Negotiating openness across science, ICTs and participatory development: Lessons from the AfricaAdapt network

Draft paper submitted to the IDRC Open Development Workshop

Paper submitted by:

Blane Harvey
Research Officer, Climate Change and Development
Institute of Development Studies at the University of Sussex

1.0 Introduction

The advent of new information and communication technologies, particularly those online technologies described as "Web 2.0" which allow for a plurality of information sources and contributors from multiple devices, has stimulated the imagination of practitioners from a wide range of fields, including international development and the sciences. Through these new platforms lies the potential for groups once understood simply as *end users* or *consumers* of information to also become active participants and producers, assuming multiple roles as they view, respond to, amend, and share content within and between different communities of interest or practice. This new potential for user-level engagement and co-creation through mediating technologies has led to claims that Web 2.0 represents a new "architecture of participation" which will democratise and thereby challenge conventional paradigms of practice in ICT-mediated environments or relationships (Thompson 2008: 825). Meanwhile, similar reflections on the evolving roles of "end users" have been unfolding in parallel in the areas of participatory development (Cornwall 2006; Cooke & Kothari 2001; Hickey & Mohan 2004) and climate science (Roncoli *et al.* 2009; Orlove *et al.* 2008; Berkes, Colding & Folke 2000), albeit to varying extents.

These reflections are indicative of the broader challenges made to the notions of "official" or "valid" knowledge from critical, feminist and postmodern theories (among others) and an increased awareness of the intimate relationships between power, culture and the construction of knowledge. They are also indicative of a broader critical re-thinking of how particular epistemic communities and disciplines operate. As this paper will briefly discuss, the way the shifts in thinking in these different disciplines have manifested themselves and the changes they have provoked can vary widely, including the resulting interpretations of concepts they produce, such as "validity" of knowledge, "participation", "openness" and "authority." The shifting sands of meaning *within* these communities points to even more complex challenges when it comes to establishing meaning *between* or *across* them, as is increasingly required in trans-disciplinary fields of practice such as climate change and development. In the context of international development, where actors increasingly collaborate across epistemic, cultural, institutional and geographical divides, understanding the processes through which particular articulations of meaning are adopted and the impacts of these processes can provide important insights into the outcomes development produces and the way its subjects are framed. The growing role of ICTs – themselves inscribed with their own internal "logics" (Adam & Myers 2003) – as a platform for both development cooperation *and* intervention adds yet another layer of complexity to this understanding.

With this context in mind, this paper reflects upon the prospect of a new architecture of participation emerging from a collaborative network using Web 2.0 technologies around climate change and international development. Using the case of a North-South network on knowledge sharing for climate change adaptation, it explores how multiple conceptions of concepts such as "openness" and "participation" coalesce around a particular initiative, and the processes that discursively construct its ways of working and understanding. The resultant shared meanings and practices, it is argued, are a product of existent epistemic and participatory cultures, internal and external dynamics and economies of power, and emergent ways of working that flow from engagement with particular technologies and protocols. The process through which these shared meanings are derived, however, is rarely transparent

or openly reflected upon, but rather emerges through the normalisation of particular practices which "organise" our social relations (Smith 2001). This limits our understanding of how a given "architecture of participation" (for example) has been constructed, or how it has situated those working in it. It has profound implications within and beyond the boundaries of a particular initiative as "knowledge cultures have real political, economic and social effects which are not neutral with respect to social structures and interests or with respect to economic growth" (Knorr-Cetina 2007: 370). Acknowledging this complexity and openly engaging with the "invisible" processes of negotiation and normalisation of meaning, I argue, offers a space to expose the ways that power and culture construct and constrain our understandings of practice and to challenge the ways that development is enacted.

The paper begins by introducing the notion of epistemic cultures (Knorr-Cetina 1999, 2007) within the contexts of climate science and international development and links it to the production of particular forms of discourse, supported by mediating technologies such as ICTs. I then provide an illustration of how the intersection of these different communities in a collaborative initiative presents challenges to meaning-making through the case of AfricaAdapt, a network for knowledge sharing on climate change adaptation in Africa. Through discussions with core network members, I explore how ways of working were established and understood and the influences that have contributed to particular discursive constructions of meaning and purpose within the network. Attention is paid to the powerful influence of the development paradigm on how differently situated partners understand participation and openness, and on ways which the ICT-enabled environments within the network privilege certain forms of engagement at the expense of others. Based upon these observations I consider the influence that these processes of meaning-making have had on the present shape of the network and reflect on what this means for such forms of collaboration more generally. The paper concludes with a consideration of the avenues through which notions of "participation" and "openness" might be extended beyond the *ex ante* enactment of a particular strategy with pre-determined sets of meanings, and be understood as a site for a more transparent negotiation and production of meaning which takes into account the diverse contexts from which partners have been drawn.

2.0 Theoretical background:

Epistemic cultures and the discursive construction of meaning

Interest in the processes and conditions through which knowledge claims are constructed, validated and enter into currency has steadily grown since the 1970s, as new light has been shed on how power (Foucault 1972), gender (Harding 1998) culture (Bhabha 1994), and professional or bureaucratic practice (Knorr-Cetina 1999; Smith 2001) intervene in shaping what we know "objectively," and conversely, how the ability to define what is "known" reinforce the authority of certain social groups and disempower others. The rise of globalisation and new technologies in post-industrial societies has also led to a growing emphasis on information and knowledge as political and economic currency in transnational "information" or "knowledge societies." Given these parallel trends in understanding around both the situatedness of knowledge and its link to power, and the growth of knowledge as a both currency and commodity, researchers are keen to explore the make-up of what Knorr-Cetina calls *knowledge settings,* or "the whole sets of arrangements, processes and principles that serve knowledge and unfold with its articulation" (2007: 361-362). These settings, she argues, are shaped by the particular epistemic cultures[1] which determine the policies and practices that sustain or discourage particular outcomes to inquiry (*ibid*). Knowledge settings have historically tended to be bound by time, place and "lifeworld" (laboratories within the physical sciences, for example), but the advent of networked social interaction on a global scale – largely facilitated by technological developments in ICTs – has permitted the rise of more distributed settings within which these processes must unfold. The result of this evolution, Knorr-Cetina suggests, necessitates a merging of lifeworlds through the negotiation of compatibilities between different administrative and political cultures (*ibid*). It is within this contemporary state of the transnational, ICT-enabled *negotiation of* and *trade in* knowledge that the case discussed here finds itself.

Knorr-Cetina's work on epistemic cultures provides a useful lens for analysing the spaces and mechanisms with which particular communities of professional practice construct knowledge, or as she describes it, "the construction of the machineries of knowledge construction" (*ibid:* 363). However, in a context where the areas of inquiry overlap across multiple epistemic, geographical, and societal divides, a clearer understanding of how the products of these machineries circulate, are adopted or subjugated by other communities or cultures with competing knowledge claims, and merge themselves with other "truths" is also required. Further, it becomes important to better understand the impacts that particular articulations of peoples' knowledge bears on their agency, identity, and power, particular across post/neo-colonial divides (Said 1979; Mignolo 2000). In the context of research on global climate change, for example, Young (2004) has pointed to the influence of international environmental governance regimes (such as the UNFCCC) on the growth and validation of particular forms of knowledge claims at the expense of others. "A striking case in point" he argues, "involves the preference

[1] Knorr-Cetina defines an epistemic culture as the "interiorised processes of knowledge creation. ...[T]hose sets of practices, arrangements and mechanisms bound together by necessity, affinity and historical coincidence which, in a given area of professional expertise, make up how we know what we know." (2007: 363)

embedded in most environmental regimes for western, scientific knowledge in contrast to traditional ecological knowledge or other types of knowledge claims that may prove useful in understanding ecosystems" (Young 2004: 220). A wealth of literature similarly exists on the production of "valid" knowledge within the context of international development and the impacts of these processes on peoples' power and agency (Escobar 1995; Kothari 2005), but within the context of climate change, investigations of the processes of knowledge production are still largely absent (Grist 2008).

As an approach to better understanding the link between the production of knowledge claims within particular epistemic communities and their entry into wider circulation on a beyond those communities, I propose drawing on the concept of *discourse*[2]. A focus on the production of discourse is useful for understanding the ways communicative practices both constitute and express our social reality, and reflect the role that power plays in this process (Foucault 1980). "Power to control discourse" Fairclough argues, "is seen as the power to sustain particular discursive practices with particular ideological investments in dominance over other alternative (including oppositional) practices" (1995: 2). The discursive shaping of words (and, consequently, the range of concepts they refer to) is ultimately constitutive of objects and social relations, as well as of the subject positions within these discourses from which individuals or collectives can speak. Thus, the framing of the meanings of terms like *participation* and *openness* in development effectively shapes the politics of development practice, and by extension, the potential agency and identity of those who are understood to be (or seek to be) operating within its community of practice.

Another important attribute of discourse for this investigation is the concept of "interdiscursivity" (Fairclough 1992), which acknowledges that most contexts draw upon multiple and fragmented discourses which, to a certain extent, provide actors with options with regard to the discourses upon which they draw. This is useful, both in reflecting the complex and multiple sites around which new knowledge is often negotiated (as mentioned above), and in framing discourse, not as a hegemonic monolith, but as a something which is contested and evolving. As Hardy, Palmer and Phillips note, "individuals engage in discursive activity with particular intentions in mind and may secure preferred outcomes, but they do so against a backdrop of multiple discourses that have complex, far reaching effects that are beyond the control of single individuals" (2000: 1232). This is important to bear in mind when considering the negotiation of meaning among actors who are themselves embedded in differently-situated institutions, epistemic cultures, and socio-political conditions, and are also operating against a backdrop of a specific institutional and technological context, as I will explore below.

[2] The use of the term "discourse" here, following Fairclough (1992; 2001) and others, goes beyond the assumption that speech *reflects* a certain organisation or interpretation of reality, and instead sees discourses as sets of texts – statements, practices, etc. – which are in fact constitutive of social reality. Thus, what becomes naturalised (in Fairclough's terms) as discourse, is a product of the exercise of power.

A final issue that should be addressed here is the role of new communication technologies in relation to this process of production, validation and circulation of knowledge. In this context ICTs are understood to serve as "mediating technologies" which play a key role in how people organise and coordinate their (and others') actions. Silverstone describes the process of mediation as:

> ….a fundamentally dialectical notion which requires us to address the processes of communication as both institutionally and technologically driven and embedded. Mediation, as a result, requires us to understand how processes of communication change the social and cultural environments that support them as well as the relationships that participants, both individual and institutional, have to that environment and to each other. At the same time it requires a consideration of the social as in turn a mediator: institutions and technologies as well as the meanings that are delivered by them are mediated in the social processes of reception and consumption. (Silverstone 2005: 189)

In this sense, the role of mediating technologies cannot be seen as passive or neutral, but rather as simultaneously *products* and *producers of* the environments and contexts in which they are being put into use. By understanding ICTs in this light it is possible to draw useful comparisons and linkages between the impacts they produce and the impacts of other mediating forces in development including managerial technologies (such as *the project* and *evaluation*) (Kerr 2008), and documentation (Smith 2001) which "serve to organise and coordinate actions involving people, time, space and money in the interests of efficiency and accountability" (Kerr 2008: 99).

Research into the use of information systems and technologies in the context of development have yet to fully explore these issues of "power, politics, donor dependencies, institutional arrangements," yet these are "precisely the type of issues where critical work can open up the 'black box' as an aid to deeper understanding, and a stimulus to appropriate action" (Walsham and Sahay 2006). One such example can be found in Van der Velden's (2003) examination of the development and use of knowledge management software and strategies within the World Bank's Global Development Gateway. The Gateway, she argues, is primarily inspired by corporate models of knowledge management, seeking to achieve a single *best practice* or strategy, a strong contrast to the context of development, and one which "obscures 'the plurality of alternative and legitimate knowledge' (Mahiri, 1998), and obscures the role of the knower and of the knower's social system" (Van der Velden 2002: 31).

3.0 AfricaAdapt: Negotiating meaning through networked collaboration

I turn my focus now to the case of AfricaAdapt, a knowledge sharing network which brings together partners from both the science and development communities, based at a range of institutions including a non-governmental organisation, an intergovernmental organisation, a regional centre for scientific research, and a development research institute. This case provides a clear example of the types of intersections between differently situated epistemic communities, drawing upon different forms of technological mediation (in terms of use of ICTs, management, etc.), within a network whose overarching objective of "promoting a culture of knowledge sharing" could be understood by many as nearly synonymous with promoting openness. It can thus serve to illustrate the processes and influences on meaning making that have shaped individual roles and understandings, as well as

collective practice, within the core network partnership. Where possible, I have sought to use respondents' own words in describing their impressions of how these processes, often placing these alongside one another to illustrate how people's situatedness has influenced their construction of meaning.

3.1 Background

AfricaAdapt is a knowledge sharing network on climate change adaptation in Africa hosted by four partner organisations: Environment and Development in the Third World (ENDA-TM) based in Dakar, Senegal; the Forum for Agricultural Research in Africa (FARA) in Accra, Ghana; IGAD Climate Prediction and Applications Centre (ICPAC) in Nairobi, Kenya; and the Institute of Development Studies (IDS) in Brighton, UK. The network describes its aim as "facilitating the flow of climate change adaptation knowledge for sustainable livelihoods between researchers, policy makers, civil society organisations and communities who are vulnerable to climate variability and change across the [African] continent".

AfricaAdapt was formally launched in May 2009 with an online platform following in June of the same year, but work in establishing the network's modalities, core partners, and staffing had been underway for more than two years prior to its launch. The network was funded under a broader programme on Climate Change Adaptation in Africa (CCAA) through the UK Department for International Development (DfID) and Canada's International Development Research Centre (IDRC). The CCAA programme was designed to promote African research by primarily African researchers through the use of participatory action research projects, and AfricaAdapt was conceived to work within a similar ethos, namely of promoting African knowledge to help African communities understand and adapt to climatic impacts. Early thinking around the establishment of a knowledge sharing network (before the selection of other partner institutions) was largely shaped by discussions between IDRC and IDS, which has a significant depth of experience in knowledge services for development. An IDRC representative gave this reflection on some of the initial thinking in the establishment of the network:

> *I mean the hope is and was that we could create, we could find some kind of a platform that would allow not just CCAA partners but others who are engaged in research and even more broadly policy making in areas related to climate change adaptation in Africa, to find means of sharing. And it starts from early in the programme, there was an identification that one of the challenges impeding the adaptation in Africa was the tendency of many organisation to hold their cards close, that the research community not to be particularly forthcoming in sharing findings.*

A close relationship developed between the two institutions, one which saw a great deal of collaboration in establishing common understandings and directions for the initiative. A key component of this initial relationship was a lengthy process for identifying, evaluation, and selecting African institutional partners through regional meetings with prospective partner institutions. This process was funded by IDRC and also served as an opportunity to shape the proposal for the network on the basis of feedback that was given. The aim here, according to one respondent who had been part of the IDS search committee, was "helping to understand the offer of different partners to the project and trying

to think through how could we get a consortium together that would be representative of the challenge that the project was trying to face, have the capabilities to deliver on the project, and could work together." After the selection of the three partner African institutions (named above) a write-shop was held in October 2007, during which all of the institutions worked together to further refine the proposal, learn more about the scope of the initiative, and agree upon key activities to be conducted. The formal start of project activities commenced approximately five months later, though the network itself was not launched until May 2009.

Today AfricaAdapt has expanded considerably beyond the four host partners who are the focus of this study. The network has a membership of over 550 researchers, policy makers, students, and others, approximately 80% of whom are based in over 35 countries in Africa. It has also entered into a six month "handover" process which will see overall management of the network move from IDS to ENDA-TM as a part of strengthening African ownership of the network and ensuring its longer-term sustainability. As such, this is an opportune time for reflecting on the network's current identity and focus came to be shaped, and the lessons that can be drawn from these reflections.

3.2 The construction, validation and contestation of meaning

To illustrate the process through which meaning has been constructed within the network, it may be useful to begin with an examination of some of the core concepts underlying its principles and objectives, and reflecting on how differently situated partners understood these meanings and the process through which they were shaped. Three concepts which were noted to be particularly central *and* subject to discussion and interpretation are those of: *a culture of knowledge sharing* (the core tenet of the network, and fundamentally linked to questions of openness and participation), *researchers* (as one of the key targeted groups of the initiative), and *quality* (a particularly nebulous concept, but a much-debated one for a network aiming to attract, translate and disseminate climate-related research). As stated at the outset of this paper, the shaping of discourse is understood to be constitutive of objects, social relations, and the subject positions within these discourses from which individuals or collectives can speak. Thus, reflection on this process can be useful in revealing how power is negotiated between particular actors, institutions, or communities.

The link between the establishment of meaning for these terms and social relations within and between institutional partners in AfricaAdapt seems to be recognised by the project manager, who noted regretting that definitions hadn't been established more clearly in advance of commencing project activities.

> *Interviewer: So if you were designing the project now, knowing what you know now, what would you have done differently?*
>
> *Programme manager: I would, we've talked about this a number of times, would have worked harder at the start in engaging the whole institution in a discussion about what knowledge sharing means for them, from the start, rather than thinking that we can build the capacity of a*

few individuals, and then begin to think that that's going to change the institutional culture. […] You know, it's I suppose an organisational change theory, it depends how you approach this, but yes, to go back and actually to spend some time really understanding the institutional context, the ways of working, the history, who holds power within those organisations, all very important, and I think we needed to have done much more of that at the start. Trying to do it somehow retrospectively, already with the knowledge sharing officers there, it makes the kind of politics of it much more difficult, so that's what would have changed.

This points to a key feature of how openness has been conceptualised within the project; namely that it has been the product of a particular theory of organisational capacity and change, developed at the outset of the programme development, and nurtured from within through the engagement of a select group of "champions," as I will discuss below.

Developing and instituting "a culture of knowledge sharing"

Clearly, for a network whose stated aims include "demonstrating the added value of a culture of knowledge sharing," a clear shared understanding of what such a culture implies is an important point of departure. Given that theories of knowledge sharing, knowledge management, etc. are still emergent, and interpreted differently depending on one's epistemic or professional background, there was a concerted effort at the outset of the network's inception to introduce a particular vision of knowledge sharing in line with both the ambitions of the program, and the perceived shortcomings of current practice in African climate change adaptation. This was largely guided by one of the network's current Knowledge Sharing Advisors, then based at IDS, who played an instrumental role in developing its implementation strategy, in cooperation with the programme manager.

Knowledge Sharing Advisor: We knew that we wanted to support knowledge sharing but that could have been done in many ways and so I think part of my role at that [initial]stage was maybe influencing a bit to be thinking of it as a knowledge sharing network rather than centred around the idea of a database, or maybe just thinking of it in terms of a series of face to face meetings, but to try to bring that idea, concept of a knowledge sharing network to become central to the actual design.

Programme Manager: So at the start we came out quite strongly in saying that there was a big difference between knowledge sharing and information sharing and data sharing, and these terms were familiar to different organisations involved, but they didn't necessarily know what they meant. Now I remember a very clear and interesting session given by [the Knowledge Sharing Advisor] at our inception workshop that said this is information dissemination and this is knowledge sharing, and recognising that there were a whole bunch of networked actors within a domain of different stakeholder groups or boundary partners or whatever you want to call them, who had a number of multiple connections, and were providing brokering and facilitating roles for knowledge, and adding value and changing it and synthesising it in different forms for different audiences, and very different to this kind of push out and down the "hub and spokes" model of information sharing.

This process was recalled with great enthusiasm by a Senegal-based partner who had participated in the inception workshop, stating that:

> *There was a document on the culture of knowledge sharing and the culture of communication that [the Knowledge Sharing Advisor] prepared. I really loved that document. I even asked if we could get it translated into French so that everyone could benefit from the great ideas that were in it. [trans.]*

It was on the basis of this document and the discussions held at the inception of the network that a professional profile of the future network drivers, its cohort of "Knowledge Sharing Officers" (KSOs) was developed, and with which they were to be recruited. Each partner institution then took these initial recommendations and then tailored them to their particular contexts, and proceeded to hire their KSO. The wide-ranging profiles of the KSOs which were ultimately recruited is indicative of the process of internal interpretation and negotiation between the profiles developed on the basis of IDS' initial vision of knowledge sharing, promoted through the inception meeting, and the established culture of the partner organisations. Within the agricultural intergovernmental organisation a KSO with a background in library information systems and ICTs for Development was selected, however one notable element of this particular recruitment is that it was decided they should be recruited as a clerical grade post rather than a professional grade. Within the environmental NGO a KSO with a background in marketing was chosen, while at IDS it was a KSO with a background in education and development. Meanwhile, within the science-based climate research institute it was decided that the KSO should definitely be a climate scientist, and as a result a meteorologist with a background in physics was selected. The close relationship this particular recruitment and the existing epistemic community within the organisation was made evident in his discussion of his previous knowledge sharing experience, and of those that are usually practiced at the centre:

> *KSO 3: [In the past] I was involved with knowledge sharing in ways like participating in workshops and making presentations on findings etc, also through publishing in proceedings and journals. Those were the most common type of knowledge sharing activities. But AfricaAdapt is different compared to what I have been doing previously. […] [At my organisation] we have the traditional way of sharing knowledge, like workshops or publications and the like. That is still there, it's still the most common way of doing things there. It will take some time to change and people are really resistant to change.*

The interplay between the assertion of a particular vision of a culture of knowledge sharing at the inception of the network, and the way this vision has been interpreted and ultimately translated into the actual recruitment of new Knowledge Sharing Officers into a role split between network and institutional activities reveals the multiple influences that shaped how knowledge sharing has come to be understood and enacted within the network. This process unfolded in stages that were visible (through presentation of a concept at a group meeting), partially visible (through internal negotiations within partner institutes), and largely invisible (initial development of a vision of knowledge sharing that would be presented for review and approval) and which involved similar scales of participation. As is evidenced by the enthusiasm some expressed on the concept of knowledge sharing that was presented, there isn't a necessary link between degrees of openness and the quality or acceptability of a particular concept, but it is nonetheless important to recognise that processes can unfold with multiple levels and

scales of participation being enacted simultaneously. This can greatly influence how particular concepts are collectively understood, embodied, and enacted, particularly within decentralised collaborative networks such as this one. I shift now to how similar influences have played out in the identification of one of the network's key stakeholder groups.

"Our researchers are not lab-coat researchers"

As stated earlier, researchers form a core constituency and target audience for participation in the AfricaAdapt network. In the development of the network's development strategy it was generally agreed that researchers should be the first target as a part of a phased marketing of the network to its potential stakeholders. However, given the multi-dimensional nature of research into climate change in Africa, the range of possible researchers that might be targeted is wide and varied. Despite the fact that the network is open to anyone who would like to join, the establishment of who was being inferred through the term "researcher" has had significant bearing on who is targeted and actively approached for inclusion, as well as the types of tools and resources made available to network members. Combined with challenges of translating the notion of "research" across cultural and linguistic divides among network members, this rather vague identification of a target audience created some initially confusion, according to a number of respondents. As one remarked:

> *KSO 1: I'm not the only one who feels that they had a different view of who the researchers were. I remember some time, I think maybe even five months down the road one of my colleagues, a knowledge sharing officer, she's from a francophone background, but she was always using the word researchers, researchers, and I think she reached the point where she was confused. So she was like "ok people, please clarify what do you mean by researchers? For me when I hear researchers I think of someone in a lab coat, but our researchers are not lab coat researchers."*

In time, however, the understanding of what is implied by researchers within the shared discourse of network members has narrowed considerably, and fallen very much in line with the forms of research that were being funded through the broader funding programme of the network's donor. These are primarily action-oriented research projects, often with strong social-science dimensions, which tend to privilege smaller-scale interventions over meta-level analyses. This evolution was understandable on a number of levels, given that these forms of research matched well with the overall objectives of the network, there were clear advantages in terms of access to contacts and information for outreach, and of course, the obvious advantage of being seen to be promoting donor-funded research. However, between members of the network, the process by, and justifications for which "researchers" came to mean this particular set of actors, are differently understood, though the recognition of a strong outside influence of the funding partners was acknowledged by all. One KSO expressed a sense of having lost control of the focus of efforts to competing priorities:

> *KSO 1: In the beginning we seemed to be really independent, that is the way, so it was only maybe four months ago, shortly after the launch, where you know I started noticing you know the donor tone more and more when the project manager communicated to us. I think that was*

about the time when he also had several meetings with them and yes, so the tone from the donor has now sort of filtered into the project.

[Interviewer] What tone is that?

KSO 1: You know like placing emphasis on the participatory action researchers, yes. Because as I was saying I'm not sure if that is what determined the focus on researchers for year one, yes it may not have been the most strategic move but [the funder], as a funder, you know of course wants the researchers involved in the project. So I would think that they have influenced us targeting the researchers in phase one of the project. […] And actually when you think about it practically those are the only researchers we are now looking at. […] ICPAC has links to climate scientists and people like that but I don't see any of the scientists on board. So now that I think about it yes maybe it would have sort of, not diminished their role, but not made the most out of them. Because phase one we are supposed to target researchers, we are only doing the [donor] researchers, we are leaving out the climate scientists.

For another KSO, however, the focus arose from a search for focus from *within* the network, alongside the influence of donors:

KSO 2: I think that we said to ourselves, "let's start with researchers," but "researchers" is so broad… to reassure ourselves we fell back on CCAA projects because it was easier. We really focused on that and it helped us a lot. I think it was heavily influenced by the project funders. Even unconsciously we said to ourselves "Ah the CCAA projects!" because they funded us, but is that the best process? [trans.]

In discussing this issue with the programme manager, however, a very different perspective is offered; one which sees the network evolving (through some degree of contestation) *toward* a greater degree of inclusiveness, not away from it:

Programme Manager: I think a very important change that happened and something that I fought for, and actually something that the field programme manager in Africa was supportive of, and that was that AfricaAdapt didn't have to serve just the needs of the CCAA programme, that it could actually be seen as covering the whole of the African adaptation domain, it didn't have to just be a client of the programme. What we're finding at the moment though is that the CCAA programme in research terms is making up about 50% of everything that's going on in Africa in terms of what's being shared through the network, so I think for us it's allowed us to provide some degree of delinking from CCAA, but externally viewed people still think of it as some kind of child of IDRC.

The range of perceptions on how the current understanding of targeted researchers evolved is indicative of how significant the "hidden transcript" of meaning-making can be in shaping peoples' understandings of how things work. In theory, AfricaAdapt is open to anyone who wishes to join, and indeed those who discover it either online or at an event that where the network representatives are presenting can be from any variety of backgrounds. However, openness and participation are not normative concepts, spaces for participation are contingent on a diversity of factors, including, in this case, the types of tools made available for users to participate, the forms of invitation they receive to participate, and the types

of values that a particular space seems to reflect and reinforce (as will be discussed below) (Cornwall 2002). This is recognised by network partners, particularly in discussing the engagement (or lack thereof) of climate scientists as a part of the research community. The programme manager provided some initial reflections on this reality, pointing toward both internal and external factors that have had an influence:

> *Programme Manager: Science has not played a particularly strong role, but again I think that's partly because there are other networks, and other spaces that inhabit the science interactions, and that we've tended to say we're not there to duplicate. So ICPAC scientists have not been strongly engaged, and I think the quality or quantity even of heavily science informed information and knowledge flowing through the network, or even being uploaded or project shared, is lower than I would have expected to start with.*
>
> *[Interviewer]: So the reason why they're not as engaged has to do with the fact that they're engaged in other networks?*
>
> *Programme Manager: Partly yes, they have a climate outlook forum network, which is a big one for them, and I suppose because of the perception that the CCAA programme itself is about kind of action research on the ground, it's not necessarily heavily science informed. DfID senior managers have got the same kind of view. And I suppose we haven't really provided the kind of spaces and sharing spaces to really encourage a strong science dimension to the network.*

These views seem to reinforce the sense that the types of spaces made available for participation, as well as the spaces available elsewhere have had played determining role on the types of participants that have ultimately joined the network. In effect, it would seem, the decision to prioritise investing the network's finite human and financial resources into engagement with the action research community may have consequently constrained the ability of other types of researchers to engage. While such decisions might be understood as a failure to be open and inclusive to all, on a more pragmatic level they reflect an understanding of the challenge (or futility) of being "everything to everyone," and instead developing a particular niche vis-a-vis other initiatives, as the programme manager mentions. This illustrates a challenge of genuinely promoting openness, namely that the spaces for achieving it do not look the same for everyone. It also leads us to a related concept that may have influenced, and been influenced *by* the membership that the network ultimately appealed to.

Assessing and Valuing "Quality"

It isn't surprising that, within a network dedicated to sharing knowledge on a subject as contentious and complex as climate change, questions of quality and validity of information should be considered of utmost importance. Recent controversies around the transparency of the IPCC's climate modelling processes which underlie our predictions on future climatic impacts reflect the current bias toward bounded and cloistered "expert" dialogue in the establishment of new conclusions and knowledge (Tol, Pielke & Von Storch 2010). Thus, openness and participation have tended to be more closely aligned to models of apprenticeship and hierarchies of trust found within the sciences (cf. Knorr-Cetina 1999: 130-

135). However, in recent years there has been an increasing acknowledgement of the potential for both drawing upon traditional practices bound within "non-scientific" knowledge sets (often termed "local," "traditional ecological" or "indigenous" knowledge) to inform climate prediction, measurement, and adaptation; as well as for engaging with communities from outside of the sciences in the *use* of climate information (Roncoli *et al.* 2002, Roncoli *et al.* 2009, Orlove *et al.* 2009). This trend has emerged from a growing recognition of the central role that local knowledge, culture and practice play in effective responses to climate change (Ensor & Berger 2009) as well as recognition of the limits of science in predicting and responding to these threats. In many ways it is at this frontier between the familiarity and verifiability of scientific observation, and the "softer" forms of local observation, traditional or indigenous knowledge, and multiple ways of representing knowledge that AfricaAdapt finds itself. The challenge working across these knowledge sets was articulated by one African respondent who recounted a firsthand experience:

> *CG: We once did a participatory workshop […] we asked communities: "In your opinion, over the last 10 years has rainfall fallen or risen?" And they'd answer "Oh, we've had an extraordinary rainfall deficit over the last 10 years, we're really suffering. We need a solution." However, when we'd consult with the meteorological services, it's possible that we'd find the opposite…*
>
> *[Interviewer]: So there was a problem with the reliability of the information sometimes?*
>
> *CG: Exactly. Sometimes you have to be careful. That's why we say you shouldn't ignore what communities say, but you need to combine this information collected in communities with modern knowledge. It's within this pairing that we find a compromise, and all this process is the participation which allows us to move ahead. [trans.]*

Given that processes of gathering, appraising and validating knowledge are central to the structure of epistemic communities (Knorr-Cetina 1999) it was clear from the outset of the network that decisions would need to be made on the "editorial" approach to quality control that would be pursued. These decisions would fundamentally shape the opportunities for contribution among some audiences, while potentially creating a more *or* less familiar space for contribution for others depending on the conceptions of quality and editorial control that were adopted. The thinking that shaped these discussions is recounted by the programme manager:

> *Programme Manager: Obviously from the very start we were critically aware of quality issues. But of the fact that we wanted to be a reasonably open space, not heavily moderated, and one that appreciated different forms of knowledge, and IDRC pushed this too, they wanted a very strong community dimension to the website and to our action, and that we needed to make sure that we were engaging down to community level, indigenous knowledge and all that kind of thing. So kind of the editorial policy was always being really shaped from the start, to one that was reasonably open and freer than a lot of other editorial policies I've seen. Which obviously sat a little bit in tension with members of the managing group who said well actually we need to be working on the basis of quality climate science, and quality science is the backbone to our work. And we kind of actively, well not necessarily fought against it, I don't think there was actually a major problem at any time, but to a position where we'd begun to develop an editorial policy*

with the knowledge sharing officers, and we felt it was important that it was a kind of participatory process around doing that.

These debates point to wider discussions on sources of knowledge within climate change and development, as noted above. The potential impact of this stance on the types of contributions that would be sought and accepted within the network were noted by the manager in terms of how other audiences accustomed to far more normative notions of quality, though the real impacts appear to be uncertain:

Programme Manager: You know if a climate scientist within Africa who's writing you know what they think are high quality papers on climate science, think well maybe you know I won't upload this to AfricaAdapt because there's no kind of validation process, so therefore you know, my work might be compromised by being associated with this very kind of scattered domain. And I don't know to what extent that's happening at the moment. I would doubt it actually, but it's never too clear.

Thus, we see the potential that taking an approach of seeking more openness and inclusiveness may in fact *limit* potential for participation by those working within epistemic cultures that privilege adherence to more normative standards of quality. These concerns are further emphasised by a KSO working within the climate science community when asked about his understanding of achieving "quality":

KSO 3: One thing is that the knowledge that is generated and the quality of that knowledge has to be maybe supervised or maintained through some mechanism, one could be the sort of review mechanism put in place with experts or our own exchanges or what have you. The other is getting maybe some help from outside the network, maybe commissioning some work on specific issues for example. Can we get the input of good consultants to produce something and put on AfricaAdapt? And also maybe when we put content up we have to be selective, maybe looking for people who are good in a specific specialisation, known scientists or known professors. So that could maintain the quality of the content on AfricaAdapt.

Ultimately, the ways in which markers and processes for assessing quality were established have not led to serious conflict within the network's partnership, despite the fact that partners' own perceptions on this issue vary widely. We *do* see, however, a view of quality emerging in line with the particular stance on the broader debate over knowledge taken by both IDS and the donor organisation. The implications of this stance are not insignificant, particularly within political economy of knowledge production within the climate change adaptation community. The stance has also helped to shape the ways in which ICTs have been drawn in to enable users to contribute, as I shall now explore.

3.3 Communication and technologies in the negotiation of meaning

The decentralised nature of the AfricaAdapt network partners and its targeted audiences has meant that ICTs have played a very central role in both its management and the delivery of its services to members. However, the fact that connectivity and use of online technologies remain limited in the area where 80% of network members (both core partners and the broader network membership) are located presents a significant challenge to this role. This issue has been a point of significant reflection as partners have

sought to balance the selection and use of technologies that allow users to express themselves in a variety of formats (photos, video, blogs, etc.) while acknowledging the limiting factors of connectivity, literacy, access to technology, and more. As alluded to above, there is also a need to recognise the "inscribed logic" of the tools that have been selected and their appropriateness of fit with particular knowledge settings. The use of wikis as a space for co-creation, for example, where there is never a "definitive" version of a text, and one's contributions are always subject to review and revisions by others, has met with unease (IDS 2009). Similarly the lack of climate modelling tools and data sets within the range of tools (tools which are available on other knowledge platforms) reinforces a particular view of the forms and sources of information and knowledge that the network aims to put into greater circulation. Beyond the selection and use of appropriate ICTs, communication presents broader ongoing challenges to the core partners, who seek to ensure a spirit of openness and collaboration, while at the same time negotiating different expectations within the bounds of each institution's norms of practice. These issues offer insight into the challenges of openness when collaborating across divides, be they institutional, epistemic, cultural, linguistic or technological. They also overlap with the challenges of meaning-making raised in the previous section, both reinforcing particular meanings, and being shaped by the meanings that have been produced.

The challenges of communication

Looking first within the core network partnership, communication has been recognised as one of the key challenges from a number of angles, including balancing the visibility and openness of partner and individual practices with the assurance of "safe" spaces for reflection and experimentation, and negotiating levels and protocols of communication between institutions that are accustomed to different degrees of openness. When asked about the greatest challenge facing the network, one KSO had this to say:

> *KSO 2: The greatest challenge is communication: being understood, communicating when it's needed, in a clear manner without being deferential. It's very, very complicated. […] I think we went a bit wrong and we should work more on putting communications systems into place that are really cross-cutting, and project management tools such as worksheets; very simple tools so that any project member can see what's going on. [trans.]*

This call for greater openness and visibility of one another's activities, particularly across KSOs and other members of the management group, was echoed by another KSO, who, drawing on experience from a previous networked project noted how ensuring all partners (including donors, at times) were involved in weekly meetings helped build openness. These comments point to an internal struggle of trying to balance the need for openness with the creation of spaces that allow for safer risk-taking, particularly among KSOs, a position which was strongly advocated by the IDS knowledge sharing advisor. He explains:

> *[Knowledge Sharing Advisor] I think at an early stage we felt this was the KSOs and the knowledge sharing advisors coming together, talking about where would be a space that the KSOs could themselves share, and build up their sense of peer support, and the decision to have a wiki space for the KSOs which was a private space, seemed like a very good idea. Because at the stage when the KSOs were trying to understand their roles and were experimenting and wanted to act as peers to one another, the sense that they could be talking openly amongst themselves*

about the challenges and enthusiasms and risks that they were facing, seemed really important, and that it would be quite difficult to do that if they felt that people who were in an advisory role were also in that space. […] [A]nd there was actually a desire from the core group to know actively about what the KSOs were talking about in their meetings, and there was a bit of negotiation there about how much would be shared.

These struggles to promote openness within the partnership while avoiding the forms of compulsory visibility that Zuboff (1988) terms "information panopticism" point to an important link between openness and the technologies that support it. They may also link to one of the challenges that the network has had in relation to its overall objective of promoting a culture of knowledge sharing amongst those working on climate change adaptation in Africa, namely increasing people's propensity to share.

Mediating technologies in network management

As stated at the outset of this paper, ICTs and other mediating technologies should not be seen as passive conduits of communication, but rather as both *products* and *producers of* the environments and contexts in which they are being put into use. AfricaAdapt is a network that sits both within a context where access to and mastery of new technology is limited, and among a range of other ICT-enabled climate change initiatives which tend to promote themselves on the basis of their use of sophisticated technologies (Harvey 2009). The challenge this presents was noted by one KSO:

KSO 2: People have this tendency of thinking that the latest or most modern tools are most effective and then they don't want to use older tools like the fax or the telephone, but those [tools] work. […] We need to rethink our definitions of ICTs, it's not about the latest tools, it's about the tools people use and that work. [trans.]

This has meant continuously revising communications approaches both within the core network partnership as well as with the broader membership, trying to counterbalance the allure of new ostensibly-collaborative or communicative technologies, which only succeed in being so if people are able and willing to adopt them. Some tools have successfully straddled this balance of innovation and usability among network partners, with Skype being the most frequently cited. One partner based in Senegal provided this assessment of the various online tools and on Skype's comparative advantage:

CG: For me, a tool is good to use if it has a human face. Take AfricaAdapt for example, we often use Skype, email, the telephone, and even web pages like the wiki. The telephone can be good, but it's fairly expensive. So it's not always suitable. With email you simply send an email that might be lost among a multitude of other emails, and it remains a virtual tool for sharing knowledge. There isn't this humanism inside of an email. Web pages are even worse. You simply post information on a page and you wait. You don't even know who will read it. However, with Skype, it's a tool that lets you not only call like with a telephone but you can also see. That where, for us, Skype is exceptional, it brings together everything. It's more than a telephone because you can see one another if you have a camera, and invite a number of people to exchange, even if that's also possible with the telephone. [trans.]

Thus, the use of Skype has been deemed a highly appropriate facilitator of open negotiation of meanings and process for a number of partners, while other tools, including the wiki, have been seen to hinder communication more than they help it.

Beyond the mediation that ICTs provide, other technologies (using the term in its broader sense, drawing from its root, *techne*) have fundamentally shaped the forms of openness and participation that have emerged from within the network. Of particularly strong influence here is the construct of "the project" itself, along with its associated techniques and practices. This is particularly pertinent to the field of international development, where action is largely shaped around relationships which are framed by the project structure. As noted at the outset, the process of developing the initial project proposal created a platform through which understandings of the network's aims and definitions were established. Further, the development of partner workplans and logical frameworks has served to delineate the spaces where partners and particular individuals within partner organisations are expected to take a leading role, essentially delineating spaces and degrees of openness within the partnership. One KSO alluded to the importance of these tools (or technologies) in the governance of partners' actions:

> *KSO 3: So there is also the governance structure of AfricaAdapt and on top of that we have the project documents which serve as the guidance to execute the project. So those are the things which lead us to decisions. For example, where decisions are made by the core group members for example, based on the project document and then actions are taken by say if a KSO has to do it or if each individual institution has to do it. So those decisions are made by the governing structure of the AfricaAdapt network or project.*

Thus, the development and use of these forms of project documentation effectively serve to mediate and organise people's actions in line with prescribed norms, both within and between partner institutions (Smith 2001; Kerr 2008). Slater remarks that "within the field of aid and development, international organisations endowed with financial capabilities and donor responsibilities and driven by adherence to a particular way of constituting knowledge, social practices, forms of subjectivity and power relations, need, if they are to be seen as effective, to be able to instil and to internalize their norms, values and ways of thinking into the recipient other." (Slater 1993: 438). The statement also illustrates the levels of participation perceived by the KSO (from project document [as developed and ratified by a particular set of actors] to a core management group, to knowledge sharing officers who execute particular decisions), a scale that is differently acknowledged and upheld within each partner institution.

This section has sought to position ICTs as mediating technologies, alongside other forms of technology which serve to facilitate certain forms of interaction and communication, while precluding others. In the context of developing new insights on openness and participation, this positioning should illustrate the complexity of understanding and predicting the impacts of particular technologies, where other mediating factors may serve to mitigate *or* reinforce the desired outcomes. Thus, for example, the use of new communication tools, such as Skype, may create new spaces for co-construction of meanings and collective decision making, but it these benefits may be offset by the forms of hierarchy and limits to

participation implied through the logic inscribed in the project document. The concluding section of this paper will draw out some of these observations and consider what they might mean for future research and action.

4.0 Discussion and conclusions

AfricaAdapt is a network which has set itself an ambitious challenge of encouraging greater openness and collaboration in knowledge sharing across a multitude of divides (epistemic, linguistic, technological, geographical, and more). In its work to meet this challenge it has achieved some remarkable successes, and has, at the same time, revealed some important lessons that can be drawn from the challenges it has met. This paper has aimed to provide some preliminary reflections on these lessons by drawing directly upon the reflections and experiences of those situated at different positions within the network's core partnership. In particular, it has reflected on the ways that the negotiation of meaning within partnerships influences the scope for a "new architecture of participation" based upon increased openness and broader participation, and the ways that ICTs and other mediating technologies influence (and reflect) this negotiation. The conclusion that can be drawn from this study is that, while these new technologies may indeed offer new avenues for contribution and participation in certain contexts, they are subject to a number of other factors that may play a significant role in determining whether and how this new architecture will emerge. Some of the key factors which emerged in the case of AfricaAdapt are recalled here:

- **Conceptions of openness and participation are products of particular epistemic and institutional cultures.**

Recalling Knorr-Cetina's assertion that "knowledge cultures have real political, economic and social effects" (2007: 370), the interpretations of what is implied by collaborative rather than centralised production of content (Smith *et al.* 2008) for example, will be intimately shaped by the existing institutional and epistemic traditions onto which this principle is being overlaid, potentially determining when and whether one person's opinion can override another's, whether opportunities for collaboration must be invited or claimed, etc. The influence of these existing knowledge cultures cannot be discounted, and must be better understood within the broader context of a political economy of knowledge generation, validation, and circulation in order to be engaged with effectively. Within networked collaborative environments such as AfricaAdapt this task becomes even more complex as these different conceptions of openness intersect and must therefore be negotiated.

- **The formal and informal negotiation of meaning is central to the shared understanding that is produced**

Building on the previous point, collaboration across divides invariably entails a negotiation of meaning between differently situated partners. These negotiation can take many forms, including among others, informal and/or "invisible" (such as individual confusion or frustration as one attempts to reconcile their understanding of a concept with that of others), formal and open (such as the proposal development meetings during which all partners sat down and clarified their understandings), or formal and closed (such as the establishment of some meanings between the donor and lead institution at the outset of

activities). Frequently meaning coalesces around a variety of these forms of negotiation, often leading to a lack of clarity on how particular understandings came into use. Evidently not all actors are equally placed to influence the outcomes of these negotiations, and understanding how balances of power (among donors, Northern partners, senior staff, etc.) affect the outcomes of negotiations is important. Further, meanings that appear to be shared can also be institutionalised or enacted in quite different ways (as was the case with the hiring of knowledge sharing officers above).

One key element in moving toward a stronger shared understanding and acceptance of these understanding is to acknowledge the inevitability (and normalcy) of these types of negotiation from the outset. This might involve spending significantly more time at the earliest stages of collaboration unpacking assumptions that may (from an individual or institution's perspective) appear obvious and uncontroversial, but to others could seem highly contentious. This suggests the need for reflexivity and collective learning to be at the centre of openness, as well as the appreciation of risk as people challenge their own assumptions. As such, openness is perhaps best understood as a process that is continuously under development and review rather than a fixed end-point.

- **ICTs and other mediating technologies play an influential role in both the negotiation of meaning, and in determining how we move from meaning to action**

It is important to recognise the role that mediating technologies play in facilitating or precluding certain forms of communication, participation, and openness. Further to the point raised above, there is a need to recognise the challenge of balancing an intensification of technologies and visibility with the assurance of "safe spaces" from which people can struggle to create meaning for themselves before engaging openly. It is also important to bear in mind that particular mediating technologies can either reinforce or clash with the norms of participation established within particular epistemic and cultural norms (Adam & Myers 2003), and to understand the impacts this will ultimately have on inclusion.

Further, this paper has made the case for seeing ICTs as one of a variety of potential mediating technologies, which can mutually reinforce or contradict one another. Key among them, in the context of development, is the notion of the project itself, which, through its various instruments (project documents, job descriptions, etc.), many of which pre-date the engagement of many core network members, constructs a view of what can be deemed possible in terms of openness and participation. Thus, I argue, we cannot look to ICTs as guarantors or models of new architectures of development, without also looking at the whole range of practices, understandings, and mediations that unfold within this complex arena. Doing so, however, offers us new opportunities to not only strive for better openness through the use of new communication technologies, but to challenge the very ways that development partnerships are enacted.

Works Cited

Adam, M. & M. Myers(2003). Have you got anything to declare? Neo-colonialism, information systems, and the imposition of customs and duties in a third world country. In M. Korpela, R. Montealegre, & A. Poulymenakou (Eds.), *Proceedings of the International Federation of Information Processing, IFIP 9.4 and 8.2 Joint Conference on Organizational Information Systems in the Context of Globalization* (pp. 101-116). Dordrecht, Netherlands: Kluwer.

Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications, 10*(5), 1251-1262.

Bhabha, H.K. (1994). *The location of culture.* New York: Routledge.

Chambers, R. (1997). *Whose reality counts? Putting the first last*. London: Intermediate Technology.

Cooke, B., & Kothari, U. (Eds.). (2001). *Participation: The new tyranny*. London: Zed Books.

Cooke, B. (2004). The managing of the (third) world. *Organization, 11*(5), 603-629.

Cornwall, A. (2002). *Making spaces, changing places: Situating participation in development*. Brighton: Institute of Development Studies.

Cornwall, A. (2006). Historical perspectives on participation in development. *Commonwealth & Comparative Politics, 44*(1), 62-83.

Ensor, J. and R. Berger (2009). Community-based adaptation and culture in theory and practice. *Adapting to Climate Change: Thresholds, Values, Governance*. W. N. Adger, I. Lorenzoni and K. O'Brien. Cambridge, Cambridge University Press**:** 227-239.

Escobar, A. (1995). *Encountering development: The making and unmaking of the third world*. Princeton: Princeton University Press.

Fairclough, N. (1992). *Discourse and social change*. Cambridge: Polity Press.

Fairclough, N. (1995). *Critical discourse analysis: Papers in the critical study of language*. London: Longman.

Fairclough, N. (2001). *Language and power (2nd ed.)*. Don Mills: Longman.

Foucault, M. (1980). *Power/knowledge: Selected interviews and other writings, 1972-1977*. New York: Pantheon.

Freire, P. (1972). *Pedagogy of the oppressed*. London: Penguin Books.

Gaventa, J. (2006). Finding the spaces for change: A power analysis. *IDS Bulletin, 37*(6), 23-33.

Grist, N. (2008). Positioning climate change in sustainable development discourse. *Journal of International Development, 20*, 783-803.

Hardy, C., Palmer, I., & Phillips, N. (2000). Discourse as a strategic resource. *Human Relations, 53*(9), 1227-1248.

Harvey, B. (2009). Context: From Knowledge to Action. Unpublished paper presented at the *15th Conference of Parties to the UNFCCC*. Copenhagen, Denmark.

Hickey, S., & Mohan, G. (Eds.). (2004). *Participation: From tyranny to transformation?* London: Zed Books.

Hickey, S., & Mohan, G. (2004). Relocating participation within a radical politics of development: Insights from political action and practice. In S. Hickey & G. Mohan (Eds.), *Participation: From tyranny to transformation?* London: Zed Books.

IDS (2009). *IDS submission to the Nairobi Work Programme Synthesis Report* (Draft).

Jennings, T. L. (2009). Exploring the invisibility of local knowledge in decision-making: the Boscastle Harbour flood disaster. *Adapting to Climate Change: Thresholds, Values, Governance*. W. N. Adger, I. Lorenzoni and K. O'Brien. Cambridge, Cambridge University Press**:** 240-254.

Kerr, R. (2008). International Development and the New Public Management: Projects and Logframes as Discursive Technologies of Governance. *The New Development Management*. S. Dar and B. Cooke. London, Zed Books**:** 91-110.
Knorr-Cetina, K. (1999). *Epistemic cultures*. Cambridge, MA: Harvard University Press.
Knorr-Cetina, K. (2007). Culture in global knowledge societies: Knowledge cultures and epistemic cultures. *Interdisciplinary science reviews, 32*(4), 361-375.
Kothari, U. (2005). Authority and expertise: The professionalisation of international development and the ordering of dissent. *Antipode*.
Mahiri, I. (1998). The environmental knowledge frontier: transects with experts and villagers. *Journal of International Development* 10: 527-537.
Mignolo, W. (2000). *Local histories/global designs : Coloniality, subaltern knowledges, and border thinking*. Princeton, N.J.: Princeton University Press.
Ochieng, B. O. (2009). Effective Communication of Science and Climate Change Information to Policy Makers. Nairobi, IDRC**:** 22.
Orlove, B. S., Roncoli, C., Kabugo, M., & Majugu, A. (2009). Indigenous climate knowledge in southern Uganda: The multiple components of a dynamic regional system. *Climatic Change*.
Said, E. (1979). *Orientalism.* New York, Vintage.
Slater, D. (1993). "The Geopolitical Imagination and the Enframing of Development Theory." *Transactions of the Institute of British Geographers* **18**(4): 419-437.
Smith, D. (2001). Texts and the ontology of organizations and institutions. *Studies in Cultures, Organizations and Societies, 7*(2), 159-198.
Smith, L. T. (1999). *Decolonising methodologies: Research and indigenous peoples*. New York: St. Martin's Press.
Roncoli, C., Ingram, K., & Kirshen, P. (2002). Reading the rains: Local knowledge and rainfall forecasting in Burkina Faso. *Society and Natural Resources, 15*, 409-427.
Roncoli, C., Orlove, B. S., Kabugo, M. R., & Waiswa, M. M. (2009). Cultural styles of participation in farmers' discussions of seasonal climate forecasts in Uganda. *Agriculture and Human Values*.
Smith, M., N. J. Engler, et al. (2008). Open ICT4D. Ottawa, IDRC.
Thompson, M. (2008). ICT and development studies: Towards development 2.0. *Journal of International Development, 20*, 821-835.
Tol, R., Pielke, R., & Von Storch, H. (2010, 01/25/2010). Save the panel on climate change! *Spiegel Online*.
van der Velden, M. (2002). Knowledge facts, knowledge fiction: The role of ICTs in knowledge management for development. *Journal of International Development, 14*, 25-37.
Walsham, G. and S. Sahay (2006). "Research on Information Systems in Developing Countries: Current Landscape and Future Prospects." *Information Technology for Development* **12**(1): 7-24.
Young, O. (2004). "Institutions and the Growth of Knowledge: Evidence from International Environmental Regimes." *International Environmental Agreements: Politics, Law and Economics* **4**: 215-228.
Zuboff, S. (1988). *In the age of the smart machine: The future of work and power*, Basic Books.