# "Connecting the world from the sky": Spatial discourses around Internet access in the developing world

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## ABSTRACT

This paper examines the discourses around emerging Internet connectivity solutions for rural and resource-constrained populations in the developing world. It draws primarily on interviews undertaken with 26 experts within the Information and Communications Technologies for Development (ICTD) field, as well as on institutional explanatory and publicity materials put forward by several industry actors. We identify a sustained disconnect between different conceptions of how technology alters or bridges space—spatial imaginaries. Institutions use narratives that assume technologies eradicate or collapse distance, and thus drive transformative socioeconomic change. By contrast, expert accounts underscore the socially embedded nature of technologically mediated relations and non-infrastructural barriers to connectivity. The paper draws attention to the ways that these spatial ideas are used to justify the development of new infrastructures to extend Internet access in the developing world. The paper identifies a need for continued attention to spatial imaginaries in ICTD, not only as a guiding frame for critical research, but also as a means to improve collaboration between research and industrial practice.

## CCS Concepts

• **Social and professional topics**→**Socio-technical systems** • *Networks*→*Network types* • **Networks**→**Network architectures** • *Human-centered computing*→*Ubiquitous and mobile computing theory, concepts and paradigms*

## Keywords

Internet access; technological innovation; geography; space; spatial imaginaries; narratives.

## INTRODUCTION

Emergent technologies have always been entangled with human aspirations and predictions about them, from the postal service and electric telegraph, to railways and the Internet [9, 36, 41]. Recently, various institutions have put forward a suite of new technologies and business models to provide Internet access more effectively and at lower cost to isolated and/or resource-constrained populations in the developing world [12, 42, 44]. Of particular popular interest have been drones and stratospheric

balloons, smaller and lower orbiting satellites. Other emergent technologies also include community GSM, dynamic spectrum allocation and local area mesh networks.

Of course, cycles of popular expectation and disappointment are nothing new in technology [28], but the attention to these new technologies seems particularly apt this time, perhaps due to the prominence of their powerful, charismatic Silicon Valley champions.

Given the usual structural lag in scholarly research, academic treatments of these new technologies remain relatively scarce. In this case, this paper is not about the technical or economic prospects for any of these technologies, in particular or in aggregate. We report some of those assessments, gathered via structured conversations with those within the Information and Communications Technologies for Development (ICTD) field, in a separate paper [3].

Instead, this paper seeks to connect the discourses around this "next wave" of connectivity initiatives to the same patterns of discourses surrounding earlier waves of communication technologies and infrastructures. By juxtaposing industry and ICTD research perspectives, we uncover the ways that space and spatial imaginaries intersect with these generalized discourses about ICTs. Building on previous work by one of the authors, this paper offers one version of a "more sustained inquiry into the discursive effects of the powerful and particular ways that we envision the coming-together of technology and connectivity (p. 39)" [17], with particular attention to how the connectivities afforded by these new technologies are imagined to alter lived geographies. The paper is concerned both with the way in which experts and institutions construct these spatialized discourses, and how these discourses, once created, come to influence the allocation of scarce resources and shape the ways development is undertaken.[1]

Because much of the work done in the field of ICTD involves "connecting" previously "disconnected" actors [6, 20], it is important to better understand how spatial discourses about the effects of changing connectivities are deployed and reproduced in the sector. Those discourses are a key matter of concern for social scientists because of power relations and resource allocations legitimated through discursive practice [5]. Powerful discourses often accompany changing connectivities, just as the electric telegraph was considered to have "telegraphed [time] out of existence" [41], digital connectivities afforded by the Internet have been envisaged to result in the "death of distance" [2], "network society" [4] and ultimately "end of geography" [35].

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[1] The paper reflects the views of the authors and not those of their respective institutions.

These spatialised imaginaries form regimes of truth [10]; they "do not simply describe how different people and places are connected to one another" but also "prescribe the effects those changes in connectivity ought to have in the world (p. 32)" [17]. Discourses thus shape "not just how we envision connectivity, but also how we enact it (p. 32)" [17].

This is a moment where discourses around new Internet access technologies have jumped from the specialized arena to the popular and practitioner arenas. The "spatial" frame of a digital divide, which can be closed via technologies, may be as prominent now as it was at the height of the first dotcom boom in the late 1990s. This moment provides a valuable opportunity and impetus to examine how these spatial discourses interact with existing "development narratives" [40] around ICTs.

This paper examines how these emergent technologies are considered by: a) experts in the evolving Internet access landscape through semi-structured interviews and b) public-facing discourses used by the institutions developing particular technologies. Specifically, the research comprised 26 semi-structured interviews with experts in emerging access solutions: including interviews with private sector institutions Microsoft and Inmarsat; civil society organizations including the Internet Society and Alliance for Affordable Internet; new Internet access start-ups Endaga, EveryLayer, Village Telco, Souktel and Esoko; and academic perspectives from five continents. These interviews are considered alongside analysis of audio, visual and written information presented by each institution's promotional material supporting each new technological approach.

Those data and methods are used to address three research questions:

- What discourses are employed by private, third sector and academics, in talking about connectivity afforded by new technologies?
- How are spatial imaginaries employed within discourses about digital connectivity afforded by new technologies by private and third sector groups?
- How do these discourses support or justify organizational objectives and the allocation of private and third sector resources?

This paper thus has much to offer to the field of ICTD because while spatial issues have become central to the field, they have remained largely unexamined in the ICTD literature.

## 2. THE RELATIONSHIPS BETWEEN TECHNOLOGY, SPACE AND TIME

The Internet is often portrayed in popular and scholarly media as a "uniquely disembedded medium … capable of collapsing physical distance, transcending geographic barriers (p. 26)" [36]. Scholars have noted further that spatial metaphors and simplistic notions of space help to emphasize the notion of "profoundly antispatial" Internet communications [32]. This aspatiality masks "the fact that the Internet continues several long-standing characteristics of communication technologies" [29], and similar aspatial imaginations ascribed to connectivities throughout much of human history [32]. Instead, historically varied technologies have been understood in relation to space, place and time, hinging on different ontological assumptions about "space".

"Space" emerged as a category of Western thought in territorial and absolute terms. In these terms, space is characterized as the container in which "all things happen", represented in a Euclidian manner as a two or three dimensional grid [24]. Under the ontology of "absolute space", technology becomes an agent for

bridging or overcoming spatial frictions by reducing the time taken to cross given distances. Thus a "death of distance" results from the compression of time relative to space [2].

In opposition to these ideas, contemporary relational understandings of space emphasize that space is constructed through social relations and discourses. Space is viewed as the product of interrelations; this means that space is "always in the process of being made. It is never finished; never closed (p. 9)" [30]. Scholars in this tradition have strongly critiqued the notion that technologies eradicate distance, as suggested by an absolute ontology [4, 29]. Many point out that connectivities have been technologically mediated for much of human history [22] allowing physical distances to be charted, crossed, and reimagined. Actors are differently positioned in relation to the flows and interconnections afforded by new technologies; rather than uniformly "shrinking" space, connectivities "shrink" certain geometries while extending and remaking others [30]. Some actors are able to initiate flows and movements whilst others are effectively imprisoned by evolving "power geometries" [30]. These approaches remind us that an absolute ontology risks ignoring where power lies in these "geometries". Instead, richer analysis recognizes how new technologies are "bound up in the active construction of space and place, rather than making it somehow redundant (p. 174)" [19].

### 2.1 Spatial imaginaries

This paper examines how spatial imaginaries, bundles of loosely related discourses that conceive of the relationship between technologies and space in particular ways, continue to underpin many institutional and expert discourses about connectivity, allowing claims for ICT's developmental potential to be made.

The centralities, contradictions, and complexities of these spatial imaginaries can be seen through the paradoxical application of metaphors; although ICTs are often imagined to eradicate geographies, they are just as frequently understood through geographic metaphors [7, 16]. "Cyberspace" and the nominalization of the term "Internet" reflect a territorialized conception of digital relations where "the virtual takes on an ontic role" [15]. Similarly the metaphors of "global village" [31], "flat world" [11], and "digital divide" hinge on the notion of "an ethereal alternate dimension which is simultaneously infinite and everywhere (p. 3)" [14]. Related metaphors such as "network society" and "information age" [4] also posit spatial ontologies on the basis of virtual connectivities, which eradicate spatial distances [15].

These powerful spatial imaginaries allow various actors to make claims about the transformative effect of communications technologies and often intervene in the world with material implications and importance for development. Essentialist visions of connectivity afforded by the technology of the railway supported colonial ambitions in East Africa [17], and are similarly used to support neoliberal globalization [39]. Likewise, Graham and Mann [18] identify how discourses around the installation of undersea cables in Kenya framed Internet connectivity "as the key factor determining the course of social and economic development" by breaking down traditional spatial barriers to international work [18]. They note how these spatial narratives justify and expedite investment in Internet infrastructure, whilst closing down alternative developmental resource allocations.

This paper examines to what degree experts and institutions employ spatial imaginaries in justifications for extending the Internet through the next wave of connectivity technologies. To

this next wave, we apply three durable, general, and archetypal spatial imaginaries initially put forward by Graham, Andersen, and Mann [17] and by Graham [13]: *Shrinking World*, *Global Village*, and *Digital Augmentation* (see Table 1.1).

Both *Shrinking World* and *Global Village* imaginaries assume that the barriers of space and distance are in some way overcome by new technologies. In a *Shrinking World* or *Global Village*, ICTs are seen to reduce the barriers to communication and information sharing between non-proximate actors [13]. A *Global Village* imaginary sees the importance of distance diminish further through the creation of a "friction-free ontic space"—a virtual "Village"—"that exists beyond the material world" [13]. This understanding suggests that "any connected economic actor" can be "brought into a shared market-space or communications space" through digital connectivities [13].

**Table 1.1 Adapted from Graham [13, 17].**

| Spatial Imaginary | Description |
|---|---|
| Global Village | Imagines a world where connectivity brings connected actors into a shared digitally-mediated space. For connected actors, spatial distances become irrelevant. |
| Shrinking Distance | Connectivities reduce barriers to non-proximate communication and information sharing, reducing spatial frictions. Distance becomes a unit that is shrunk by technology. |
| Digital Augmentation | Communication technologies augment existing social relations. Distance is altered unevenly by technologies and, even when bridged, is one of many challenges faced by developing populations. |

In contrast, *Digital Augmentation* stresses "the incremental changes" brought about by communication technologies and the "ways that those changes [are] embedded into existing networks, structures, and positionalities" [13]. Under this imaginary, "distance is but one of many hurdles to cross" alongside myriad other social and technical complications [13]. Whilst *Global Village* and *Shrinking World* imaginaries conceive space as a unit bridged by technology, *Digital Augmentation* stresses a more modest and complex reconfiguration of space. This paper uses this model of these three spatial imaginaries to examine how spatial discourses are used by experts and institutions.

## 3. METHODOLOGY

This paper builds on 26 semi-structured interviews conducted in person and with online conferencing software, and on a discourse analysis of the institutional explanatory and promotional material that supports specific access approaches. Desk research identified individuals with prominent roles researching or working with new technologies or approaches. Interviewees were selected for their involvement or knowledge of particular new Internet technologies. This initial search scanned academic literature, news media, blogs, technology commentaries and lists of speakers at relevant conferences. This scan took place over the course of two months (April to May 2015) and reviewed more than 400 articles. Discourse analysis was undertaken on the publicly available publicity material on institutional Web pages and shared on social media by institutions developing new technologies for Internet connectivity. The purpose of the analysis was to understand the dominant messages being used by institutions, and therefore only publicly facing and readily available material was considered.

More than 100 webpages were analyzed alongside 20 videos and 2 white papers. Appendix 2 lists the institutional material considered. The sample does not claim to be representative of the whole ICTD field. The priority for this work was to sample the diversity of ideas within the field and inspect tensions and incongruences.

Experts fell broadly into three categories: private sector, civil society and academic and policy researchers. From the initial list that was compiled, a snowball methodology was employed; experts were asked to refer other individuals and suggested areas for literature review. Interviews were recorded, transcribed and coded. Participants are left anonymous in this discussion, whilst quotes have been reviewed in a separate report [3]. Consulted experts and their institutions are included in Appendix 1. We are grateful to each of the participants for the contribution of their time and their thoughtful reflections on the field. This paper would not have been possible without their inputs, and we hope that we have aggregated and abstracted the patterns in their responses to address broader discourses in a manner that nevertheless respects the diversity and depth of each of their contributions and perspectives.

The primary goals of our interviews were to assess the potential contribution of new modes of Internet access to the landscape of future Internet access. This included anticipating which new mode of Internet access might have greatest impact in the near future, who would benefit from this shift, and how competing business models might emerge. Experts' responses on these topics are reported elsewhere [3]. Yet in the course of the interviews, four open questions were structured in ways that invited longer and more discursive reflections on the nature of the communication technologies in question. These four questions underpin the discourse analysis described in this paper. We (a) asked whether new connectivity was important and why, (b) examined anticipated social economic and political changes related to the technologies, (c) discussed potential changes to "the character of the Internet" [37], and (d) interrogated organizational goals.

## 4. ANALYSIS

### 4.1 Tensions across the material considered

Although the material considered was collected from specific groups—interviews with academics and practitioners, and publicity material across a range of technologies—the viewpoints and stances are not easily categorized in to discrete groups. Instead, expert interviews revealed tensions that cut across sectors. We describe in [3] how experts surfaced tensions and adopted different viewpoints on "top downism" and community-led approaches, on the non-instrumental use of technology (through activities such as social media, gaming, entertainment and pornography), on second order digital divides such as literacy and availability of relevant content, and on persistent constraints to connectivity. Likewise, experts saw vastly different roles for different technologies in the emerging landscape of Internet access. Others pointed to the difficulties entailed in working across theory, practice and changing technologies, and the difficulties of reconciling thinking across these junctures.

This paper focuses on the way in which experts and institutions construct discourses, especially in spatialized ways. The folds of discussion do not map straightforwardly on to the backgrounds of different interviewees. However, the lens of spatial imaginaries provides a valuable tool for grouping particular discourses and surfacing the way in which they are constructed across different conversations and the publicity used by different institutions.

To be clear, this paper does not seek to support any particular theory, technology or approach. As we see it, no new innovation is likely to solve the remaining access challenges. Indeed, that leading ICT4D experts can disagree about the paths forward is, in itself, evidence that we should be pursuing multiple, complementary technologies and approaches rather than searching for a single silver bullet. However, this discussion helps place the anticipation around access innovations into better context. Development practitioners need to remain mindful of shifting narratives, especially associated with "moonshots" like drones, stratospheric balloons, and low earth-orbit satellites, and recognize that as thinking in ICTD is shifting, it is increasingly becoming entwined with high-profile, popularized narratives about connectivity.

## 4.2 How are spatial imaginaries employed?

The first interview question asked experts "is connectivity for resource-constrained and isolated populations important, and if so why?" A small minority of experts (exclusively academics) put forward views that challenged the importance ascribed to digital connectivity. In response to the first question, one explained:

*I would say that it is largely unimportant in the context of the fact that they are lacking many, many other things that could be of much greater value to their lives. To the extent that our focus on providing Internet access to the very rural poor in the developing world becomes a distraction or draws resources from other things, I would say that it is not even just unimportant, but possibly even harmful.*

Another academic suggested ambivalence and discussed the lack of evidence about the value of digital connectivity to resource-constrained populations. To this initial question, they answered:

*Is improving Internet connectivity and access for resource-constrained people important? I think it could be important compared to other things, and I am not sure why. I don't know. I have never asked people that particular question and feel like I can't answer it for them.*

Dissenting viewpoints aside, most other experts and institutions put forward positive, often celebratory narratives of the potential of digital connectivity, many of which drew on spatial or spatialised justifications, which are discussed below.

### 4.2.1 Global Village

The notion of a *Global Village* offers the most jubilant vision of what digital connectivity is able to achieve by implying that spatial frictions can be entirely overcome. We see examples of *Global Village*-like discourse in a limited way in some institutional material. For instance, Google Link, refers to the Internet as a "global community":

*Many of us think of the Internet as a global community. But two-thirds of the world's population does not yet have Internet access.*

Here a *Global Village*-like imaginary is combined with notions of a distinct "digital divide" [15] to argue for the extension of Internet access. This dualistic view of global community—one that you are exclusively in or out—gives the impression that an equalizing virtual space is brought into being through digital connectivities [25]. This "global community" much like McLuhan's [31] "global village" supports the notion, not only that distance can be eliminated through new connectivities, but that, through digital mediated connectivities, inclusive virtual spaces are brought into being.

A similar imaginary underpins Facebook's institutional material. In a white paper that sets out Facebook's strategy toward high-altitude drones and low orbit satellites, Facebook CEO Mark Zuckerberg sets out a vision for the growth of the "global knowledge economy" that is underpinned by new connectivities. The new technologies the white paper supports have material impacts and constraints which the white paper discusses in detail, yet the justification for development of these technologies is outlined in abstract terms; through discussion of "connectivity" as the foundation of the "knowledge economy":

*Connectivity is also the foundation of the global knowledge economy. Before the Internet and the knowledge economy, our economy was primarily industrial and resource-based ... [The shift to a knowledge economy] is good for the world because everyone will benefit from the increased knowledge, experience and progress we make from having everyone connected to the Internet.*

These quotes rely on the idea of an egalitarian space, akin to a "village", with access for all those with an Internet connection.

Facebook's Internet.org[2] publicity builds on this theme with the story of Erika & Esmeralda, two physics students from Bolivia who, the Web page outlines, won awards for building robotic arms:

*This is exactly what the Internet needs more of. Robot arms? No. Resourceful, innovative people like Erika and Esmeralda? Bingo.*

*Now imagine connecting all of the world's unconnected 4.5 billion people. Get them online and who knows what they'll do. Erika & Esmeralda see possibilities everywhere they look. Multiply that kind of ingenuity and optimism by the rest of the world's unconnected 4.5 billion people. And anything is possible.*

The metaphor of the *Global Village* is again created through the notion that the Internet is an ontic, or real, space; that it has its own agency and in this case "need" for a greater number of people to be connected. In the above quote, nominalization of the term "Internet" [14] extends beyond an assemblage of socio-technical relations [33] to a shared digital space or representative and universal community. In the same way nations are imagined as territorialized communities [1], "the Internet" comes to be a distinct community from which many people are excluded. Access to this community becomes a prerequisite for sharing "ingenuity and optimism" and unlocking the world's potential—indeed with global Internet access "anything is possible".

In sum, this virtual space of the *Global Village* that opens up a world of possibility for social and economic transformation—especially for those previously unconnected—yet can become a key constraint for those without access.

### 4.2.2 Shrinking World

*Shrinking World* perspectives were articulated strongly in institutional justifications for connectivity. For instance, Facebook puts forward a vision of the wide-ranging benefits of new technologies, again stressing the value of "connectivity":

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[2] Facebook renamed its zero-rating service from Internet.org to Free Basics in October 2015. Internet.org continues to refer to the arm of Facebook's operations that focus on extending connectivity, through mechanisms such as Free Basics, Facebook's Connectivity Lab, and Express WiFi.

*Connecting the world is one of the fundamental challenges of our time. When people have access to the Internet, they can not only connect with their friends, family and communities, but they can also gain access to the tools and information to help find jobs, start businesses, access healthcare, education and financial services, and have a greater say in their societies*

Likewise, a video promoting Google balloon technology called Project Loon outlines a parallel narrative of abstract socioeconomic transformation from new connectivity:

*But what if there was a way to light up the entire globe? And finally make all of the world's information accessible to all of the world's people? Well, even though today one in three kids can't get to a real secondary school, everyone could have secondary school come to them. In places where there aren't enough doctors, everyone could be helped by doctors in other places. ... Farmers could benefit from better weather data. And we all could have a better harvest. And because small businesses that are on the Internet grow twice as fast, everyone could create new opportunities for everyone.*

In both accounts we observe that connectivity is positioned as an enabler. For Project Loon, simply the ability to connect with other places is perceived to deliver instant gains, for instance in the cases of schools or hospitals. Similarly, Facebook's white paper equates the introduction of new connectivities with wide-ranging social, political and economic benefits through inter-personal connectivity and access to information. Indeed, the determinism of technology is so strong that delivering connectivity is considered, in itself, a "fundamental challenge of our time".

By contrast, institutions working with community-orientated technologies employ more contextually grounded accounts of technologically afforded change. For example, Village Telco a social enterprise, which operates community mesh networks through devices named "mesh potatoes", explicitly lays out how changing connectivities would be employed by users. The company outlines its value proposition for reducing the cost of common communications within a village:

*John lives here. He needs to keep in touch with the important people in his life. Like his colleague Big Mike, Kamalo at the clinic and of course [his girlfriend] Otomi. But John's only option is using his mobile phone. And like most people he knows he is spending a big chunk of his disposable income on expensive mobile services. And mostly just to talk to people in his village. But that was before the mesh potato.*

Rather than putting forward an abstract narrative of social and economic transformation coming from either a *Global Village* or *Shrinking World,* Village Telco uses a more modest imagination of new connectivities, which stresses the particular contexts in which this technology will be used. Their description focuses on how connectivities will be used within a given setting; clearly situating the use of connectivity within existing social relations, within a given village. Rather than drawing on an envisioned potential to transform the lives of the "the poor" through connectivity, Village Telco justifies its work by reducing the cost of communications.

Similarly, other the discourses used by other organizations that approach the extension of connectivity through community-led means stress the political economy of connectivity. Endaga, a private sector start-up, allows local entrepreneurs to run localized mobile networks in areas major networks don't operate, and employs a discourse of autonomy and self-directed control:

*Be the phone company. No more waiting for coverage: now you can build cellular networks yourself... Endaga empowers anyone to build their own independent, profitable cellular networks, even in the most remote, sparsely populated places on Earth.*

Likewise Guifi.net, a global community mesh networking solution that emerged from Spain, argues:

*guifi.net is a telecommunications network, is open, free and neutral because it is built through a peer to peer agreement where everyone can join the network by providing his connection, and therefore, extending the network and gaining connectivity to all. [It] is a collaborative project horizontally managed composed by individuals, organizations, enterprises, education institutions and universities and government offices. [It] is open so everyone can participate in same terms and conditions.*

For these community-orientated organizations, the arguments they use primarily relate to the political economy of communication and localized control over communications infrastructure. New connectivities are positioned as transformative in offering alternative (cheaper or more autonomous) modes of connectivity, in the absence of palatable alternatives. These alternative imaginaries still point up the importance of connectivity, yet employ different discourses. By situating arguments more directly into specific context and use cases, the community discourses offer a more modest and contextual assessment of the transformational potential of connectivities.

*Shrinking World* perspectives were also common in expert justifications for connectivity, even though more detailed discussions of connectivity in practice tended to emphasize contextually specific barriers. In response to the initial interview question about the importance of connectivity, the most optimistic experts put forward a narrative that outlined the various social and economic benefits brought about access to Internet connectivity. For instance, a start-up founder noted:

*It is the amount of literally life-changing information that can be accessible through connectivity. It is only growing at tremendous orders of magnitude. Having access to that is really important. [The information can be] everything from financial inclusion related information ... Basic concepts such as household budgeting, saving for the future, how to use your money wisely; educational content ... On the agricultural side of thing there are tremendous applications, and everything from information about market prices for crops, irrigation and farming to animal husbandry tips... then we see a lot of work on the economic growth and employment side of things ... Then basic functional literacy and learning to read, basic numeracy.*

Here, digital connectivities are seen to reduce barriers to information flow and exchange, in ways that could transform the lives of resource-constrained populations.

Some experts examined their justifications more explicitly in relation to space. A perspective commonly outlined, which emphasized the ability of technologies to shrink space, is put forward here by an academic:

*[Internet connectivity] continues to bring economic opportunity, it will help promote learning through remote classes, and promote healthcare through specialists on the*

*ground being able to get more information and access more qualified healthcare practitioners. This is great because it all can be done on people's home location.*

Another academic outlined what they saw as the "huge importance" of Internet connectivity through social connectedness with non-proximate relations:

*The impact that this makes of allowing people to connect to information, to participate in discussion about topics which are relevant to them, the participatory aspect, the transparency aspect and the aspect of being able to self-direct your life with access to information, and being able to engage, is of huge importance.*

Others stressed how new technologies might extend connectivities to include rural historically isolated populations. A community practitioner suggested:

*One of the critical things in rural areas is isolation. The critical thing that bringing connectivity to these places achieves is to reduce the isolation penalty—having less access to different services, public services, government services. Communication to some degree reduces that penalty. It is critical for the urban poor as well, but more so for the rural poor because they can't hop on a bus and bang on someone's door or table and say 'I demand that whatever is not working in the community is fixed'.*

We might observe that these perspectives relate diverse and substantive socioeconomic transformations to new connectivity's ability to "bridge" or reduce space. For these accounts—which interestingly cut across academic and practitioner perspectives—reduced spatial frictions alone leads to beneficial transformations.

### 4.2.3 Digital Augmentation

A *Digital Augmentation* perspective, which looks at how communications technologies augment existing social relations, dominated expert interviews.

Unsurprisingly and mirroring a recognition within ICTD scholarship that technology alone is rarely a "silver bullet" [26, 43], expert discussion consistently underscored how digital connectivities were enacted in context, in contingent, but often constrained ways. One academic clarified an earlier positive statement they put forward about the potential of connectivity:

*You cannot simply connect these communities and expect immediate impact in terms of poverty alleviation or raising incomes and productivity. The communities face a lot of challenges. Connectivity is one of them but it's clearly not a magic bullet... It's not the only piece of the puzzle, because after connectivity comes a host of other challenges.*

The vast majority of experts emphasized this view, stressing the operation of new technologies within existing relations. For instance, a start-up founder challenged the importance ascribed to contemporary connectivities:

*There's always this narrative of technology coming in and connecting the unconnected and that's just not how the world works. There's always an existing mechanism for you to talk and communicate with the people that are important to you. For instance [in rural communities I work with] in Papua New Guinea ... There's a satellite phone or you could catch a bus. Those are the existing connectivities. There was never the no connectivity*

*option... This goes back through the human history; mail was taken all around the world.*

Experts highlighted how technologies are embedded in specific contexts and enacted through existing social relations. Here an academic outlined intersecting challenges that constrained the value of connectivity for developing populations:

*One [challenge] is the availability of low cost smart devices; there is no point in having mobile Internet in villages especially if you cannot use it ... so the device is very important. Second is the content and right now there is so little content on the Internet for people ... The third part is the capability for the people to recognize the value of the content.*

This *Digital Augmentation* perspective was extended so far as to argue that new connectivities could work within existing relations to cause disadvantage. A civil society voice examined new difficulties that might arise from digital connectivities, especially for the poor:

*[Connectivity is important] with the caveat that increasingly we are seeing the "dark side" of being connected. Which allows us to be surveilled in potentially undesirable ways. The poor are especially at risk because they have no voice to object, and may have no awareness of how they are being observed. In autocratic regimes this is a particular downside to having Internet access.*

An academic noted the way in which hopes for technology tend to prescribe a favorable assessment of their impact:

*The irony is the assumption in the technology field, that "technology is good". Which is not what I would say ... [instead] we need to force people to ask that question, OK, why?*

Experts stressed how technology would interact with existing social relations to enact change. An academic elucidated how technology "amplifies" rather than transforms existing relations:

*It is vital not to overplay technology as the saviour. And I always borrow Kentaro Toyama's quote that technology is the "amplifier of human intent". Connectivity is a very powerful force for these things I've mentioned, but only when it's tied closely with motivated teachers or keen students and an entrepreneurial spirit then it becomes powerful for development.*

A civil society actor extended this point to note the irony of narratives that attend inadequately to particular contexts; in this case where physical distance constrained the usefulness of price information:

*There are these stories about farmers in rural areas, using [the Internet] to find out prices for what someone might be selling 40 to 50 kilometres away, which they may not be able to reach because the roads are terrible.*

Tensions emerged across many conversations as individuals struggled with stated potential economic and social gains, and evidence of constraints faced in context. These competing perspectives regularly played out in the course of a single interview. Here, an academic outlined the developmental importance of Internet access, yet simultaneously acknowledged that developmental aims were rarely achieved in practice where entertainment was a dominant use:

*I have seen what the development effects of giving information in rural areas is, because they are the*

*information starved. Now with mobile Internet [in India] ... there is a new kind of liberation happening. They are not making a whole lot of economic or knowledge capital generation activities on the Internet. But I think that will come. It is like a ladder, or like the stage theories of growth. Because [at the moment] I see most of them using it for entertainment.*

Another academic voiced a critical perspective on non-instrumental use of technology, explaining:

*The things that we supply via the Internet are becoming a kind of opium of the masses, where people may feel that they are possibly even happier in the short term because they have better access to movies and music and communication with their friends in the city and so on. But it may end up only taking away their own time and ability to engage in more productive activities that could actually support them.*

A third sector interviewee spoke explicitly to this tension between instrumental and non-instrumental use:

*Whenever we talk about rural, we always keep on thinking, education is important, health is important, nobody thinks entertainment is more important, because we have that very patronizing attitude that they shouldn't watch a movie, they need food first, they need water first. We don't realize that they are also humans ... All the time we keep on harping on about the necessary part.*

In these quotes we observe a gap between idealized visions of what digital connectivity could achieve and evidence about how new connectivities play out when embedded in particular contexts, primarily being used for entertainment.

# 5. DISCUSSION

## 5.1 What do we learn from spatial imaginaries?

### 5.1.1 Global Village:

A *Global Village* implies that digital connectivity brings actors into a co-present virtually mediated space, which dissolves all barriers to information sharing and communication between non-proximate actors ultimately offering a world of potential. Through a *Global Village* all places conceptually become equally able to participate in the shared space of a "knowledge economy" or "global community", and particular contexts and their varied histories and power relations are seen to be made irrelevant through digital connectivity. Whilst the term "global village" itself wasn't found in the analysis, the authors note that several examples imply the creation of new virtual spaces, "communities" or "economies" which, like McLuhan's "global village" [31] create discrete and distinct virtual spaces.

In this imaginary, connectivity is presented a sufficient rather than necessary condition to bring about dramatic socioeconomic changes for disadvantaged populations. Equally, access is seen as sufficient for individuals to participate fully in the global "communities" or "economies" that connectivity sets up. This utopian-like imaginary ignores key questions surrounding the ability of disadvantaged populations to access a meaningful online experience (for instance due to constraints in digital and functional literacy), and the accountability and willingness of global institutions to respond or listen to alternative accounts, given that online content mirrors many existing geographies of

power [48]. Rather than framing the lack of Internet access in terms of historic socioeconomic disadvantage, these perspective frame inequality in terms of binary access to this "global community". This binary distinction further obscures the differentiated nature of life online [6, 20]. As a result, intervening factors including device affordances, literacy, affordability, local language content and censorship come to be obscured.

It is revealing that many of the assumptions about connectivity set out in McLuhan's early vision of the Internet continue to hold sway in contemporary conversations about emergent technologies. As the starkest and most simplistic of the imaginaries examined, the *Global Village* points to the remarkable continuity of oversimplified ideas in our understanding of connectivity, and how the limitations of this analysis continue to influence how connectivity is envisioned.

### 5.1.2 Shrinking world

Closely related the *Global Village,* the idea of a *Shrinking World* positions connectivity as an enabler of social and economic transformations through the perceived ability of new technologies to reduce or "shrink" spatial frictions. At its starkest, simply the ability to connect populations with other places is perceived to deliver instant gains, for instance in healthcare or education. Other perspectives suggest that technology helps remote populations overcome physical isolation. Again, overcoming this geographic isolation is seen to be central to reversing communities' exclusion.

We observe that in these *Shrinking World* accounts the stated benefits are tied only in abstract terms to the places and activities that might drive change. For example, enhanced job opportunities, knowledge and improved health are assumed to take place simply through the task of connecting "disconnected" populations. This is not explained through reference to particular contexts or to the mechanisms that might enhance outcomes. Instead again connectivity comes to be presented as a sufficient, rather than necessary or even valuable element of enhancing health or education outcomes. Ultimately, this hinges on a strongly technologically determinist view of social change. This view assumes that once new technological solutions are in place (and the frictions of space "shrunk") socioeconomic transformations will be instantly delivered.

Although we have experienced successive waves of new connectivities and technology, it is apparent the vision of how these technologies will alter the world has barely changed. The *Shrinking World* imaginary underpins many of the discourses about new connectivities put forward both by institutions and experts, much as this idea that space can be "shrunk" underpins previous popular narratives such as the "flat world" [11] or "end of geography" [35]. When applied to emergent technologies we see that similar limitations with these simplistic framings are manifested anew. Resultantly, simplistic assumptions about the how the world is changing and the best subsequent interventions are put forward; a simplistic view of connectivity continues to pervade much of popular and indeed expert thinking.

### 5.1.3 Implications of a Global Village or Shrinking World imaginary

Behind both *Global Village* and *Shrinking World* imaginaries analyzed is the idea that there can be a technological "fix" to the "problem" of development. Under these imaginaries, the ability of technology alone to "shrink" or "bridge" spatial frictions is seen as synonymous with wide-ranging socioeconomic change. The "technical fix" of connectivity is all that is required to initiate

these changes. Indeed, the imaginaries assume that the lack of connectivity is the crucial factor disadvantaging the places in question.

These imaginaries operate by adopting an essentialist reading of space, where the ontology of absolute space allows it to be "bridged" or "shrunk". Because space can be made irrelevant through technology, connectivity becomes a "fix" that promises to solve various socioeconomic inequalities. Of course, a technical fix ignores the complexity of embedded and structural relations that underpin development; instead it attempts to offer a panacea to ultimately a more complex question.

These simplistic readings of space conveniently support interventions to extend connectivities amongst marginal populations, especially where the intervention is technical or an infrastructural "fix". Section 5.3 addresses the material consequences of framing discourse through the imaginaries of the *Global Village* and *Shrinking World* in more detail. However, an important question for members of the ICTD community is what assumptions are made on the basis that through technology, space can be shrunk or bridged, and which alternative approaches and outlooks the notion of a technical fix obscures.

The prevalence of both *Global Village* and *Shrinking World* imaginaries reveals how framings applied to technologies such as the train and telegraph continue to be applied again to new connectivities; adopting the same simplistic and a-contextual assumptions. This highlights the need to critically interrogate the assumptions that underpin our discussion, rather than repurposing these ideas with successive phases in Internet roll out, or evolution in the use and experience of the Internet. Discourses about geography matter especially here because of the ways in narratives about economic development are often framed around proximity, access, and isolation. Claims that ICTs can restructure and reconfigure what the very ground under our feet means, need to be taken seriously. Thus, understanding the spatial dimensions of these narratives about what technology can achieve is crucial task. These spatial dimensions are as important for drones and balloons, as they are for the nascent "Internet of things", for high bandwidth video, and for virtual reality augmented online experiences, since each reconfigures connections between actors.

### 5.1.4 Digital Augmentation

*Digital Augmentation* views communications technologies as augmenting, rather than radically reconfiguring, social relations. These perspectives formed the bulk of expert descriptions of the role of connectivity. This imaginary has much more nuanced views of connectivity, which allows for a greater degree of complexity and contextual understanding. Ultimately, this better reflects the complex ways in which connectivity is enacted in context, and myriad ways in which space is reconfigured through the introduction of new connectivities. We have cause to celebrate that experts are employing a *Digital Augmentation* imaginary, and thus a more nuanced vision of the impact of connectivity. Yet, the contradictions between the imaginaries reveal how other kinds of (more simplistic) discourses are used in powerful and pervasive ways. An important question is how these perspectives can be sustained and challenge dominant narratives within and beyond the field of ICTD.

The contradictions between *Digital Augmentation* and other imaginaries reveal that even experts move between different ways of envisaging connectivity. It is not surprising that relational understandings of space dominated expert accounts, given a recognition with ICTD literature that technology alone is rarely a

"silver bullet" [26, 43]. Yet, many experts responded to the first interview question "is connectivity for resource-constrained important and why" by outlining celebratory accounts of connectivity's potential in abstract terms in line with a *Shrinking World* imaginary. These initial highly positive perspectives might have been simply the concessions before experts' assertions, the kind words delivered before the critiques that followed. But the application of the three imaginaries to the conversations nevertheless surfaced an important contradiction. We saw, in the progress of the conversations, a persistent gap between idealized visions of what digital connectivity *could* achieve (globally) and evidence about *how* new connectivities are used in specific contexts. This disjuncture is important as it influences scholarly and expert projections and justification for technologies.

## 5.2 Contradictory Perspectives and a Scalar Schism

Yet, why do these contradictory perspectives on digital connectivity endure, even across the course of a given conversation? A previous study by one of the authors [13] points to sustained contradictions in discourses between *perceptions* and *practices* of connectivity amongst business managers in Kenya. Although the reproducers of discourses here are experts and institutions (rather than business managers), this study finds a similar parallel in ways of talking about connectivity. Abstract ideas of connectivity allow discussion to stay within the realms of what is possible—what connectivity *could* do—and involve the reproduction of popular narratives of space shrinking through technology (for example of a "flat world" or hyperglobalizing narrative). Examining connectivity with reference to particular context contradicts these narratives. Instead, contextual discussion reveals a messier, more complex picture of social change; where extending connectivity infrastructure alone is rarely enough to fundamentally change social and economic disadvantage of the poorest populations.

These contradictions do not occur by chance, but reveal a sustained "scalar schism". The contradictions amongst Kenyan business managers expose a "scalar schism" between "internationally-operating regimes of truth" and "local experiences and practices" of connectivity in Kenya [13]. This schism results from the collision of two kinds of discourse: powerful international discourses which "originate non-locally to the contexts they discuss", and contextual discourses about "local experiences and practices". In the case of our research the schism is exposed as abstract and dislocated accounts of connectivity become incoherent when examined with attention to particular contexts and practices.

This analysis illustrates how international discourses, especially those produced and perpetuated by powerful international organizations such as Google and Facebook, shape and determine ways of talking about and understanding connectivity beyond those institutions. Yet, it also illustrates how these ways of thinking tend to fall down when we consider the practices and contexts that constitute how people actually come to connect to the Internet.

This scalar schism is of interest because it reveals how powerful international discourses come to speak for particular places and populations, prescribing an abstract, yet compelling, vision of what ICT connectivities might achieve [17]. These discourses are powerful, in part, because of their abstract, geographically dislocated nature. This means that "arguments about inevitable changes can be made without ever pinning down those arguments

to specific places and contexts" [13]. Consequently it is difficult to challenge or locate discourses in particular places. Indeed, their reproduction in expert conversations points up the prevalence of these discourses and the compelling nature of their vision [9].

Yet experts have some agency in the discourses they perform. There is a tension that, whilst these international discourses are persuasive and passively reproduced, they also aid strategic arguments which justify and allocate scarce resources to industries that promise to deploy ICTs and more connectivity in the service of international development As such, the scholarly and practitioner communities require richer and more robust approaches that interrogates key assumptions underpinning justifications for technology—whether they voiced by international organizations or elsewhere. Because narratives and discourses always shape and frame practices, scholarship unpacking and deconstructing those frames can be useful to understanding what technology can achieve in specific practices and contexts.

## 5.3 How do discourses support or justify organizational objectives?

The scalar schism points up the work achieved by these international institutional discourses. Essentialist *Global Village* and *Shrinking World* spatial imaginaries position technological connectivities as a technical fix. This portrayal of connectivity as a technical fix to development supports particular institutional interests in myriad intersecting ways. First, this 'fix' legitimates the development of novel technologies and modalities, in particular "top down" approaches like balloons, drones and satellites. Indeed these approaches—"top down" in both the metaphorical and literally stratospheric sense—embody the idea of a technical fix [3]. The discourses in questions suggest that technology can alter peoples' lives by operating "above" the complex, often messy realities of particular contexts. This means ignoring the social relations tied into any kind of "development", patchworks of often-unconducive policy and regulatory regimes, and the materiality of devices, submarine cables and limited power availability.

Second, these kinds of portrayals of connectivity lend connectivity a discursive position of unassailability. The notion that providing connectivity can deliver instant gains makes the idea difficult to challenge; if connectivity is universally beneficial then who could argue with attempts to extend it? Actions to extend connectivity become "philanthropic" or framed in the interests of developing the lives of others for a greater good. This deflects closer inspection of underlying aims and ambitions. The unassailability given to connectivity risks obscuring key questions about that connectivity. We note that the discourses in question assume social and economic benefits arising from new connectivities, rather than asking key questions such as: who benefits and who loses out from newly configured connectivity? Or, how might imagined socio-economic benefits come about in practice? As a consequence, "soft" aspects of enhancing Internet access (for instance digital literacy, the availability of relevant content, and simply demand for Internet access) are marginalized within these discourses. This has consequences for the debates these powerful international discourses foster amongst policy makers, in centers of power and public discussion.

Why then do we see that these discourses are being employed in this way? The level of secrecy surrounding the projects by international heavyweights, such as Google and Facebook, makes estimating their investment in these technologies difficult.

However, when we consider that acquisitions of stratospheric drone companies Ascenta and Titan Aerospace for $20 million USD and an estimated $60 million USD and respectively [34, 46][3] we might begin to get a sense of what these projects might cost to these companies. Yet, despite the philanthropic rhetoric, there are clear arguments to be made about how the discourses analyzed could benefit the organizations perpetuating them.

First, these kinds of discourses obscure the alignment between the commercial incentives and the development of new modalities. These initiatives leverage philanthropic branding, yet there is also value generated for the companies involved. It is worth noting for instance, that these initiatives are not funded from charity or foundation arms, but as part of the companies' corporate activities. Arguments about the commercial value of these initiatives have largely gone unconsidered in the mainstream press, yet a handful of commentators have speculated on the objectives underlying this work. One commentator notes these activities are key ways of "driving user growth in the developing world" for Google and Facebook [45], another argues "the profit motive is behind both firms' investment in unmanned aircraft, whatever terms they might couch it in" [34]. Likewise, speaking of Facebook's zero-rating initiative, recently renamed from "Internet.org" to "Facebook Free Basics", Ethan Zuckerman has noted "it's hard for me to read Internet.org as a particularly philanthropic venture" instead "I think it's a pretty smart business venture" of benefit "to a limited set of companies (p. 2)" [45].

Second, these initiatives generate considerable publicity, and especially allow companies to cultivate positive press surrounding their actions. As one interviewee discussed:

> These companies are very good at PR. The journalists get invited to the headquarters and get impressed, and they are fun initiatives, and its good publicity. But I don't see that as in the same league [as other attempts to extend connectivity].

This positive publicity can be of great value. On the one hand, by framing these initiatives as primarily of philanthropic rather than commercial interest some institutions have been able to capture funding from various sources including developmental organizations [21]. On the other, this philanthropic framing can help deflect from other criticisms these organizations face including around market dominance, privacy and data protection [8, 38] and concerns about net-neutrality [27].

These spatial imaginaries are important because they are closely tied to philanthropic themes. The *Global Village* and *Shrinking World* frame the world in terms were the interventions put forward by external players can radically reconfigure global inequality and poverty; by extension these players and their actions to extend Internet connectivity become charitable, and unchallengeable. In contrast, Digital Augmentation does not lend this easy framing of philanthropy.

## 6. CONCLUSION

New technologies are often accompanied by utopian and futuristic predictions and claims about their ability to reconfigure unequal relations and overcome spatial inequalities [17, 25, 47]. This paper contributes to a more sustained examination of the discourses surrounding emerging technologies that attempt to provide Internet access to marginal populations. The paper makes three contributions to ICT research and practice.

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[3] The exact cost of Titan Aerospace was never made public [46].

First, the paper introduces the frame of spatial imaginaries, quite central to the field of human geography, into the field of ICTD. Specifically, we investigated and tested the concept of spatial imaginaries as developed by [13, 17] with new data from interviews with experts from the ICTD field. The new data confirms that while the technologies may be changing, the framings used to assess and promote them are not. The paper reveals the persistent power of the spatial imaginary lens as a tool of analysis; spatial imaginaries provide a valuable point of understanding, the paper validates and further extends these spatial concepts.

Second, we argue that a spatial analysis provides a powerful path for keenly needed critical assessments of this new wave of connectivity options. This frame of analysis can be easily applied to drones and stratospheric balloons, given their technical aerial nature. Yet, we suggest that spatial dimensions underpin almost any discussion about connectivity. The paper surfaces and unpacks these imaginaries, and demonstrates the material impact of this approach for fruitful analysis.

Finally, the discussion and juxtaposition of expert ICTD narratives with the materials and popular discourses from *outside* ICTD may help equip readers *within* ICTD with additional frames though which to "see" these discourses. A renewed and heighted salience of these persistent spatial imaginaries should prove valuable to those asked to engage with industry, practitioner, or public discussions around these new disruptive Internet access technologies. This gives new tools to help build contextual (and spatial) awareness of the trajectories and complications of deployment, scale, and adoption.

These three contributions and takeaways help inform and give insights as to where these discourses about the extension of digital connectivities are going. An essential question raised in this discussion is also a call to action, asking, 'where' (please pardon the spatial pun) the field of ICTD wants these discourses to lead us. Silicon Valley leaders and their firms are currently (re)appropriating and transforming some core, persistent themes in ICTD – in ways in which they may or may not be aware. The persistent attraction to the optimistic *Global Village* and S*hrinking World* imaginaries around these new technologies are a point around which accumulated ICTD practice and evidence can be particularly helpful and, more importantly, incisively *challenging*. This moment of changing technologies on a global scale is a crucial one for ICTD, on par with the introduction of mobile/cellular networks a decade ago. An understanding of the continued centrality of spatial imaginaries is one key way to address this latest shift and shape the discourses around it. Any appraisal of the value of connectivity in development will ultimately be richer for a consideration of space.

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# APPENDIX 1: INTERVIEW PARTICIPANTS

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9. Hernan Galperin, Professor at Centre of Technology, University of San Andres
10. Jacob Korenblum, President and CEO Souktel
11. James Cemmell, Head of Government Affairs Inmarsat
12. Jane Coffin, Director of Development Strategy, the Internet Society
13. Kentaro Toyama, Associate Professor University of Michigan School of Information
14. Kurtis Heimerl, Founder, Endaga and researcher at University of California, Berkeley
15. Mariya Zheleva, Assistant Professor U. of Albany
16. Mark Davies, CEO Esoko
17. Mark Summer, CEO and founder EveryLayer
18. Mike Gurstein, Director Centre for Community Informatics Research
19. Osama Manzar, Founder Digital Empowerment Foundation
20. Paul Garnett, Director, Technology Policy Group, Microsoft Research
21. Rekha Jain, Professor Indian Institute of Management
22. Saul Freidner, Principle Consultant, Real Wireless
23. Sonia Jorge, Executive Director, Alliance for Affordable Internet
24. Steve Song, Founder Village Telco
25. Susan Wyche, Assistant Professor Michigan State U.
26. Tim Hatt, Senior Manager GSMA intelligence

# APPENDIX 2: CONSULTED INSTITUTIONAL MATERIAL

For the sake of brevity, the individual Web page URLs are not given here. For a full list contact the paper's authors.

| Institution | Material Analyzed |
|---|---|
| Digital Empowerment Foundation | Digital Empowerment Foundation website (3 pages) |
| Endaga | Endaga Web website (17 pages) |
| EveryLayer | EveryLayer website (12 pages) |
| Facebook | Internet.org website (12 pages) Connectivity white papers (2 papers) Promotional videos (4 videos) |
| Google | Google Loon website (4 pages) Google Project Link website (9 pages) Google promotional videos (6 videos) |
| Microsoft | Microsoft Research, TV whitespaces sub-site (6 pages) Microsoft4afrika initiative website (5 pages) Promotional videos (2 videos) |
| O3B | O3B website (16 pages) Promotional videos (4 videos) |
| OneWeb | OneWeb website (8 pages) Promotional video (1 video) |
| Outernet | Outernet website (10 pages) Promotional video (one video) |
| SpaceX | SpaceX website (8 pages) Promotional video (1 page) |
| Village Telco | Village Telco website (19 pages) Promotional video (1 page) |