D research, as I believe it represents a domain needing an injection of hope. As the field has evolved over time, researchers have often focused on developing increasingly theoretically elegant ways to describe why systems do not work (Sahay et al. 2022). This engenders lack of hope that reinforces "failure" stories, which does not augur well for promoting development. Injecting hope becomes particularly critical as the world is experiencing extreme and apparently hopeless challenges related to climate change, wars, environmental degradation, and antimicrobial resistance. We need strong catalysts to engage with these challenges and hope arguably can provide some of this impetus.

Hope has been a topic not much discussed in the ICT4D and even the broader Information Systems (IS) research domains, and historically has raised discussions in the social sciences. The relative absence of hope in ICT4D research and preoccupation with failures is theoretically and methodologically unsatisfying because it tends to undermine aspirations of people, and what may have been the invisible learnings, even in the light of "failures", and the longer-term pay offs of these learnings. In my coauthored book, *Digital Development: Stories of Hope from Health and Social Sectors* (Sahay et al. 2022), we deliberately discussed empirical case studies which were said to be "successful" and identified what made them so. The message the we sought to convey was that technology for development is a hopeful endeavor, and not just gloom and doom. However, there discussion on hope was more abstract and idealistic, not focusing enough on how we can understand hope theoretically, and how it may be realized in practice.

Rebecca Solnit (2016) in her book *Hope in the Dark: Untold Stories, Wild Possibilities* describes hope as a gift which we should not surrender and throw away. Hope does not mean that we deny realities but represents a force to identify and engage with realities. She argues that hope represents a broad perspective which carries in it specific possibilities, one that demands and invites us to act. "Critical thinking

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without hope is cynicism but hope without critical thinking is naivete" (4). She quotes Patrisse Cullors, one of the founders of the Black Lives Matter movement in the US:

> Provide hope and inspiration for collective action to build collective power to achieve collective transformation, rooted in grief and rage, but pointing towards inspiration and dreams (Solnit 2016, xiv).

Hope locates itself in the premise that we don't know what will happen tomorrow and that in this space of uncertainty we have the potential to act. It provides a vehicle to embrace the unknown, and this unknowable presents us with an alternative to the certainty of both optimists and pessimists. Optimists think that the future can be achieved, without their involvement, while pessimists don't act because they believe it will not make a difference. Ernst Bloch in this book *The Principle of Hope* (1986, 3) argued that "Fraudulent hope is one of the greatest malefactors, even enervators, of the human race, concretely genuine hope its most dedicated benefactor". This statement inspires us to understand what is genuine, or realistic hope, and how can it be realized in practice.

Hope and action – taking or avoiding – are inextricably interrelated. Malcom X said that "the future belongs to those who prepare for it today" (Solnit 2016, xvii). Hope is not a substitute for action, but only a basis for it, as James Baldwin put it: "hope gets you there, work gets you through" and "not everything that is faced can be changed, but nothing can be changed until it is faced" (Solnit 2016, xviii). Action tomorrow is rooted in our experiences and perspectives toward the past, in Walter Brueggeman's words: "memory produces hope as the same way in which amnesia produces despair" (Solnit 2016, xix). Actions can be small which lead to large and unanticipated effects in the future. For example, we read about how comic books were created of Martin Luther King's civil disobedience movement, translated to Arabic, and distributed on buses prior to the Arab Spring.

The relation between hope and action invoked through technology initiatives often plays out in political circumstances, as hope is centrally invoked in political messages. Prime Minister Modi, in a recent address as the head of the G20 provided the hopeful message that "The digital transformation should not be confined to a small part of the 'human race' and its greater benefits will be realised only when digital access becomes 'truly inclusive'." Greta Thunberg in her speech to the UN Climate Action Summit, 2019, accused world leaders of killing the hopes and dreams of the younger generation in their unrelenting fairy tales of economic growth. Many interventions of Western countries, such as in Libya, Afghanistan, and Iraq were based on hopeful promises of bringing in well-functioning democracies such as theirs. Such promises can be seen to represent a "false" or a "utopian" hope rather than a "realistic hope". How to pursue realistic hope is an important and relevant question for ICT4D research.

What constitutes realistic hope in the context of ICT4D research, and what role technology can play in enabling meaningful action for change? To answer these questions, we need to explore issues such as "who has the capacity to hope?" "under what conditions can one hope?" and most importantly, "how can hope be realized positively in practice?" To try and explore some of these questions, I turn to Arjun Appadurai's formulation of the "capacity to aspire".

Appadurai and the capacity to aspire

In 2004, Arjun Appadurai, an anthropologist, proposed the concept of the capacity to aspire, a future-oriented cultural capacity, which could help the poor and disadvantaged to contest and alter their conditions of poverty. A focus on culture as concerning the past, Appadurai argued, creates an "aspirational conflict" with development which relates to the future. With all the energy of the poor being focused on survival, they don't have the luxury of considering how present actions can contribute to future beneficial outcomes. Appadurai sees the capacity to aspire as a navigational capacity to help engage with constraints arising from social structures, lack of voice, and limited opportunities. Building local level capabilities is a defining aspect of creating this capacity to aspire.

Appadurai's capacity to aspire, has been developed into a conceptual map – Conceptual Map of the Capacity to Aspire (Stade 2016a), based on 4 interconnected themes: i) capabilities; ii) hope; iii) voice; and iv) atrophy of hope (culture of poverty). Taken together, they provide a conceptual approach to understand how hope can be encouraged and realized in practice. I first summarize these key themes in the table below (Table 1) and then elaborate on their synthesis.

Sen's (1999) ideas of capabilities point to the potential that humans have to pursue the choices they value. Building on this, Appadurai (2004, 2013) develops the notion of the capacity to aspire, which includes a cultural dimension. Appadurai argues, Sen's notions of capabilities are underpinned with universalist, modernist, and humanist assumptions. However,

Table 1. Conceptual map informing the capacity to aspire approach.

Concepts	Theorist	Key characteristics
Aspiration	Arjun Appadurai (2004)	The practice of thinking about the future, and agency to realize in practice.
Capabilities	Amartya Sen (1999)	The potential individuals have to pursue the choices they value, of which aspiration is one.
Hope	Ernst Bloch (1995)	Helps to reach you to the "not yet" and represents something that can be learned.
Voice	Albert Hirschman (1970)	Ability to articulate concerns and grievances when in unfavorable situations.
Atrophy of hope	Oscar Lewis (1969)	The lack of favorable experiences that poverty creates, undermining capacities to aspire.

aspiration is not universal and predetermined, but refers to the practice of thinking about the future different than the present. The capacity to engage in such aspirational practices is unevenly distributed and culturally situated.

Including the cultural dimension into the discussion on capabilities, allows the world of freedom, reason, progress, and liberty, emphasized by Enlightenment, to come into a more critical discussion. This inclusion of culture, however, raises the dilemma of diversity and moral relativism. For example, as Stade (2016b) gives the example, that people may aspire as "yes, I don't mind being a slave, but at least take off the chains, but I will continue to be a slave" (212). While political systems in the West, assure certain minimum capabilities (such as reason), primarily through defensive and protective measures, Appadurai distinguishes between a "minimal" and "full" humanity, and to achieve a "full humanity", the cultural variation needs to be incorporated on how people achieve a full life, including diverse ideas of a good life. A minimal humanity is necessary but not sufficient – as it is largely procedural and underplays the substantive. He invokes Clifford Geertz's statement that "to be human, is to be Javanese" (Stade 2016a, 213), implying a paradox that one is not completely human unless they are completely local, which emphasizes culture.

Appadurai argues that the human capacity to aspire in order to grow has to be put into practice. "Aspiration is like a muscle. It needs to be exercised. Should it be underused – should there be no history of success, no role models, no cultural traditions, no habitual aspirations, then the possibility of imagining change and knowing how to achieve it is absent" (quoted in Rapport 2016, 218). Eriksen (2016) considers the conditions in which hope fades away and disappears, even in affluent societies.

Appadurai draws on Ernst Bloch (1995) book *The Principle of Hope* written post-World War 2, to understand hope as something which can be learned. He brings forth the idea of "not yet", and how hope is the thing that moves you to this "not yet," which is different from some kind of political or anti-political escape from the present. Hope represents an expression of the human capacity for optimism and a response for negation and absence. While life goes on amongst existing conditions of the present, it is also lived toward the future, representing the "not yet." Hope thus becomes a pervasive feature of the actuality of the present, which does not make sense if we disregard hope.

Appadurai is deeply inspired by Albert Hirschman's (1970) writings in his book *Exit, Voice and Loyalty: Responses to Decline in Firms, Organization and States*. Hirschman argues that individuals have two broad choices if they are dissatisfied with a public or private organization or the state. She can *exit* from that service or can continue but with complaints or protest – *voice*. Exit and voice co-vary, if exit is readily available, there may be less reason to exercise voice. Voice tends to the more difficult and costly option as it might involve organizing collective action, whereas exiting may be a private or individual action. The option of exit is likely to atrophy the development of voice. When there is a strong loyalty, it can set off the choice of voice. A loyal citizen will likely choose voice over exit, which may be more common in the political sphere, while exit in the marketplace. For the poor and disadvantaged, options of both voice and exit may be limited. A poor villager living in a developing country may have limited options to exit from the public health system to access healthcare, as the alternative of the private sector is non-affordable. At the same time, given her disadvantaged social status, the options to initiate collective protest through voice is also untenable. What role can hope play for the poor villager to develop alternative courses of action and how can this be realized in practice? These become important questions for us to analyze in the context of ICT4D research.

In his essay "The Culture of Poverty," anthropologist Oscar Lewis (1969) talked about the atrophy of hope. The culture of poverty refers to a culturally constructed way of life that is born out of dreadful material and social conditions, which force the poor to develop adaptive mechanisms to cope. This creates an undeveloped capacity to aspire and allows short-term gratification to appear as a good adaptive

strategy. Appadurai describes the future as a cultural fact, and in the case of the poor, the cultural fact seems to be that they have no future. Adaptation in the absence of hope, perpetuates poverty, both in individual and across generations, and generated creative and resilient actions. This is illustrated by Appadurai's empirical work with the slum dwellers in Mumbai, India. He goes on to argue that the capacity to aspire is not about IQ or some fundamental dispositions about biology or neurology, but analogous to a muscle, and the possibility of its use or nonuse. Experience then becomes an important condition in shaping this capacity. While rich people have many experiences of how they or the people around them have achieved their aspirations, which reinforces their capacities to aspire, similar conditions are not available for poor people. Poverty can thus atrophy hope.

In summary, the capacity to aspire is developed based on the following themes: i) this capacity represents a cultural practice of forward looking, which is unevenly distributed; ii) hope can be learned and reflected upon, to help achieve the "not yet"; iii) voice is performative, and ability to exercise it can help strengthen the practice of aspiration; iv) prior experiences shape this practice, as poverty atrophies hope.

Relevance of hope for ICT4D research

The capacity to develop the practice of imagining positive futures is culturally determined and is unevenly distributed. The spaces and opportunities that users have to express their concerns, can support the development of this capacity, which can be strengthened by positive experiences of aspirations being realized. The table below (Table 2) represents a form of conceptual map or framework, to help ICT4D research on understanding hope and how efforts can be made to realize it in practice. Digital interventions are always accompanied with hope about a better future for users, organizations, and society. How can this hope be translated into something that is realistic and learned and how it may be strived for? – this framework provides guidance for addressing such questions. First, I discuss an empirical project experience from India, and then interrogate the value of this framework to analyze the role of hope.

Table 2. Framework for thinking through the role of hope in ICT4D research.

Concepts	Relevance for ICT4D research and practice
Aspiration as a capacity	Understanding models of local level capacity building to create practices of aspirations around digital initiatives.
Hope	What is the "not yet" for users, and learning how digital initiatives can help reduce the gap between the "now" and "not yet."
Voice	Provide spaces and means by which individuals can voice their concerns about future desired states.
Atrophy of hope	How can positive experiences and stories be developed to which users can relate to and find inspirations from.

We build further on this framework by examining the link between *hope and information,* which is of relevance in the context of our discussion on ICT4D research. This link has been largely unexplored within the domain of IS and ICT4D research. Coming from the field of psychology, Gorichanaz (2022) has discussed how information can create and act as a carrier of hope, which is a positive attitude oriented toward a possible yet uncertain desired outcome. He identifies four ways information can generate hope: i) understanding (information for forming beliefs about the past or future, such as facts, evidence, or predictions), ii) moral imagination (information for engaging the moral imagination regarding possibilities for the future, such as stories, scenarios, or visions); iii) desire (information for creating desire for particular moral outcomes, such as values, goals, or motivations) and iv) metacognition (reasoning about reasons through information about how we become informed with respect to hope, such as feedback, reflection, or evaluation).

Information for understanding

Absence of information can act as a key barrier to building hope. For example, lack of awareness about antibiotics is one of the key drivers of antibiotics resistance. Building a more realistic understanding of the role of antibiotics, and its potential benefits and mal effects, can help people to have a realistic and accurate understanding of their situation and the possible outcomes that they can hope for. Gorichanaz (2022) argues strengthening such understanding can act as a basis for hope. This understanding is based on facts and affects our beliefs about the world, whether present or past ultimately fostering hope about the future, as one understand the specific possibilities for action. In order for hope to be effective, it needs to be grounded in solid information that demonstrates the potential for positive outcomes and the possibility of addressing the issue.

Information for moral imagination

This concerns information which opens up possibilities for future action. Novogratz (2020) describes moral imagination as "the humility to see the world

as it is, and to have the audacity to imagine the world as it ought to be" (239). Moral imagination is not an inherent and fixed trait, but something which can grow (and also contract) with our experiences and circumstances. Moral imagination serves as a cognitive resource which can help answer questions of value and preferences, which are shaped by our cultural backgrounds, religion, social practices, and expectations. Moral imagination is that which broadens our horizons, inviting us to see possibilities that had not occurred to us. It allows us to build hope.

Information for desire

Gorichanaz (2022) discusses how information can spark the desire, which is important for generating hope. Such desire is not limited to material and superficial desires but should be rooted in the pursuit of a deeper, more fulfilling life. For instance, desire for a good life, or better health and well-being, particularly of the poor and disadvantaged. Information can expand our desires by showing us new possibilities, inspiring us to act, or motivating us to change. Information about the values, goals, or motivations of moral exemplars can help to emulate them in our own attitudes and behaviors. Sparking such desires based on relevant information, can act as a catalyst for action.

Information for metacognition

Metacognition refers to our ability to think about our own thinking processes – reasoning of reasons. Not only it is important to reason why something is a problem, which is hopeless, so in the need to understand why this is the case. This entails building processes of reflection on the institutional thinking processes building awareness of the cognitive abilities and limitations. Such processes of metacognition can prompt individuals to critically examine their own beliefs and assumptions by building a reflective capacity to analyze the situations and reasoned based approaches to tackle them. Going back to the problem of AMR, metacognition would involve individuals to understand how their processes of antibiotics use is contributing to the problem, and only then will they be able to take practical actions to mitigate the problem.

In summary, we have taken Stade's conceptual map of aspirations, comprised of capabilities, voice, hope, and atrophy of hope, and bought in the dimension of information as a source and carrier of hope. This informational linking arguably helps to develop a more nuanced understanding of hope offered by ICT4D projects and how these can be realized in practice.

Relevance of this framework for IS and ICT4D research and practice: An empirical project experience from India

I draw upon a more than decade old empirical project experience from India, relating to the development and implementation of hospital information systems across 20 public district hospitals in one state. The story is long and complex, all details of which cannot be accounted for in this commentary. I present some relevant snippets from this story, which I believe highlights on issues relating to the nature of hope, and how in the empirical work, we have tried to engage with it in practice.

The context

Public hospitals in India and most low- and middle-income countries (LMICs) remain largely a neglected lot. Donor and government funds historically have been directed primarily toward the primary health care sector (where it is relatively easier to show results of digital initiatives), ignoring the tertiary sector which paradoxically caters to nearly 60–70% of the health care load of a district in the public sector. Patient load is immense, with a hospital receiving a daily stream of 1000 to 1500 or more outpatients, giving doctors a maximum of 2–3 min with a patient. In this limited time, the doctor has to listen to the patients, check their symptoms, carry out some routine checks (such as blood pressure and temperature readings), make their provisional diagnosis, prescribe tests, medicines, and follow-up actions. In this setting, introducing a digital patient record system is complex, threatening to compromise this limited time the doctor has in discussing with the patient, if she is expected to herself record all these patient interactions into the digital system. Such a setting indicates an "atrophy of hope", as the dominant logic is toward short-term adaptations and coping, denying the space for longer term and grander objectives. This provides a difficult starting point for establishing a virgin digital intervention.

Our study started in about 2008–2009, within the framework of the National Rural Health Mission (NRHM) in India, which had a clear political mission to strengthen the public health system and reduce the dependence of the poor on the private sector. Systemic reforms, including relating to the health information

systems, were directed at bringing about architectural corrections. There clearly was hope in the air. This sense of political and rather utopian hope originating from the central government, needed to be translated to the state and lower levels, and translated into "realized hope" in practice. Capacities to aspire needed to be developed at multiple levels from the state authorities to individual hospitals and health staff. This has historically been a challenging task and not straightforward, as state systems were generally accustomed to authoritarian and centralized initiatives.

As a starting point, the state appointed as Mission Director (MD) a visionary and activist oriented individual, who gave priority to strengthening the hospital systems, supported through improved digital systems. He put out a tender, terms of reference for which was designed by a consultant. The tender produced, however, was utopian, envisioning hospitals to become "paperless", making all processes digital, including remote scheduling of appointments by patients. This represented a form of "false hope", given the complexity of hospitals, the extreme resource constraints, high patient loads, and next to no experience of digital systems. Fifty-three companies, mostly large IT firms operating in the private sector, submitted bids in response to the tender, but all were rejected. The demanded utopian vision was financially and technologically infeasible.

The MD then approached HISP India, a small NGO already working in the state, if they could support them in their efforts. Personally, I had established HISP India in 2000 as part of the global network known as the Health Information Systems Programme (HISP) (see dhis2.org). In this network, research and practice for open-source software for the primary healthcare sector is being developed and shared across countries, and capacity building for health IT, information use, and software development is promoted. From a small start in post-apartheid South Africa in 1994, the HISP network has grown to become a global standard for health information systems development in LMICs. However, the main orientation of the HISP work was toward primary healthcare, and not hospitals. Hospital information systems development was a virgin endeavor, which HISP India believed was relevant for development efforts. They approached the effort with both hope and apprehension about what it involves.

There was inherent uncertainty, with the state unclear on what they needed, and HISP India without the relevant specific experience. This uncertainty, however, provided the potential to initiate change efforts as the MD deliberately designed a Memorandum of Understanding (MoU) between the state and HISP India in a way in which the system requirements were not pre-determined but were contractually seen as evolving over time as the system would develop, and users gained experience. Further, the use of open-source systems was mandated, to promote state ownership and control over the trajectory of growth, without the burden of high licensing costs. Open-source software allowed for digital flexibility to deal with an uncertain and evolving future, as it allowed for choices to be taken in the present which did not preclude future technological choices. The evolving nature of requirements and the use of open-source platform, as contracted in the MoU, represented a form of institutional innovation, as typically public sector procurement was based on licensed software and payments linked to predefined deliverables. Most importantly, they created enabling conditions to develop and realize capacities to aspire.

With the MoU in place, HISP India set up a local team in the state capital, and embarked on a process of learning in context, by studying intimately how the hospital worked, understanding the aspirations of users from the proposed system, and their existing pain points, which were many. To fill the capacity gap in the technology, HISP India established a technical and implementation team, comprising of about 10–12 people. The local technical team was supplemented with some global experts with experience on the digital platform. These experts mentored the local members on the technical details of the platform. Simultaneously, the implementation team approached the design challenge through an intensive process of co-production. This team spent a couple days in each hospital departments (outpatients, medicine, surgery, etc.), where they studied the work and information flows, and together started to imagine the future socio-technical system. From this aspirational stage, detailed mockups of the proposed design were co-created, discussed with users, revised based on their feedback, and then translated for the technical team. Co-production thus was taking place at multiple levels. One, between the global and local teams on understanding the technology and how it could support the evolving requirements. Two, between the implementors and users, to build more detailed and practical understandings of the proposed system. Additionally, the HISP India coordinator actively updated the MD on progress, showed demonstrations and plans for implementation in an incremental manner. Researchers like myself and others were involved, studying and discussing broader processes relating to the new socio-technical order gradually evolving in

the hospital. For example, the move from a department wise to a centralized billing process, represented a new socio-technical order, which not only involved novel institutional arrangements, but also the design of the information system to support this new arrangement. As both HISP India and the state were treading into unknown grounds, these new arrangements had to be co-produced as novel socio-technical imaginaries.

To minimize the risk of big bang failures, an incremental approach was adopted. In one reference hospital where the design process unfolded over a year, first one module was developed, tested, and institutionally approved, leading up to the development of an integrated 10 module system. This integrated system was then implemented first in this reference hospital and then gradually expanded over a two-year period to the other 20+ hospitals in the state. The national level gave the state an innovation award for this system, creating a positive reference for the state to further strengthen their capacities to aspire, as positive values and experiences started to accrue.

The co-production process was guided by the Scandinavian tradition of participatory design, but in a significantly expanded form, to also include processes of implementation and capacity building support and not just limited to system design. The process was developed in the real word context of the users, akin to a "living lab" (Mukherjee et al. 2023), and extended beyond a primary technology focus. The process was not limited to one setting, but to a large network of distributed hospitals. Participation did not stop with design but extended over the implementation period covering more than a decade, and ongoing.

Many challenges were faced. Technical challenges, of course, such as systems going down, printer wires being chewed away by rats, servers collapsing in the face of heavy electricity outages, and many more. There were institutional challenges too, such as frequent turnover of senior officials, changes in the political leadership, the heavy existing workload of nurses and doctors, and inadequacies of resources. As the systems became present across the state, HISP India set up a team of five young graduates to strengthen field level support. All five belonged to the same state, were eager and enthusiastic to learn, and ever willing to travel even to remote corners of this hilly state to provide technical support to the hospitals. They were seen by the state not as traditional trainers, but mentors, who would always be present to support users as they experienced problems in their everyday work. They could understand intimately the mental models, aspirations, and circumstances of the users, and were capable of translating the system to better align with these aspirations. Now after 10 years, they have literally become members of the hospital family, with good levels of technical competence, with the unique ability to transmit their infectious enthusiasm to others. They have over time developed capacities to aspire, through the unique model of mentoring |based on a co-production approach, and to translate these capacities to users in the hospitals. The capacities to aspire grew from individual to institutional levels, although unequally across the 20+ hospitals. As Appadurai has rightly argued, the capacity to aspire is culturally determined and is unevenly distributed.

Building visibility of the data and demonstrating its value to particular hospitals, was a unique strategy of HISP India through refresher trainings (held once a quarter in each hospital) aimed at initiating "conversations around data". In these meetings, the training team would display to the hospital staff their local data for the previous quarter, show them the gaps and achievements, and discuss how they could improve the data analysis to support their everyday activities. This visibility of local data helped make concrete to the hospital staff what the system was doing and its local value. They could also imagine what additional values can be generated through the same data, thus the practices of aspiration started to become more routinized. Information increasingly became both a source and carrier of hope.

More than 10 years on, the system is still functioning with varying rhythms across the hospitals, indicating something is being done well. Some of the original aspirations of a statewide digital network of hospitals had been achieved, and new aspiration were generated, such as the need to link up with various national level systems for drugs management, remote appointment scheduling, insurance, etc. A new set of standards (such as patient and provider IDs, transfer of patient data, etc.) have been mandated by the central government, to which all state systems are expected to comply with. Carrying out these integrations are technically and institutionally complex and requiring new forms of capacities. The evolution process has been plagued by challenges in different shapes and forms and are continuing. Some existing challenges endure, such as poor use of data at the state level, frequent transfers of administrators and hospital staff and many more. Over time, the state has developed immense faith and hope in HISP India to technically meet these challenges, but they have to travel a fine line in responding to the central government

pressures of using their systems while continuing their existing systems on which they have made huge investments and have hope in. The air of uncertainty still continues, creating both opportunities and challenges for the future.

How is the capacity to aspire being realized in practice?

The capacity to aspire was not limited to the users but also included the system designers, implementers, administrators, and the health system at-large. Aspirations were co-constructed, which also provided the impetus for building hope inspired action. From the case snippets presented, I draw some inferences around the means by which capacities to aspire and hope were cultivated incrementally over time.

Governance structure enabling aspirational actions: The political climate in 2008 was full of hope, as public health sector reforms was central in political and institutional thinking and practices. The visionary state NRHM Mission Director took legitimacy from this positive climate generated by the political environment and established the MoU with HISP India which set the grounds of how to translate the vision of hope into practice. While over the years there have been extensive changes in governments and Mission Directors, some of the practices initiated through the MoU have endured. Initially, the MoU covered a 2-year period, and has gone through 5 renewals and HISP India still continues today, more than 10 years on. Partly due to bureaucratic inertia, and partly due to the state's satisfaction with HISP India's work, the MoU has always been extended on existing terms and conditions, making the initial conditions of engagement well routinized practices. While the current government is promoting a different technology-intensive vision of a pan-India patient-centric vision, its materialization in practice at the level of state facilities continues to be challenging. Till this realization happens, HISP India continues while continuously engaged in upgrading their technology to align, to the extent possible, with the national vision that de facto also becomes the state agenda.

Stimulating action in spaces of uncertainty: In 2008–2009, there was incomplete understanding amongst the state, hospitals, and HISP India of what was a digital hospital information system. This created a space of uncertainty which provided the impetus for a future-oriented action. Some broad templates for action were however in play, such as the development and testing of the systems in the reference hospital in year 1, scaling of the system to all other hospitals over the next two years, conducting refresher trainings every quarter, and so on. These smaller and more manageable goals helped to convert the original and uncertain aspiration of "making district hospitals digital" to something more realizable in practice. This realistic rather than false hope arising from utopian visions, helped capitalize on concrete openings for actions that people could see and act upon, unlike utopian hope that draws a fairy castle in the sky, but does not point to the concrete actions needed to realize it. The aim of realistic hope is to build and guide everyday practices and gradually seek to routinize them, while making visible the values being obtained for different stakeholders.

Co-production to help build the capacity to aspire: For long, digital systems particularly in public systems of LMIC contents have returned with sub-optimal results because of their top- down nature of design, representing a form of "design from nowhere" (Suchman 2002). The approach adopted here could be described as a form of "co-production" (Jasanoff 2004), which emphasizes how new scientific objects co-evolve and come into being, including new representations and institutional practices, creating social, institutional and technical orders. This approach extends participatory design approaches to multiple settings and locations, unfolding over long periods of time. This co-production approach allowed for the different actors involved to engage collaboratively to evolve the technology and the ways of working in the hospital. Co-production demands a move away from traditional trainer to trainee-based messages, to one where the trainers seek to intimately understand the mental models of the users and engage in processes of mentoring and on-job support over extended periods of time, forever! In many cases, efforts have not borne fruits, such as the doctors often rejecting the system. Rather than seeing this as creating a hopeless situation, HISP India has sought to identify local champions and support development of their capacities to aspire.

Visibility of data as a carrier of hope: HISP India strongly believed that enhancing visibility of hospital and clinical practices through data being generated by the system, was a key vehicle to see how aspirations are or can or not be realized in practice. With the same reasoning, it also helped people to see what data remained invisible, and what efforts are needed to enhance their visibility. Strategy adopted was to conduct refresher trainings quarterly in each hospital, where the HISP India team would display to the hospital team what data were collected in the system for

that hospital, what were the improvements and shortfalls with respect to the previous quarter, and some basic analysis was presented (such as trends) to show where the hospital stands. This would then lead to discussions amongst the staff, where they would either defend their positions or provide suggestions on what improvements they would like. This led then to continuous cycles of feedback, improvements and more feedback and further improvements. While there were these positive improvements at some of the hospitals, at the state level where the visibility of data provides tremendous potential to analyze and compare the workings of 20+ hospital along dimensions of administrative, epidemiological and clinical processes, we have not invoked enough energy amongst state authorities to act. An important aspect highlighted by the strategy of refresher training is that the process of co-production should not terminate with the development of technology, but needs to be nurtured and continued, in different forms and aims, over long periods of time.

Open-source technology enables engagement with the uncertainty of the future: Open-source technology allows you to make choices today which minimizes probabilities of being shut out from making future choices. The public health system by definition is constantly evolving, and new health and technological priorities are emerging. Locked into proprietary licensed software indeed precludes such future choices and can act as a strong deterrent to enabling aspirations. There are indeed multiple stories, particularly from LMIC contexts of how governments got locked into proprietary systems which could not evolve with changing informational needs. Having control of the source code, potentially provides the state with a longer-term horizon in which they can visualize the impacts of the system. This is indeed a pre-requisite for bringing about any degree of change within complex public health system contexts. Within a long time horizon, there is space to work toward making small changes in practices, and gradually trying to synthesize them into larger changes, through expected and often unexpected ways.

We can summarize with a discussion on how information became an important source and carrier for hope across these different mechanisms discussed above. The open-ended MoU allowed for the building of information for understanding what comprised a digital integrated hospital information system. Intensive processes of co-production provided the users and developers the opportunity and space to engage with each other to build this mutual understanding. This understanding then became trigger for building information for moral imagination and also desire. In retrospect, information for building moral imagination, was not as effective as it could have been, and as we may have liked. A key reason was that the medical doctors, who should have been key drivers to build such imagination with the aim of improving patient care, for example, by providing more continuity of care, had not extensively adopted the system. The reasons for this were very justifiable, as they had extremely high patient loads, and were unable to take on the additional task of entering data into the digital system while also providing care to the patients. The hospitals were not adequately resourced to provide them with additional data entry personnel. For the limited set of doctors who adopted the system, there was information created to fuel their desires, for example, on how chronic patients, who needed long-term care could benefit from such an integrated system. The processes of refresher training in hospitals, which encouraged having conversations around data, were important sources for enabling metacognition. As the hospital staff could see the value of data, and also understand what additional data are needed, they could build aspirations for future data-based work. As the current national agenda of deploying such patient-based systems is under major reconfiguration, there is again the source of uncertainty of what the future would be like. The social capital built in terms of hope, can be an important driver for engaging with this future uncertainty.

Conclusions: Some personal reflections

About 25 years ago, I started to hear about the HISP (Health Information Systems Programme) research and development initiative at Oslo, and when a vacancy arose, I applied and moved to Norway. I had strong feelings of hope that I could engage in making the world a better place, working with digitally enabled change in the public health sectors of LMICs. Over the last 20 years, I have learnt a lot about the complexities inherent in trying to translate this hope into practice. I have also seen changes in the whole HISP initiative, leaving me unsatisfied due to the limited critical questioning of what difference are we are making to development processes? Are we saving lives or primarily promoting technology? And how are we trying to counter forces of capitalism being promoted by large-tech, or are we promoting similar processes albeit with different business models under the framework of development?

With these troubling questions in my head, I have decided to refocus my personal efforts away from the

landscape of global health to an India focus, where I believe I have stronger contextual understanding, and can to a better degree share the hopes and aspirations of people there. I have now primarily focussed my attention on trying to engage with the grand challenge of antimicrobial resistance (AMR), where India is a global hotspot. Today we have a situation where antibiotics that used to work against infections are becoming increasingly ineffective, which threaten the death of modern medicine as we knew it. The microbes have become resistant to the drugs, and as a result infections are spreading and becoming harder to treat and has been described by World Health Organization as "one of the biggest threats to global health, food security, and development today". AMR is propagated by the misuse and overuse of antibiotics, as well as poor infection prevention and control practices in health facilities and more broadly in society. There are multiple information-related aspects to this problem situation, leading to research opportunities and challenges for ICT4D researchers. It represents a domain where hope can and should play an important role in stimulating collective action.

AMR is a grand challenge because of its global impacts, and life-threatening consequences of existing and new infections not treatable by antibiotics. Currently, the challenge of AMR is not adequately visible, which constrains policy-making and practice. I strongly believe as a first step, practices need to be developed to make the challenge more visible to policy makers and clinicians. Visibility serves as a crucial carrier of hope and impetus for action. People can then start to better visualize the existing state (of infections and their spread) and imagine what capacities need to be developed to create a better future. The framework outlined earlier highlights the different means by which information can serve both as a basis and carrier for hope – by building understanding, expanding our moral imaginations and desires, and providing means of strengthening metacognition. The digital can be deeply implicated in strengthening each of these basis and thus also strengthen this basis for hope.

In India, I work with the NGO called HISP India (see hispindia.org), which I founded almost 20 years ago. Over time, this NGO has grown into a thriving research and development entity, which values self-reliance. It is comprised of committed young individuals, with strong capacities to hope and aspirations and have developed concepts and methods to realize this aim of improving visibility and action. They have seen how digital technologies can play an important role for strengthening hope. I aspire to work through them and help channel their energies toward realizing aspirational change, over years to come.

Acknowledgements

A version of this research commentary was presented at ECIS, 2023 in Kristiansand, Norway. I deeply acknowledge comments by Margunn Aanestad on earlier versions of this talk. I deeply acknowledge the team at HISP India who have been the empirical and conceptual breeding ground and to Arunima Mukherjee who has inspired me to develop more critical perspectives towards ICT4D research and practice. These have contributed to my personal development of hope and aspirations. Special thanks to Harmeet Sawhney, Editor-in-Chief, *The Information Society*, for his valuable inputs in the development of this paper.

Disclosure statement

No potential conflict of interest was reported by the author.

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