Why do Foreign Solutions not Work in Africa? Recognising Alternate Epistemologies

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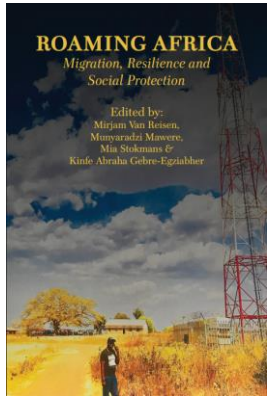

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Introduction

This chapter presents the narrative of a Western-trained engineer working with rural communities in underserved areas of Southern Africa. Through the reflexive interpretation and reinterpretation of physical evidence (nature) and the narratives in communities (nurture), I present insights into the tension between the normative epistemology underpinning technology and the integrative epistemology of rural communities in Southern Africa. With a transdisciplinary sensitivity, I show the effects of technology on meaning-making and resource allocation in these communities. From my 'in situ' embeddedness – living and working with African communities – I investigate the modernist philosophical approach that separates nature from culture and culture

The misalignment between foreign solutions and local realities in rural Africa is often the cause of harmful cultural entropy. This clash in value systems undermines solutions that embolden and strengthen local communities. The recognition that value systems may differ is lacking in research on resilience in Africa. The undermining of resilience can lead to loss of trust in what 'home' has to offer and encourage people to move to new places. We need to take a fresh approach that values African epistemologies and ways of knowing and that nurtures local talent to take the lead. In order to solve African problems, there is an urgent need to see the situation through an African lens – both when defining the problem and coming up with locally-relevant solutions.

from technology, highlighting the intrinsic disrespect for indigenous worldviews that guide daily practices in African communities. Using two examples, one of a rural hospital in Zimbabwe and the other of an Internet network in the rural village of Macha, Zambia, this chapter argues for sensitivity towards, and respect for, local epistemologies and the local embodiment of knowledge, as well as for the local ability to define problems and come up with solutions. As part of ensuring such sensitivity and respect, I outline the 'Big Five', which are African virtues that can be used to guide interactions and interventions in rural communities of Southern Africa.

In March 2018, I accompanied a team of experts on a journey into a remote rural area in Southern Africa. We went to visit a hospital in Zimbabwe, located more than 500 kilometres from the capital of Harare. I had visited this particular 160-bed hospital several times before. During the visit, we found 15 patients admitted, most of them suffering from malaria, as can be expected in the rainy season. On one of my previous visits in late 2017, I found only two patients admitted to the hospital. Although this hospital has a catchment area with a radius of over 100 kilometres, at any of my visits, the utilisation of its facilities was underwhelming.

Before moving back to Zimbabwe at the end of 2012, my family and I lived in Zambia for 10 years. In the rural village we stayed in, collaboratively, the community itself built a local and wide area network to link the local community to the Internet (Matthee, Mweemba, Pais, Rijken, & Van Stam, 2007). The network provided connectivity in places where there was none before. From its beginning in 2004, the network was always congested (Belding *et al.*, 2012) and the gap between supply and demand has continued to grow ever since (Belding, Johnson, Pejovic, & Van Stam, 2011). The use of this network was overwhelming.

Both of these cases represent efficiency problems with service utilisation in underserved areas. The first case is of service utilisation that is underwhelming, with infrastructure for health care laying idle. The second case is of use that is overwhelming, with communication

infrastructure used up to its capacity and beyond. In both cases, efficiency dissipates and stakeholders become distressed. So, *why do foreign solutions not work in rural Africa?* To answer this main research question, this chapter examines these two case studies and asks: *What is the common thread linking both cases? And how can solutions to their troubles – in health care and communications – be found?*

Methodology: Why do foreign approaches not work in Africa?

This chapter is based on a method congruent with the extended case method, as described by Michael Burawoy (1998). In my time in Africa, I have applied and amended this method to suit my longitudinal academic goal: to recognise common cultural threads and values in an effort to understand 'knowing' in African society. I have dubbed this adapted method 'living research' – to live with theory, in theory and for theory (Van Stam, 2012; 2017b). In this setting, I act as a perceptive, reflective, evaluative and active 'practitioner', seeking to understand how community members 'know' (Bigirimana, 2017). 'Living with theory', Burawoy (2013) argues, takes away the separation between the participant and the observer, inspiring critical assessment of existing theory and allowing for alternative understandings. This approach allows for participation while observing and conceiving a hypothesis.

The realisation of the existence of multiple realities, depending on one's philosophical and epistemological lens, fuels this chapter to uncover foreign (Western) views and theories about an African world, set in normative epistemology. In previous work, Mawere and I (2015) pointed out the very real, and often destructive, ramifications of such views. Due to the messiness of reality, I do not claim that this chapter is universally valid. My perceptions and deductions are based on my happening to be at a particular place, in both time and space. I link my long-term and ongoing observations in Sub-Saharan Africa with my desire, for example, to discern new theories. My notions of significance – for instance, valuing the knowledge of the so-called subaltern – align with my aim to provide a culturally-sensitive and theoretically-rich narrative using reflexive research that unfolds

interactively and retrospectively (Ingold, 2000). In this way, I continuously loop between the critique of Western-dominated theories and practices, using evidence gathered from extended case studies, and confront abstract or foreign projections of an African world with lived experiences. Through the presentation of my work in local, national and international settings, I check the validity of my claims, while gaining an ever-evolving understanding of African epistemologies.

Pathfinding

"It has been quite a journey"[1] for me, as a Western-trained engineer, to live, learn, and know in rural and urban areas of Southern Africa. Only after considerable study have I started recognising what might make or break the use of technology in so-called 'underserved areas' (Van Stam, 2011; 2017d). This journey has taken me almost 30 years, during which time I have worked as a broadcast system engineer at a shortwave radio station in Swaziland, a strategist in telecommunication systems in South Africa, and a resident expert in information and communication technologies (ICTs) in rural Zambia and Zimbabwe (IEEE TV, 2010). I have been fortunate to be involved with communities that use many forms of technology, for example, the use of local subsoils for building housing infrastructure[2] and ensuring the availability of 'essential services' such as water[3] (Van Stam, 2011, p. 23) and electricity[4] (Mudenda, Johnson, Parks, & Van Stam, 2014). I was also involved in various community enterprises working to produce biofuel or solve transport challenges with the use

[1] A phrase borrowed from Njabulo Khumalo (2017), as he put it in the title of his assessment of the implementation of an information platform (DHIS2) in the health system in Zimbabwe.

[2] In the process, locally produced, interlocking soil-cement blocks are dry stacked eliminating the use of mortar, concrete or steel columns, using South African Hydraform block making machinery.

[3] In arid regions, like in Macha, Zambia, water provisioning requires creativity and perseverance, involving the sinking of deep boreholes, the purchasing, installation and maintenance of pumping equipment, and the development of a distribution network covering a wide area.

[4] Using generators and, later, grid power in Macha, or planning for biofuel in Chikanta or water-turbines in Kalene, Zambia.

of aeroplanes. So-called 'local talent' (Bets, Van Stam, & Voorhoeve, 2013; Van Oortmerssen & Van Stam, 2010) were at the forefront of these endeavours and trained information technology experts in rural areas (Bishi, Bishi, & Van Stam, 2016; Mudenda & Van Stam, 2012). They sensitised, implemented, and operated infrastructure and services and mobilised, at times, hundreds of people for local development in their respective communities (BBC Clicks, 2011).

In my research, I have reflected on the different ways that we experience reality. In its wake, over 50 publications and a few dissertations were published.[5] I focused on the built environment, mostly concerning access to ICTs, in rural areas of Zambia and Zimbabwe (Van Stam, 2013a; 2014), and examined "the displacement of technology and meaning in an African place" (Van Stam, 2017d). However, upon invitation by my friends in these community, I cannot resist sometimes taking up a screwdriver or a computer or participating with local engineers and other experts in facilitating service delivery (Toyama, 2011). Getting one's 'feet wet', when invited by – and reporting and accountable to – local leadership, provides valuable and transdisciplinary inputs. In all of this, I focused on the nexus between community engagement, culture, and digital technologies. In this quest, I have seen local 'future centres' emerging, such as an eHealth laboratory that tests local and national eHealth services (Bishi, Shamu, Van Dijk, & Van Stam, 2017a) and have searched for local perspectives on how to facilitate communities in the use of remittances (Fulgencio, Ong'ayo, Van Reisen, Van Dijk, & Van Stam, 2016), TV white spaces (Gweme & Van Stam, 2016) and eHealth (Bishi, Shamu, Van Dijk, & Van Stam, 2017b).

In this process, I quickly learnt that my skills and, especially, my Western-trained understanding of 'needs' and 'solutions', was inadequate and incomplete to provide solutions to the problems of these communities (Van Stam, 2012). Whatever I tried to build would fall to pieces, stand idle, or break within a short period of time. Hardly

[5] These publications are available from https://www.vanstam.net/gertjan-van-stam.

any of the activities I initiated worked, as there was always something else needed to complete it, something that was not available and needed sourcing from the outside world.

My training and methodological understanding of how to 'get it done' was not cutting it (Mawere & Van Stam, 2015). Electric equipment got blown up by dirty power (Mudenda *et al.*, 2014); the Internet would be available in a manner and at a cost incompatible with the local economy, tools and equipment; that 'last thing' needed to complete something took years to arrive; or an airplane would sink in the mud after a freak rainstorm. Those visiting from the outside seemed to be unable to keep hold of what they learnt from the community. I found out the truth in what the Italian Ernesto Sirolli bluntly, but convincingly, presented in his TED Talk: "Want to help someone? Shut up and listen!" (Sirolli, 2012).

I recognised that my training as an engineer, with its methods of essentialising and categorising and its set frames for technical assessments, were leading me astray and preventing me from being part of the solution (Van Stam, 2014b). This mismatch, of course, is quite logical (Mawere & Van Stam, 2016a): how can anyone be part of sustainable development when one does not start together, does not share the local community's understanding and needs, and does not respect the existing craftsmanship in the local community? Turning it around: which nation or people would welcome foreigners that 'bring development' but do not share the local understanding of history, culture, way of living and way of knowing? (Mawere, 2016).

The question that hounds me is whether the search for interdisciplinary solutions for the disenfranchised is like a puzzle or a mystery. If it is like a puzzle, it would be a matter of sorting out all the available pieces, consider all available information, and finding the answer. However, if it is a mystery, the answer will remain elusive, because one would misunderstand the underlying question (Van Stam, 2017d, p. 51).

Contemplating this issue has raised some nagging questions in my mind. What if science is proposing answers, or solutions, to misconstrued questions? What if the methodology used to define problems and validate solutions in Africa settings is flawed? What if the dominant epistemic 'state of mind' used to approach and identify issues and guide the assessment of success is not applicable in the African environment?

When reflecting on the dynamic interface between technology and culture in rural communities and its effects on meaning-making – taking into account the local perception of the dynamics of resource allocation (Sheneberger & Van Stam, 2011) – the benefits of technological solutions and interventions that come from the outside appear to be unclear and disserving in many ways. Where (who) do the solutions for conceptualised problems emerge from? (cf, Ahmat *et al.*, 2014). In fact, who defines what the problems are? And who defines the divisions and system of classifications that mark the conceptual frames that technologists use?

When I regarded the hollowness of presumed 'solutions' to perceived needs, I decided that I am dealing with a mystery rather than a puzzle.[6] When using a non-African lens, it appears that we are seeking to understand unknown unknowns. Therefore, the philosophy of science and use of dominant epistemologies needs to be reviewed. There is a need for science to wander into unchartered waters.

Thus, my engineering research shifted to gain a better understanding of the question. However, I learnt that 'questioning the question' is not necessarily appreciated by engineers, especially when this uncovers moral and political issues, which points to the need to regulate technology platforms, locally and internationally.[7] It is in this

[6] The revelations of Edward Snowden (Greenwald, 2014) and, for example, the public concern about unanticipated socio-political influence possibly exercised through social media and information platforms by Cambridge Analytica are pointers towards such a mystery in the use of the Internet and social media.

[7] In this line of thought, Tim Berners-Lee, the inventor of the World Wide Web, argues for the regulation of large technology firms (Solon, 2018).

way that I started on the path of transdisciplinarity, while setting up intellectual camp in both the natural and social sciences.

Upon entering a community, and in researching needs and potential local solutions, I focused on building and maintaining relationships first (Van Stam, 2016a). In Murambinda, Zimbabwe, in the year 2000, it took more than six months of unstructured living in the community before I was able to carefully participate in local discussions about needs and solutions (Van Stam, 2017b). From that point onwards, I fervently studied the many histories, local understandings of meaning, complicated settings of the many stakeholders (Kroczek, Mweetwa, & Van Stam, 2013), and built environment in the rural communities in which I lived. Through such study, I endeavoured to discern contemporary and fruitful theories of change and their epistemologies that involve technology from within the communities themselves. I noticed the utter complexity underlying what some call 'underservedness'. I recognised that what is happening in disenfranchised areas is related to a history of being 'othered' (Van Stam, 2016b; 2016c) and, subsequently, being dominated (Van Stam, 2017e). From my position as an engineer in Zambia and Zimbabwe, I found that this 'othering orientalism' and its handmaiden 'hegemonic imperialism' remains the order of the day in disenfranchised environments. I started to see that many realities express themselves in a clash of paradigms and, subsequently, a clash of epistemologies (Van Stam, 2017d).

To deal with the multiple realities I saw, I conceptualised three different paradigms (although there may be more), which those who I studied in rural Africa seemed to switch between (Van Stam, 2017d, pp. 201–203):

- **I-paradigm:** In the 'I-paradigm', which exists in the context of globalised policies and practices, truths are predicated in relation to individualism and capitalism, and people interact the way billiard balls do.

- **We-paradigm:** In the 'We-paradigm' one is defined as a derivative of the whole. This reality is set in the community and deals with social personhoods.
- **It-paradigm:** In the 'It-paradigm' one considers the inputs from cosmology and religious belonging.

I noticed that my African friends had no problem switching between these realities in a matter of seconds. It sometimes took me weeks to be able to switch with them, especially when I would return to the community from a trip overseas (Van Stam, 2011).

Through lots of lengthy and ongoing conversations, hard study, reflection and introspection and 'living-the-life' in rural Africa, I started to recognise and appreciate the local paradigms, philosophies, and epistemologies. I eventually understood their solidification in contemporary cultural expressions and the practice of local engineers. So sensitised, I became enthralled by the ingenuity of local engineers and the general agency of people to provide local solutions to local problems (Mawere & Van Stam, 2016a; Van Stam, 2013b; 2016a). For instance, I recognised that 99% of Zambia's electricity production is green energy (Mudenda *et al.*, 2014) and that mobile money infrastructure allows for expressions of communal love (Fulgencio *et al.*, 2016; Van Stam, 2017d, Chapters 12, 15). From then on, together with my local, national, and international friends and collaborators, I committed myself to searching for pathways that make sense of what technology might mean in the intricate web of meanings, perceptions, and human relationships in disenfranchised areas in rural Africa.

The voice of the 'subaltern'

Although far between, critical voices do pop up, even in mainstream academic literature. In ICT, for instance, various scholars have asked: "are we asking the right questions?" (Gomez & Pather, 2012) and "do pilots really work?" (Surana *et al.*, 2008). These are questions of ideology. Perhaps the most pressing of these questions is: 'Who defines success?'

Critical and courageous contemporary writers, notably from within Africa, such as Munyaradzi Mawere, Sabelo Ndlovu-Gatsheni, Francis Nyamnjoh and many others, raise the issue of local agency (for instance, Mawere & Awuah-Nyamekye, 2015; Ndi, 2011; Ndlovu-Gatsheni, 2013; Nyamnjoh, 2012). These academics invariably insist on the existence of different perceptions of reality and success, depending on where one resides. They provide a sound academic basis for the idea of local, African understandings, even while they set their research in the context of global matrixes of power underpinned by Eurocentrism and coloniality.

In my various works, I have shown how the local perspective in the areas where I lived and live – now in rural Zimbabwe – have had a profound impact on how I understand needs and service provisioning. I have made the case for the ongoing existence of orientalism imperialism and colonialism, which I call the 'Terrible Three' (Van Stam, 2016c; 2017d; 2017e). These predispositions affect and obscure the contributions of many a technologist and academic, both in and outside Africa.

Living together and sharing resources and conversations with those regarded as 'subaltern', or, even more demeaning, generalised as being in the 'Global South' (Grosfoguel, 2010), gave me whole new realms of academic sensitivity and understanding of the meaning of technology in the communities in which I live. I had methodologically migrated from interdisciplinarity to transdisciplinarity (Du Plessis, Sehume & Martin, 2013).

So, scientifically, what are some of these realities that I have found in rural Africa in the communities in which I have lived? And, what can be observed about epistemology? What approaches have been unearthed?

Lessons learnt

First of all, living and working in rural Africa, I discovered that technology is not only about nature – determined by its essential

properties – but, and perhaps more profoundly, about nurture – its affects for humans. We are human beings networked together in complex relationships. Therefore, nature is to be understood in its social context. It is the local cosmology, epistemology, ontology and methodologies that form the basis of the local, indigenous knowledge system that defines 'what is'. I learnt that, in the community, knowledge is understood in its embodied form (Mawere & Van Stam, 2017) and not necessarily – or not at all – as text (Van Stam, 2013d). For example, I noticed that network designs of community networks, if they existed, would be drawn up after the creation of the network. Designs drafted upfront were neither consulted nor adhered to, as they were not communally developed. Using my interdisciplinary handling of both the social and natural sciences, and appreciating the local, ever-evolving indigenous *knowing*, I was gaining some understanding and, hopefully, some wisdom. Subsequently, local realities started to make sense when I began to approach them from the local understanding of reality, set in a dynamic and integrative epistemology. This need to understand technology contextually is real; technology needs to be understood both from where it is conceptualised and from where it is deployed. When those understandings do not overlap, which often seems to be the case in disenfranchised areas in rural Africa, there are at least two worlds – two realities – to consider, one embedded in a local epistemology and one set in a foreign epistemology.

It is in this realisation of the past and the present that the 'where we are right now' makes sense. For instance, I discovered that in many disenfranchised areas in Southern Africa, colonialism relied on a circular process of condemnation, brainwashing, and, subsequently, resource release linked to foreign imposed conditions (Van Stam, 2017e). Understanding colonialism in this way I came to realise that such practices are still ongoing. Quite often, external experts would portray my local interlocutors as having essential deficits that need urgent intervention to solve, for instance, approaching technologies as relational instead of 'being rational'. Proposed solutions would require foreigners to fly in from the West. Only after sufficient compliance was committed to – in the form of a written project

proposal – would resources become available. Ironically, the resources involved might have been expropriated from Africa in the first place (Mawere & Van Stam, 2016b).[8] An academic friend living in Rwanda recognised this, and told me in early 2018: "researchers from abroad that often stopped by my office were almost always on some mission to study about Africa as if Africa was some curiosity-ridden domain to be investigated from their elevated perspective from the outside" (Prof Bruce Krogh, personal communication, 2018).

Secondly, I was amazed to realise that a focus on innovation can be entirely counterproductive. Change brings a lot of risks and is often proposed with such vigour that local relationships in the community and with stakeholders have no time to develop or strengthen. The literature seems to exalt these innovations. However, the innovations proposed are not necessarily mapped with a local understanding of what is valued, are desirable practices, or can be considered a success (Mawere & Van Stam, 2016a). In the communities I have visited and lived in Southern Africa, change is the result of a collective process and happens gradually. Therefore, it is essential to observe the ordinary (Van Stam, 2016a).

I learnt that the local focus is on improvisation: one works with what one has. Locally, engineers aim to improve on what works and neglect practices that are not beneficial (Van Stam, 2016a). Such a stance is reflected, for instance, in the current National Health Strategy of Zimbabwe, which states:

> *Significant investments in health system strengthening are necessary for the health facilities and other service delivery and coordination platforms to function optimally. [...] new innovative programmes such as e-health are implemented to enhance and not to disrupt what has been working so far.* (MoHCC, 2016, p. 61)

[8] In 2014, for Sub-Saharan Africa, researchers reported a yearly inflow of USD 134 billion – in the form of loans, foreign investment and aid – and a conservatively calculated net outflow of USD 192 billion – mainly in profits made by foreign companies, tax dodging and the costs of adapting to climate change (Sharples, Jones, & Martin, 2014).

Clash of epistemologies

The Burundian scientist Stanislas Bigirimana (2011; 2017) describes how normative epistemology positions externalise knowledge as indubitable, infallible and incorrigible. This aligns with Michael Burawoy's (2009) assessment of a positive science, which relies on the '4Rs': representativeness, reactivity, reliability and replicability. These authors problematize these approaches as harbouring dichotomies and being removed from the complexity of power.

The use of amended positivistic methods, such as in post-positivism and constructivist-interpretivist and critical-ideological methods, seem not to deal with the fundamental issue of regarding knowledge as existing separate from the knower. The results of any of these methods are further problematized by their dominant use, being focused on *the individual*. Maslow framed the self-actualisation of the individual as the central theme of human development, something Mawere, Mubaya, Van Reisen, and Van Stam (2016) show is unaligned with the reality in many African places. This consistent framing of 'the individual' and reflecting on his effectiveness or her self-actualisation have influenced how success measured. Subsequently, in line with the adage 'what gets measured gets done', the conceptualisation of technologies and reports on their implementation are set to echo this foreign discourse of success.

Indirectly, the statesman and former Secretary-General of the United Nations Kofi Annan stood against such individualism. Preceding his passionate arguments for democracy, he commented on the politics of human beings, stating that "Man is born, lives and dies as a member of a community and the affairs of that community are therefore his and vice-versa" (Annan, 2017). However, dominant western approaches continue to put the individual at the centre. Such a centrality creates division, as it pitches one against the other in a competitive world. Individualism also raises dichotomies, where opposing and mutually exclusive positions are assigned to thinking and doing, for instance, as well as experience and understanding, reason and faith, knowing and knowledge, facts and

principles, orality and textuality, physics and thinking, practice and theory, and reflection and action. The resulting fights over boundaries have taken academic attention away from the value of integrated ways of knowing, often available in the form of counter-narratives.

In the search for a method, I have endeavoured to understand the local epistemologies by gleaning inputs from African philosophies. Although outside the mainstream, often tough to access, and relatively under-researched (Van Stam, 2017d, Chapter 2), the study of African cultural heritage provides narratives on how meaning-making is *lived* in a community. A rendering of such meaning-making, embedded in conversations and abundance, matured and in the present moment, I called the 'Big Five'. The Big Five consists of 'ubuntu' (communal love), 'oratio' (communicating embodied knowledge), 'relatio' (relational resource allocation), 'dominatio' (maturity through forgiveness and covenants), and 'animatio' (the continuous present moment) (Van Stam, 2017d, Chapter 14). This interpretation of African value orientations presents a gateway to understanding and knowing how many Africans sustain their cultural identities against the (often technology enabled) onslaught of the 'Terrible Three' (orientalism, imperialism, and colonialism), which has led to Africa's disenfranchisement for over 500 years. The epistemology of the Big Five is dynamic and integrative, understanding 'knowing' as an act of the knower and 'knowledge' as having emotional, intellectual, evaluating and pragmatic forms (Bigirimana, 2017). Methodology, of course, is subject to the epistemic base and philosophy of knowing and, in the case of the dynamic and integrative epistemology of the local community, methodological approaches must be subject to and aligned with the level of consciousness one is focusing on (Bigirimana, 2017, p. 1603). Unfortunately, technology research seems to undervalue methods – which are social constructs – that involve a dynamic and integrative (and thus evolving) local knowing in a community of inquiry and that trigger the intention to know, involving human and non-human inputs (for instance, 'other beings', as in Mawere, 2013).

In the land of the misunderstood

To my relief, the literature is gradually starting to resonate with the kind of counter-narrative presented in this chapter. For instance, coming back to the rural hospital mentioned in the introduction, a decline in health service utilisation has been noted in Zimbabwe's National Health Profile (MoHCC, 2015). The profile lists a plethora of social issues that may be causing this underutilisation including, for instance, people's perceptions and factors like religion, culture, education, status, quality, accessibility, affordability and disease burden. Likewise, usage patterns of African community networks have been reported on, for instance, showing previously unexpected high levels of traffic between local users (Belding *et al.*, 2011). The consequences of these findings, however, are not featuring in the literature yet.

Systems designed outside of Africa are influenced by the cultures and histories of those who created them (Van Stam, 2016b). Without considering all voices, including the voice of the disenfranchised embedded in local epistemologies, any foreign construct is self-validating. Blindly accepting outside definitions creates room for alien systems and platforms to frame and dominate local realities in Africa. Such a colonial act defines (but does not describe) a world in which control is exercised by those who control the mechanisms to do so. Therefore, how one views reality defines the past, present and future.

Disquietingly, the quest to understand African expressions of technology, in its dynamic and integrated forms, is not high on African research agendas. To gain such an understanding, longitudinal interdisciplinary and transdisciplinary studies are needed, as well as a belief in local agency. Furthermore, the fact that realities in so-called 'underserved areas' are far removed from realities in environments where services are available needs to be acknowledged. Lastly, we need to be sensitive to underlying clashes of paradigms, and subsequently clashes of epistemology, and the presence – and need for mediation – of undeserved ('white') privileges (Van Stam, 2017d, pp. 102–109).

I place a big question mark on the epistemological base and methodologies that the dominant, Western-centric academy use in so-called underserved areas. Many, if not most, of these are not conceptualised or tested in the realities of the disenfranchised and, therefore, their applicability is not proven (Mawere & Van Stam, 2015). However, in our current age of super-colonialism (Van Stam, 2017e), it takes courage to stand up for counter-narratives and for the local desire to amplify local technologies (Mawere & Van Stam, 2016a), using locally embodied knowing.

So why do many technologies perform so mediocrely in disenfranchised settings? This may be due to the presence of system diversity, which encompasses three particular lineaments in Africa. When the counter-narrative is 'diversity equals normality', due to system diversity (Van Reisen, 2017), technologists are faced with three critically important features in many parts of Africa:

- **Latency:** The issue of latency recognises that the transfer of information, whether digital or interpersonal, takes considerable time. Latency occurs because of the finite speed of light, or whatever means of transport is used, whereby the transfer of information takes time given the enormous distances to information platforms. Bits and bytes have thousands of kilometres to travel, and building relationships also involves traveling and working with all authorities. Getting all the permissions in order takes a significant amount of effort as well as time. In ICT systems, for instance, we noticed that in a mixed flow environment with substantial latency, Linux based systems outperform Windows systems almost ten to one over a 1 Mbps line (Johnson & Van Stam, 2016).
- **Congestion:** Due to the dominant mix of technical, economic and political systems, supply seems unrelated to demand. Although communities are used to sharing abundance (Sheneberger & Van Stam, 2011), technical

systems thriving on models of scarcity are timing out while communities are busy interacting.

- **Variety:** Here, we recognise the enormous variety, diversity and richness of expressions in Africa. It seems that anything one can think of is available in African society and markets. A lot of variety exists in languages, cultures, and regulations, and there is an enormous range of equipment.

In many parts of Africa, the reality of system diversity has been present for a long time. This is unlikely to change soon. Therefore, it is important to think about how "to enhance what has been working so far", considering the prevalence of system diversity.

A view on African critical agency

Referring back to the two cases presented at the start of this chapter – one in which health services are sparsely used and the other in which Internet connectivity is always congested – what is the common thread underpinning these problems? I contend that underutilisation is mainly caused by 'discontinuities of vision', due to a disconnect between the normative epistemologies used by those initiating the hospital and the dynamic and integrative epistemologies of many African environments. Reviewing Africa's extended history, it is clear how pre-colonial epistemologies have been overlaid and crowded out by a foreign normative epistemology. The systems now in place have emerged from an alien worldview, from the I-paradigm. Such systems are poorly matched with local views of continuity, which rely on the maintenance and expansion of human relationships (Sheneberger & Van Stam, 2011). Settler colonialism is long gone, but the normative epistemologies put in place continue to ravish relationships. In the first case, the underutilisation of the hospital, overreliance on a foreign scheme and support (to maintain it) has led to a disrupted vision of health. When testing counter-narratives with the leadership at that particular hospital, I saw eyes sparkle and heard initial ideas about how to augment health operations in light of locally-enshrined values.

In Macha, Zambia, from the outset, local ways of doing were taken into account (Bets *et al.*, 2013; Van Oortmerssen & Van Stam, 2010). The Macha Works Theory of Change involves local talents in a circular and continuous process of community engagement (Van Stam, 2013c), workforce development, and thought leadership (Van Stam, 2014a). Subsequently, 'new Macha' was declared by members of the community, and the Internet and technologies facilitating services like community radio became desired vehicles for progress in community life (Mweetwa & Van Stam, 2012).

So, if we want to look from the local perspective and live in the We-paradigm, what are some aspects of the local epistemology that we need to understand? What did I recognise as being regarded as 'ordinary' in the African settings I live and work in? Of course, there is no one African reality or cultural expression. However, it appears that the value of *ubuntu* is widely shared, especially in Sub-Saharan Africa, as expressed in the vocabulary of the Big Five, which are explained here:

- **Ubuntu:** In ubuntu (or whatever word in the specific language[9]), one views existence from the perspective of the community (Mawere & Van Stam, 2016c).
- **Oratio:** The value of oratio indicates how, in the community, one continuously communicates embodied knowledge (Mawere & Van Stam, 2017).
- **Relatio:** Relatio describes how resources are allocated in relational fashion (Sheneberger & Van Stam, 2011).
- **Animatio:** Animatio signifies the continuous present moment, in which one adjusts according to the way the future presents itself in the continuous present.
- **Dominatio:** Dominatio represents the virtue of maturity, activating ubuntu's conviviality through forgiveness and in covenants between people.

[9] For instance, *ubumuntu* in Rwanda (see http://www.kgm.rw).

I propose these perspectives on African virtues as tools for intellectual sensitivity – for knowing – and for use in daily encounters in disenfranchised African communities. These Big Five provide a framing for conversations on the ordinary that sustains the art of living and knowing in African places.

Technology

So, what is the effect of all this on the use of technology in solving problems for those in 'underserved' areas? 'Living research' (Van Stam, 2019) in disenfranchised communities raises questions about out of context research and the development of (technical) solutions. There is a need for sensitivity towards the opportunities created by a community, based on a local understanding of local requirements, as well as recognition of the local capacity for seizing those opportunities. The definition of success depends on the local context, epistemology, values, and agency. Techno-solutions based on normative epistemology and imposed on environments other than that in which they emerged from are problematic (Toyama, 2015). However, recognising the community for what it is and recognising what it can do opens up exciting avenues for ways ahead.

While preparing this chapter, I connected with an entrepreneur in the southern part of Rwanda. This person breeds fish. He commented that his "fish team work better than any mechanised device". He related how he was forced to find this out when his imported equipment failed to work. He explains how he dealt with the problem:

> *I converted from paperwork to software and from clipboard mounted charts to handheld Internet devices. Now I have a management information system that helps me hone in on trouble spots, and project future feed requirements, sales income and cash flow.* (Fish breeder, personal communication, 9 February 2018)

Coming back to the health case presented here, when we regard the field of electronic information handling, it is clear that the current 'platformising' of technologies (Van Dijck, Poell & De Waal, 2018) has significant effects, also for the disenfranchised. Dominant

information platforms such as Facebook, Google, Microsoft, and Twitter, as well as upcoming platforms such as Amazon and Alibaba, aim to define the information relationships that are possible. The normative epistemology that guides such platforms assumes to govern how health professionals will interact and how they will exchange information, as prosumers (producers and consumers) of knowledge, also in Africa. However, when we analyse the underlying commercial values that fuel these platforms and compare them to the communal values proposed in the Big Five it becomes clear there is little overlap. As a result, there is a need to empower communities to develop technologies and platforms that genuinely serve them.

In the history of imperialism and colonialism, 'the centre' reifies realities in 'the periphery' (Galtung, 1971). Coming back to the case of the community Internet network in Zambia: when we look at the architecture of the Internet, it is striking that the current information-streams overlap with the shipping routes of centuries ago (Williams, 2017; see also Van Reisen, Mawere, Stokmans, Nakazibwe, Van Stam & Ong'ayo, 2019). Therefore, I propose that, in its contemporary structure, the Internet will continue to fuel digital exclusion as it inherently reproduces dichotomies and sustains power-distances, bringing the benefits of the periphery to the (super-colonial) centre. However, we can counter this imperial expropriation of information and define new and more just and culturally-aligned technologies that allow communities to benefit from their local resources, locally.

Conclusion

This chapter discussed the importance of one's epistemic position in defining solutions to supposed areas of need. Its explanatory perspective calls for recognition of the implicit intent and explicit capacity of both the community and technologists. When we are decolonised and switch to the We-paradigm – to the community (Van Stam, 2017c) – and reason from a dynamic and integrative epistemology, technologists become intending inquirers, and can function in facilitating and mentoring roles to assist local talents to achieve their collective and individual potential through local

renderings of technology (Bets *et al.*, 2013; Mawere & Van Stam, 2016a). Without such an attitude and orientation, I believe that the impact of technology is minimal at best (Marais, 2011) and can amplify unintended negative consequences that are detrimental to the agency and strength of the local community (e.g., such as human trafficking, see Van Reisen *et al.*, 2017).

Accepting foreign solutions for problems in disenfranchised communities can put such communities under a foreign spell (Van Stam, 2017a) and undermine their agency. Technology is valuable only as a servant in "the amplification of human intent" (Toyama, 2015). Only if we first seek to know local human intent can technology be of use. A transdisciplinary approach that considers both nature (engineering) and nurture (humanities) brings to light that relationships and local knowing are just as substantial as the resulting technologies (Bateson, 1979).

In my research, recognising the clash of epistemologies, I have found that the notion that people who barge in with ideas (the innovators or disruptors) are the ones who will make a difference is flawed. In this chapter, I hope to have shed some light on the mystery of knowing and facilitated an understanding of the existence of local perceptions of reality. I also hope to have offered guidance, by way of the Big Five, for those seeking to align with rural African communities to find solutions to their problems, as they define them, not as outsiders see them, by recognising local ways of meaning-making and the soundness of the embodied knowledge that exists in local communities.

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