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Cognitive Justice in Pursuit of Knowledge: Evidence of Transformation from the Grassroots in Kenya

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If you have come to help me, you are wasting your time.
But if you have come because your liberation is tied up with mine, then let us work together.
Lilla Watson, Aboriginal scholar and activist.

Introduction

Knowledge production about the African informal economy has long been a fraught space of contradictions and conflicting views arising from differences in research paradigms, disciplinary ideologies and donor agendas (Nyamnjoh, 2004a; Kanbur 2014; Meagher 2018). Scholars of indigenous African entrepreneurship in economic informality such as Dr. Mary Njeri Kinyanjui (2008; 2010; 2014; 2019) note Euro-Western scholarship as "too eager to document African challenges and failures" (2010). "African indigenous markets are largely ignored" in development planning discourse says Dr Kinyanjui and considered "slow to absorb technological innovation" (2019). Clearly such representations prefer to overlook the everyday commercial practices intermediated by smartphones and mobile money (Author 2014; 2007). As Nyamnjoh says, "the mass of ordinary people in Africa refuse to celebrate victimhood" (2004). It is these types of misrepresentations, according to Kinyanjui (2010) that the late Dr Thandika Mkandawire was referring to when he said "[it] denies us the opportunity to think creatively of modes of social organisation at both macro and micro level that can extricate African countries from the crises they confront" thereby leaving the "door wide open for unlimited intervention" and dissipating "whatever enthusiasm the locals may have had for development." (Mkandawire 2001, pg. 310). The author is thus motivated to ask "Can novel approaches to knowledge production also revitalize enthusiasm for facilitating self-determined transformation and innovation?"

This contribution departs from the way dominant modes of knowledge production deny a Kenyan *mama mboga* (popular name for vegetable vendors) recognition of her achievements and undermine her agency and creativity for self-determined transformation (Nyamnjoh 2012a; Kinyanjui 2010, 2019; Mkandawire 2001). Damage-focused assumptions and deficit theorizing "rob individuals" of their agency, rendering them hapless victims in dire need (Kinyanjui 2010). If we are to counter the

hegemony of Euro-Western knowledge production, then refutation of these erroneous claims must be provided by the *mama mboga* herself. The empirical case introduces innovation-led self-detrmined transformations by informal traders during multiple waves of Covid-19 pandemic in Kenya between 2020 and 2021. Recognizing and respecting their knowledge - cognitive justice as advocated by Indian development scholar Shiv Visvanathan (1997; 2005; 2009) - guides the experimental social intervention. Interrogation of the process of knowledge production across boundaries of epistemology, ontology, and axiology contributes to research in practice. In responding to the call for papers under theme of "Pandemics, Epidemics, and the Imperatives of Social Transformation", the author situates the empirical case as reparation for creativity and agency "stolen" by epistemic hegemony. The paper concludes with a first step towards a cognitive justice-based framework for knowledge production that must transcend boundaries between incommensurable knowledge systems.

Liberation from the "tyranny of dominant logic" and its stranglehold on innovation

The late Dr C.K. Prahalad introduced "the tyranny of dominant logic" that bedevils our thinking about innovation in a public lecture at the Indian School of Business, Hyderabad (Economic Times, January 2009). We are all socialized to believe, he said, that developing countries cannot be a source of innovation. Developed country managers, consultants, academic researchers, all have been conditioned to accept this dominant logic. Because of this, he said, we never question the premise that innovation flows from the top to bottom; or, from the North to the South; or, from developed countries to the developing. However, as he pointed out with numerous examples to the contrary, this doesn't actually hold true. It is our conditioning which blinds us (Prahalad 2004). This stranglehold on our imagination is what he called "the tyranny of dominant logic" adding that "we must unlearn the past to create the future" if we are to liberate ourselves.

For knowledge production, for education, for the social sciences in Africa, such a liberation requires epistemic freedom as Ndlovu-Gatsheni eloquently argues (2018a); but for the *mama mboga*s of Nairobi

and wholesalers who supply them, it is the real world experience of cognitive justice (Visvanathan 1997) that can spark creativity motivated by the imperative for social transformation. The stranglehold of dominant logics on our imagination would lead us to conclude that the risky business of sourcing and supplying perishable fresh produce by barely literate women from Nairobi's poorest neighbourhoods would be the weakest link under the immense burden of restrictions emplaced in response to the global pandemic. The tyranny of dominant logic would blind us to their inherent creativity and potential for innovation. However, as has always been the case, the ground reality is never what is represented.

The Kenyan National Bureau of Statistics Report of March 2021 on pandemic food security situation based on two rounds of surveys from May and June 2020 tells an entirely different tale. Fresh vegetable supplies never faltered, and households surveyed experienced no scarcity in perishable produce such as kales (*sukumawiki*) or tomatoes. Prices rose overall, as would be expected, but even low income neighbourhoods (informal settlements) reported availability and access. Nairobi's informal wholesale markets - regional hubs for fresh produce trade - continued to source and supply fresh fruits and vegetables from across East Africa. The last mile of the informal urban food system - the *mama mboga*s of Nairobi and traders in Nairobi's wholesale markets - did not fail to put food on their customer's tables; persevering in the face of curfews, lockdowns, delays in transportation, and volatility of cash flows. This well documented fact points to an unrecognized but deep well of knowledge underpinning the local and regional informal economic system. It takes more than skill, experience and a willingness to absorb the risk of wasted produce without cold chain facilities, under the hot sun, to provide fresh fruit and vegetables in an edible condition attractive to customers. Not recognizing this knowledge is tantamount to injustice.

Following in the footsteps of scholars resisting dominant modes of knowledge production and its adverse effects on the "researched" (Chilisa 2019; Smith 1999), this paper problematizes the tyranny of dominant logic in innovation as a power struggle between knowledge systems - where education in the

Euro-Western system is raised unquestioningly above over all other ways of knowing (Nyamnjoh 2012a, b), thereby refusing to recognize the "uneducated" or "illiterate" as capable of exercising creativity and innovation, much less setting self-determined transformation goals and achieving them.

Epistemic Freedom, Cognitive Justice, and Transdisciplinarity

Sabelo Ndlovu-Gatsheni's idea of epistemic freedom speaks to cognitive justice (2018a:X) but does not clarify the role of each in the practice of knowledge production. The author distinguishes between epistemic freedom and cognitive justice as the distinction between theory and practice. Ndlovu-Gatsheni concurs:

> Epistemic freedom is fundamentally about the right to think, theorize, interpret the world, develop own methodologies and write from where one is located and unencumbered by Eurocentrism. (2018a:X)

Embracing epistemic freedom thus permits exploration and experimentation with decentring Eurocentrism and valorizing the knowledges underpinning African indigenous markets (author & co-author 2018; author 2012) and the ways of knowing of those considered "uneducated". Cognitive justice, an idea rooted in decolonial thought, advocates recognizing knowledge as an integral component of ways of life and the active engagement between (often incommensurable) knowledge systems (Visvanathan 1997). Nyamnjoh calls this "epistemological conviviality" where conviviality involves “a negotiated understanding” that privileges “togetherness, interpenetration, interdependence and intersubjectivity” (2012a). He elaborates that "epistemological recognition and conviviality entail moving from assumptions to empirical substantiation of claims about Africa" (Nyamnjoh 2012a).

In order to do this, knowledge production must be guided by cognitive justice, as it "requires creating a space where traditionally excluded actors are not forced to conform to Western knowledge structures and standards" (Rodriguez, 2017). Creating such a space cannot be "realized without decolonizing methodology and research" (Ndlovu-Gatsheni 2018a). Chilisa echoes Visvanathan in defining decolonization of knowledge production as "a process of conducting research in such a way that the

worldviews of those who have suffered a long history of oppression and marginalization are given space to communicate from their frames of reference" (2012).

> This presupposes that knowledge is embedded in an ecology of knowledges, where each knowledge has its place, its claim to a cosmology, its sense as a form of life. (Visvanathan 1997)

Thus cognitive justice offers traditionally excluded actors a space for recognition for their knowledges. Dr Bagele Chilisa has long argued for scholars to contest the continued suppression, marginalization, and silencing of "knowledge systems of formerly colonised, historically marginalised, and oppressed groups" (Chilisa 2017; 2019). She acknowledges that the word indigenous has various meanings and has been differently applied, pointing out that even Euro-Western research paradigms are indigenous to Euro-Western societies (Chilisa 2019). Instead the questions she asks provide the answer we seek.

> What is indigenous to the other two-thirds majority of people colonized and marginalized by Eurocentric research paradigms? What is real to the diverse cultural groups of the two-thirds majority? How can this reality be studied? [...] Their ways of seeing reality, ways of knowing, and values systems are informed by their indigenous knowledge systems and shaped by the struggle to resist and survive the assault on their culture. That is what makes the methodologies indigenous. (Chilisa 2019:10)

The "assumptions about what counts as reality, knowledge, and values" guide the research process in the post colonial indigenous research paradigm (Chilisa 2019:10). Visvanathan's words provide a clear link between livelihoods, life chances, and knowledge systems viz.

> Knowledge is deeply connected to livelihood, life cycles, and lifestyles, shaping life chances of a people. (Visvanathan 1997)

Any experiments with methodologies for knowledge production that aims to provide cognitive justice for the knowledge of the *mama mboga*s must therefore align with post colonial research paradigms. Summarizing from Chilisa's work, one can describe a postcolonial indigenous research paradigm as one that characterized by potential for research as transformative healing, whose implementation plan is designed to provide the benefits of knowledge produced to the community involved, based on the

principles of relational ontologies, axiologies, and epistemologies of indigenous knowledge systems, and where such research is guided by the principles of accountable responsibility, respect, reciprocity, and the rights and regulations of the researched - the 4Rs (Chilisa 2019).

Implementing cognitive justice contributes a 5th R - recognition. Recognition of the plurality of ways of knowing, as the first step for designing the research plan, protocol, and its implementation programme opens the doors to inclusion of the "researched" community as knowledge producers (Nyamnjoh 2004). Letting go of power during knowledge production (Chilisa 2019; Smith 1999) is only possible when the ways of knowing of the "researched" are recognized and respected.

Knowledge production involving stakeholders from outside the academy is considered transdisciplinary. Transdisciplinarity emerged in the Euro-Western academy as a response to serious harms "caused by ignoring the uncertainty of scientific knowledge, by neglecting the users' knowledge, and by failing to consider contextual conditions of application" (Hadorn et al. 2008). When knowledge about a research context is uncertain and when the nature of the problem field itself is in dispute but there is a great deal involved for those concerned by these problems, then, Pohl & Hadorn (2007) suggest that conditions are met for transdisciplinarity. The empirical context of market women selling perishable fresh produce under pandemic conditions can thus be said to meet these conditions for a transdisciplinary approach.

Innovation foresight scholars Rasmussen, Andersen, & Borch describe the challenges posed to transdisciplinarity when creative thinking is required from stakeholder in order to extend their knowledge into the uncertainty of the future (2010). To attain desirable futures, in such a mode, skilled facilitation becomes critical "in order to create a space for dialogue and exploration in a contested territory" (2010) thereby inadvertently echoing decolonial scholars for a safe space. They distinguish between modes of knowledge production based on the degree of epistemic integration required and the stakeholders involved, as illustrated in Figure 1 (Rasmussen, Anderson, & Borch 2010:39).

<table>
<tr><th>STAKEHOLDERS INVOLVED</th><th>MODE OF KNOWLEDGE PRODUCTION</th><th>DEGREE OF EPISTEMIC INTEGRATION</th></tr>
<tr><td rowspan="3">Professional research practitioners, Scientists, doctoral students</td><td>MONO disciplinarity</td><td rowspan="2">Disciplinary identity maintained</td></tr>
<tr><td>MULTI disciplinarity</td></tr>
<tr><td>INTER disciplinarity</td><td rowspan="2">Transcendence of disciplinary mode</td></tr>
<tr><td>Non-scientists & scientists</td><td>TRANS disciplinarity</td></tr>
</table>

Figure 1: Redrawn by author for this paper from Rasmussen, Andersen, & Borch (2010)

For innovation, transdisciplinary knowledge production must include problem orientation and solution orientation (Rasmussen et al. 2010). However, when more than one knowledge system is involved, such as in the context of this empirical case, Chilisa points out challenges that still remain unaddressed, and they continue recreating inequities. In her words, with emphasis added:

> Transdisciplinarity **needs to forge bridges between** academic disciplines and Indigenous and Local Knowledge (ILK) systems. (Chilisa 2017)

How to forge bridges through cognitive justice that transcend not just disciplinary modes but the boundaries raised by epistemic hegemony, disciplinary identities, and the requirements of creating a safe shared space for participatory engagement and active dialogue across a plurality of knowledges motivates the author's dissertation. The empirical case is introduced through the prism of the pandemic as an opportunity to experiment with transcending *recognized* boundaries of ontology, epistemology and axiology in service of facilitating social transformation for the unlettered and the invisible in society.

Introducing the Empirical Case

When the global nature of Covid-19 was universally acknowledged in March 2020, the Kenyan government moved to contain the spread of disease by announcing a variety of measures, such as the closing of restaurants and eateries; closing Nairobi's borders to all but essential traffic; restrictions on gatherings and groups; closing of schools; and various other restrictions on travel, transportation, and regional markets. The informal sector bore the burden of these restrictions as job losses took their toll, slashing incomes by 60 per cent or more, reducing purchasing power across the board. Market women

faced tremendous pressure to sell perishable fruits and vegetables before they spoil. According to Wakholi et al (2015), approximately 70 per cent of all losses occur during storage and handling in the wholesale markets in pre-pandemic times. Regardless of the pandemic, the time pressure for perishable fresh produce to remain attractive for sale remains the same. Thus the risk profile of the entire informal perishable fresh produce ecosystem was disrupted. That is, traders' could not rely on accrued knowledge for estimating order quantities and timing of delivery. Wholesalers in Nairobi's Wakulima and Marikiti markets found themselves carrying the burden of risk as the pandemic's impact increased volatility of timing estimates for transportation and order quantities. At the other end of the urban food chain, *mama mboga*s selling handfuls of vegetables in Nairobi's informal settlements took the brunt of the social and economic impacts as their customers' purchasing power declined and the increased presence of jobless men raised crime and harassment. In their own words, they had their backs against the wall and their morale was severely affected in this time of isolation.

At this time, it could be said that crisis conditions were imminent for not only household food security but also the social and economic fabric of the informal settlements. Informal wholesale and retail trading provides incomes for 65 per cent of Kenyans, and is the largest sector within the informal economy that provides incomes for approximately 80 percent of Kenyans (KNBS, 2015; 2019). The majority of Nairobi's food purchases are from informal trade (Owuor et al. 2017) and the city's poorest citizens rely on them for food. Sales of fruit and vegetables is the leading source of income for many uneducated women in Nairobi's informal settlements (ibid). If this critical last mile failed to survive the pandemic, it could severely damage the communities' ability to bounce back and recover. This motivated the author to take practical action in April 2020 as introduced below.

The pandemic as an opportunity for innovation and design

The pandemic also transformed the landscape of social research and intervention programmes. The systemic shock was not confined to any particular region nor experienced only in'developing countries'.

The disease did not care if people were rich or poor. Humanitarian aid organizations pulled personnel out of 'less developed' locations, as donor countries experienced severe pressure on their social and healthcare systems. It looked unlikely that external aid could 'helicopter in' for this crisis. For the informal sector in particular, they were on their own without state support or formal safety nets. The duration of the pandemic was also unknown. What these conditions created was an opportunity for a social intervention designed to work without the presence of "experts".

That is, we were motivated by the pandemic's unique circumstances to interrogate convention - were external experts and their aid programmes even required for socio-economic transformation at the grassroots? Was innovation and design only for the educated? Could we spark long dormant creativity and agency for social change remotely? Could we, in fact, prepare the traders for an unknown duration of increased volatility of operating conditions and test an experimental approach for indigenous and autonomous development at the same time? The pandemic's systemic shock provided an unusual mix of conditions to ask these answers in real world conditions.

The author rapidly convened a consortium in April 2020 to facilitate funding to ask these questions while providing some immediate relief to the target audience. Partners were Humanity Kenya, an NGO led by Kenyan development leader Jeroteich Seii and K-Youth Media Foundation, a non-profit established by award winning Kenyan journalist James Smart to provide youth from Nairobi's informal settlements training in community journalism. Humanity Kenya raised a small rapid response grant from the feminist NGO Urgent Action Fund Kenya to address the immediate needs of 100 women from Nairobi's informal settlements - 50 would receive only a direct cash transfer, while the remainder would also be invited to participate in the experiment whose implementation was funded by Humanity Kenya.

Approach

The Nordic approach to social design aims to effect decisive, qualitative change in circumstances for disadvantaged groups by leveraging the capacities and skills of design in a participatory manner (Markussen, 2017; Koskinen, 2016; Ehn, 1993). Here, the object of design is the social - social structures, practices, processes, forms of action etc. (Koskinen 2016) rather than tangible artefacts of design. In this experiment the social process of transdisciplinary modes of knowledge production were the object of the designer's efforts. Social design resembles action research, albeit implemented by practising designers for knowledge production in service of social transformation.

> Action research is a process of doing, reflecting on the action, drawing conclusions, and then reflecting again on the [iterations made to the] process. (Chilisa 2019:269)

Action research also describes the iterative nature of design process. Concept design is tested in the real world in the form of working prototypes which are then revised based on feedback from end-users to improve performance. In the context of social design, the elements of the intervention - a sequence of three participatory sessions comprising a set of planned activities - are tested by running a pilot program for the facilitator team-in-training with a select group of participants. As a working prototype for social design, the pilot is itself a form of action research for facilitation. One could say that when the object of design is the social, then the design process comprises of multiple embedded loops of action research. In the example of the empirical case, the training programme for the local facilitation team, the selection and recruitment of participants, the tools designed specifically to meet the needs of irregular and unpredictable incomes (Author 2009; 2012b) and the workshop sessions and their sequence, each of these components are moving parts of the whole and are tested and revised prior to implementation for improving fit for purpose. In this paper, the author takes a closer look at facilitator training and skills development as a recognized and important component for facilitating creative thinking in response to uncertain futures in conditions of transdisciplinarity (Rasmussen et al 2010).

Building a Team of Innovation Facilitators

K-Youth Media Foundation's 2020 cohort of 6 trainees (hereonwards Team) would implement the social design experiment on the ground, working with the author over digital platforms for preparation and skills development. They were in their 20s and only one had a university degree - the son of an informal fish trader. He was unanimously designated team leader. The team would undergo a 7 week training to enable them to implement the intervention independently. For the team's benefit, the new skills were packaged as "design thinking" - a popular label - for addition to their portfolios. Team's training was held via Zoom digital platform. Lectures, additional readings, and group discussions occurred at least twice a week for 3 hours. Less detail is given here as much will be elaborated on further in the discussion.

The Design of the Social Intervention Experiment

Case studies on transdisciplinary modes for introducing novel methods and tools recommend sequential workshop sessions for facilitating participants' grasp of new creative practices (Sautier et al. 2017). Single sessions will not suffice, and three unrelated workshop sessions would not have the same impact as a well-designed sequence (*ibid*). Pandemic conditions set design constraints and criteria. Focusing only on immediate needs would be insufficient for longer lasting self determined transformation. What could be provided - rapidly and accessibly - to facilitate participants' ability to plan and implement self-determined transformations through innovation in the long run? Table 1 which summarizes the intervention design followed by brief descriptions of each session.

Table 1: Concept Design of Social Intervention

Sequence Aims	Session Goals	Wholesalers Programme (B2B)	Vendors Programme (B2C)
First: Immediate Need -> Sensemaking Social Solidarity	Navigate Problem Space and identify challenges within their control to address through action.	Visual tool to facilitate collaborative identification of bottlenecks and breakdowns in supply chain for wholesalers.	Group discussion on pandemic related challenges followed by facilitated activity to identify issues within one's control
Second: Intermediate Need -> Enhance resilience of livelihoods	Planning Ahead and Goal Setting - Novel tools introduced	Tool to facilitate financial planning known as "Livelihood Priority Map"; Tool to facilitate roadmap of actions to address operational problems identified in first session	"Livelihood Priority Map"; Goal setting and making roadmap of actions for self-determined transformation and development
Third: Long term inspiration for innovation and transformation	Digitalization and the contactless economy selected as pandemic themes	Introduction to social media for business and Kenyan platforms that connect farmers directly to buyers.	Idea generation and group discussions on using mobile phones in creative ways in business.

Introductory Session (Workshop 1): This workshop was designed to meet the immediate need of making sense of the operating environment in the aftermath of the pandemic's systemic shock. A collaborative sensemaking tool was used for wholesalers to facilitate identification of points of breakdown in their regional supply and demand ecosystem for recovery and resilience. For the mama mbogas, solidarity and morale were more critical as they worked alone and sourced their supplies from the wholesalers. A facilitated group activity helped them arrive at a list of problems that were within their capacity to control as opposed to those externally created and outside their control for ex. curfew.

Intermediate Session (Workshop 2): Thinking tools were introduced to facilitate goal setting, prioritizing goals against cash flows, and the Livelihood Priority Map (LPM), a tool to help manage irregular cash flows in volatile conditions for expenses and purchase of vegetables for sale. The tool was designed by the author specifically to enhance traders' ability to manage cash flows in conditions of increased volatility and unpredictability based on more than a decade of work on informal economic systems.

Inspiration Session (Workshop 3): To inspire new ideas for business development and revenue growth as well as to inspire innovation long after the intervention program was over. In light of the ongoing pandemic the themes were digitalization and contactless commerce, introducing the mobile phone as a business tool. A Kenyan social platform (Mkulima Young) was demonstrated by the team to show how vegetable trade could be conducted online.

To accommodate differences in scale and mode of operations two separate sequences - one for wholesalers (B2B) and one for *mama mboga*s (B2C) were outlined. Each workshop was 2 to 3 hours long and elements were often switched between workshop 2 and 3 for time management under curfew.

Profile of Participating Vegetable Vendors and Traders

The team recruited from their own informal settlements as well as Nairobi's main wholesale markets. Table 3 below gives a snapshot of participants' risk profiles, group formation by produce category and selected locations. A total of 8 groups - two for each of the four produce categories were formed to participate together for the entire sequence. The two groups from tomato category were selected for the pilot program to test the prototype. Purposive recruitment means a willing wholesaler was asked to provide names of other traders to form their group. Random means mama mbogas were invited as individuals. It was felt wholesalers might not be comfortable revealing business details among a group of strangers, while mama mbogas operate independently of each other in the residential areas. Only 4 participants were men, primarily onion wholesalers and one banana vendor from the industrial area. Approximately 5-7 of the 50 invitees had completed a full 8 years of primary schooling.

Table 3: Participants and their risk profile across perishable fresh produce categories

Fresh Produce Category ranked in order of perishability	Lifespan without cold storage for profitable sales *after* arrival from farm	Source region for wholesalers	Trader's Role in the last mile of informal urban food system	Number in each group recruited (target n=50)	Location in Nairobi selected by team	Recruitment Strategy
Leafy greens (Kales)	24 hours	Peri-urban and rural farms near to Nairobi	Wholesalers	5	Korogocho Market	Purposive
			Vegetable vendors (Mama Mboga)	8	Korogocho	Random across Korogocho's 9 subvillages.
Tomatoes	3 to 4 days	Kenya, Tanzania, Uganda, Ethiopia	Wholesalers	4	Marikiti Wholesale market	Existing cooperative invited together
			Vegetable vendors	8	Mathare Valley	Random
Bananas	1 week if harvested in timely manner	Meru regional market, Kenya	Wholesalers	4	Korogocho	Purposive
			Street vendors of bananas	8	Industrial Area/Baba Dogo	Random
Onions	Between one and two weeks if well dried.	Kenya, Tanzania, Ethiopia	Wholesalers	5	Marikiti Wholesale market	Purposive
			Vegetable Vendors	8	Donholm	Random

Longitudinal Survey of participant outcomes

Follow up was conducted in May and June of 2021, more than 9 months after the last session ended on 1st September 2020. Of the 46 participants who completed their sequence, only 32 could be reached.

The team member conducting survey believes this may be due to a change in SIM or lack of phone. Some she met in person. Her notes also capture observations of their business. Followup questions were design to uncover evidence of transformation of their existing business practices, adoption of any novel practices, tools, or techniques introduced in the sessions, and whether they met with others to share ideas i.e. impact of the collaborative and social nature of the intervention. The demographic distribution of the respondents reflects that of the whole set. Two were men. The surveyor translated and transcribed the responses before emailing them to the author. 10 respondents were shortlisted for video interview in October 2021 on their experiences and current situation.

Data Analysis

For this paper, simple codes were used to identify those results which compare participant outcomes to the original aims of the intervention. These are tabulated below in Table 3.

Table 3: Participant Outcomes from Longitudinal Survey Data

Indicators of Social and/or Economic Transformation	Respondents (n=32)	Author's Notes
Total who made at least one significant change in established practice still in evidence one year later	31 (96.85%)	Change includes tool adoption, technology utilization, or behavioural changes in established practice of informal vegetable trade
Number who began calling customers	25 (78.12%)	Proactively going against established practice
Number who have customers calling them	10 (31.25%)	5 are vegetable vendors with domestic customers
Number experimenting with social media for sales	4 (12.5%)	Only wholesalers who comprise 12/32 respondents
Number using camera	5 (15.6%)	One mama mboga sends photos of fresh produce to facilitate home delivery to customers
Total number adopting any novel tool or technique	28 (87.5%)	Includes 1 mama mboga who purchased a phone
Number who adopted Livelihood Priority Map (LPM)	21 (65.6%)	Thinking tool using pen & paper
mentions "helps with saving"	10 (31.3%)	Transforms own financial practices
mentions "helps with planning"	17 (53.1%)	Transforms own inventory management
attributes LPM to resilience in "hard times"	9 (28.12%)	Survey conducted 3 waves of pandemic later
Total Innovation-driven Transformation	18 (56.3%)	Those who transformed their operations during pandemic (growth, expansion), not just survived.
number who provided evidence of business growth	9 (28.12%)	In revenues or in operations (expansion, upgrade)
number evidencing resilience	15 (46.87%)	9 explicit mentions attribute participation
number evidencing both growth and resilience	7 (21.87%)	Includes interviewer's own observation notes
Total whose business operations survived pandemic	31 (96.85%)	1 was not working due to illness at survey time

From the 32 respondents, 31 of them made at least one significant change to customary and established trading practices - a transformation they attribute to their participation in the innovation and creative skills program. Significant change was coded by the author based on evidence of novel tool adoption, innovative use of technology, or operational changes such as making home deliveries in response to a telephone order. The majority of respondents (31) had come through three waves of pandemic with their business operations intact even in not the same shape as previously. Proactively calling customers (25) is considered a significant change in social practice, particularly among the *mama mboga*s. In group discussions, facilitators met extreme resistance to the idea from mama *mboga*s in particular. They ran a micro-experiment independently offering the pilot group of 8 vendors low value airtime vouchers to test the idea for themselves and report back the following week. The results surprised everyone - the worst outcome reported was three new sales, everyone else did better. The impact of this testing of an idea, itself evidence of the team's adoption of design thinking, can be found in the video interview of the oldest participant (age 70 in 2020) in the micro-experiment.

> "Now when I'm tired and do not want to go to the market, I just call my supplier in the market and have the goods delivered to me, then I give a call to my customers who come buy."
>
> *Mama Mboga, age 71, October 2021*

Even after a year, 21 of 32 respondents (65.6 per cent) were using the LPM tool for planning, for ex. the quantity of produce purchased as well as frequency of restocking. This can be interpreted as operational innovation, as well as a transformative change in established practice. Many who did not adopt the LPM experimented with using their phone in a variety of ways. This pattern correlates to their risk profile. Those who credited the LPM with "helping us get through in hard times" (9/32) were mostly *mama mboga*s from high risk produce, for ex. kales, which have a shelf life of 24 hours under the hot sun before they wilt too much to be profitable (see Table 1). On the other hand, wholesalers of onions (Video 1) or bananas (Video 5) - both having longer shelf life, experimented with sending photographs of new stocks on social media and using mobile money to complete a contactless transaction cycle. They had converted their smartphones into a business tool that was useful for accelerating cash flows.

Over half the respondents (18 of 32) evidenced innovation-driven transformations. These vary from product innovation eg. bundling ginger & lemon together and marketing it for anti-Covid-19 wellbeing, to diversification for risk mitigation eg. adding a line of mosquito nets to banana trade. One showed off the achievement of meeting goal set during the session of opening a second shop while others transformed their business entirely in response to changes in operating conditions.

> "Initially I used to sell only onions. But the market changed after intercounty lockdown was lifted and I realized I had not made a profit from onions. It was this moment that I decided to change."
>
> *Wholesaler, age X, October 2021*

At least half, (16 of 32) were able to transform their social and economic circumstances beyond simply survival. Growth was coded from a range of evidence such as renting a kiosk instead of selling from a tarpaulin on the ground, to opening a second shop or establishing an entirely new activity such as the banana vendor who used knowledge acquired through the farmer market app to begin telephone farming upcountry. At least 2 respondents mentioned revenues were back to pre-covid levels.

> "I got to learn and practice how to save. I was able to save my small earnings from my mboga kiosk till they were significant enough for me to open this *mali mali* shop. The most important thing is for you to have confidence and self-belief in your business. "
>
> *Mama mboga age 37, October 2021*

The picture painted by the voices of the participants refutes their representation as hapless victims unable to "coordinate the social and economic environment" (Kinyanjui 2010). Evidencing a willingness to learn and experiment with novel tools - both for creative thinking as well existing such as the mobile phone, Nairobi's mama mbogas and wholesalers could be said to have been motivated to innovate in response to the imperative for social transformation created by the pandemic conditions.

Discussion of Outcomes

Were these participant outcomes due to the technical design of the social intervention (an experiment) or were they a result of the facilitation? If it is due to the latter rather than the former, then it raises questions on transdisciplinarity as it is conceptualized today and the assumptions made on stakeholders and their ways of knowing (Chilisa 2017). The author has pondered the answers to this question for the past two years ago - diving not only into the data but also introspecting deeply on the way the team's training was conducted, the reflective video received from facilitators, as well as through conversations with team members, particularly the team leader. After a long process of reflection and study, the following response can now be arrived at as a best case answer to an unbounded subjective question involving multiple knowledges, not to mention disease, distance, and demographic differences. Beginning with a participant's own reflection:

> "Personally, I can say the sessions were helpful because I did not know that mama mbogas were recognized as business people. Mostly, mama mbogas are looked down on by society because maybe they are not well educated so society thinks they have no other options but to become mama mbogas. But what your program did, was **make me feel proud of myself**. It made me feel seen, recognized and respected and that I can better myself through my business."
>
> *Mama Mboga, age 37, public video interview, October 2021*

In all important ways but one, the author's implemented process for transdisciplinary knowledge production serendipitously (albeit inadvertently, given the author approached the problem space through the dissertation field of innovation and design engineering rather than the social sciences) met the aims of the formal definition of participatory action research that is transformative in intent (Chilisa 2019:275-276) as articulated below:

> The poor and the exploited are empowered to believe in themselves and to have the confidence and the will to conduct research on their own reality using their ways of knowing and to use the research findings to embark on positive social change. (Chilisa 2019:275)

From the perspective of practice-based design research this serendipity can be considered part of the research results since the path to design of the intervention was from outside the knowledge base for

social sciences in post-colonial contexts. Thus the author notes that while much of what has been discovered may already be familiar to readers; from the perspective of the author's dissertation these outcomes contribute to important gaps in transdisciplinary product development. Here, the empirical evidence in the voice of the people which may be of contributory value. Elements of this definition are tabulated below against substantiation from the empirical case for clarity before further discussion.

Table 4: Comparison of empirical case design against formal definition

Definition of participatory action research with intent for transformation (from Chilisa 2019:276)	**Substantiation from the Remote Resilience Project** (the author's experimental social intervention design for pandemic times)
Involves a whole range of powerless groups of people	Target audience were mama mbogas and their suppliers. Wholesalers in this supply chain tend to work their way up from street vending. The novice facilitator team comprised youth from their own communities.
Involves the full and active participation of the community in the entire research process.	The novice facilitation team were responsible for all activities in Nairobi. They were involved in program design and knowledge production.
Subject of research originates in the community itself, and the problem is defined, analyzed, and solved by the community.	Workshop 1 was designed to facilitate participants' own capacity to identify the subject of their own research through a guided problem space navigation process.
Ultimate goal is the radical transformation of social reality and the improvement of the lives of the people themselves. The beneficiaries of the research are members of the community.	This experiment's aim was to test popular deficit-laden damage focused assumptions. Was a vegetable woman from an African slum capable of innovation - operational or technological or both? Could the design process empower them if indeed design was the miracle cure it was purported to be? And, did "the poor African" need foreigners for development and empowerment?
The process can create greater awareness in the people of their own resources and mobilize them for self-reliant development.	This was the explicit aim for Workshop 1 - to help participants make sense of the first shock through a facilitated exercise and identify issues within their control to address or change.
Participation of the community in the research process facilitates a more accurate and authentic analysis of social reality, making it a more scientific method of research	There were multiple concurrent streams of knowledge production in action - the author's aims; the knowledge created within the community during the intervention workshops; and the knowledge created by facilitators during their skills development process. This is elaborated in discussion section.
The researcher is a committed participant and learner in the process of research, i.e. a militant rather than a detached observer.	This is the element in the formal definition that the author considers to be an outlier in the empirical case design. Was the author a participant in the knowledge production process with the target audience? No. The author was clearly a remote actor due to the constraints of the pandemic and had to learn to let go of control over the process of participatory research in order for it to succeed. On the other hand, the author was certainly a committed participant and learner in the process of skills development for the young team of facilitators but only through the prism of the technological intermediation necessitated by the pandemic. That is, the community controlled the author's access to the knowledge production process and its outcomes

Picking up on the exception that author was not present during the knowledge production activities with the vegetable traders, one can conjecture then that the young team of facilitators from the participants own communities who were rapidly enskilled in the basics of the design process and the innovation practices may have been instrumental in the unexpected success of the experiment. Unexpected because human behaviours are not easy to change and certainly one sequence of three workshops conducted during a pandemic could hardly be expected to achieve anything more than providing a safe space for participants to gather and share their own challenges, eat a hot meal with meat and receive the emergency cash grant. With this mindset, the author and the team of facilitators approached the intervention with confidence to experiment with a supportive environment for failure.

To pursue this line of reasoning further, the author introduces one more point from the first follow up survey. The surveyor also noted those respondents who were "eager to talk" rather than simply replying in monosyllables. At least 14 of the 32 (43.75 per cent) were clearly eager to talk and only 3 gave short pointed answers. The remaining 15 did not demonstrate any noteworthy feelings one way or another. However, 10 of these 15 attributed their business growth and/or increased motivation to their participation and the new tools they had picked up. That is, one could say that 29 of the 32 participants evidenced a positive experience - a factor that one can correlate to facilitation, in line with scholarship in participatory design. Light & Akama (2012) clearly explicate, using empirical evidence from case studies of a similar context of a natural disaster, it was not the methods and techniques introduced that made a difference but the human touch, i.e. the quality of facilitation. According to them, it is the social aspects of the participatory process that have the greatest bearing on participants' experience of the intervention (Light & Akama 2012).

The contributions to decolonization and to transformative impact of the participatory intervention design can now be considered through the lens of the local facilitator team who helped the author forge a transdisciplinary bridge, as Chilisa advocates (2017), between design methods and innovation

practices from the Euro-Western academy and their own Indigenous and Local Knowledge (ILK) systems. The training programme emphasised the iterative and discovery-driven nature of the design process, and the key takeaways were creative practices such as prototyping and testing ideas, experimenting to see what might work, developing a robust willingness to fail, and learning by doing. Expectations were set for contextual flexibility rather than rigid adherence to the author's concept design (on paper) of the sequence and plan of activities. This flexibility was necessary was due the nature of the task involved in forging such a bridge. Cognitive justice's imperative for active engagement across boundaries of knowledge systems meant epistemological, ontological, and axiological boundaries had to be transcended in order to be comprehended.

1. Forging a Language Bridge Together Enabled a Transfer of Power

Use of the language of the people (Chilisa 2019; Ndlovu-Gatsheni 2018b; Ngugi wa Thiong'o) can be said to have transferred power from the author to the young facilitators. This occurred during the prototype testing process where the Tomato category groups of vendors and traders were selected for a closely guided pilot of the workshop sessions and the testing of every selected technique and practice comprising each workshop including the novel tools designed for financial management in economic informality (the LPM). In training, phrases such as "Horizon Scanning" and "Brainstorming" would dissolve the novice facilitators into gales of laughter as they struggled to wrap their tongues around unfamiliar words. To facilitate their rapid grasp of novel concepts well enough to introduce in another language to the participants, most of whom had not completed primary school, it rapidly became clear to the author that terminology and jargon long taken for granted were not fit for purpose. Simply translating "brainstorming" into Swahili for example would still be meaningless to facilitators and participants alike if they were unaware of the concept behind the word - a collaborative practice of idea generation. Similarly, for stakeholders involved in transdisciplinary knowledge production who were unfamiliar with the use of sticky notes and flipcharts (or whiteboards) taken for granted as tools for

creative expression, simply requesting the team to make these workshop materials available during the sessions would achieve nothing more than a cargo cult version of a "design thinking workshop".

Forging this language bridge - the language of design and innovation not just the shared language of English - was an unexpected preparatory task that forced the author to reflect deeply on the nature and purpose of design methods taken for granted. The bar was raised all the more so by the incisive questions posed in class, particularly by the young team leader who had informally taken on the task of helping the rest of the team understand all the new knowledge and concepts flowing their way over a digital platform. Only the bare bones stripped of jargon would suffice, demonstrating the need to drill down to first principles. Only tools and methods that could be rapidly grasped would be robust enough to survive the two step flow of information required by this boundary spanning activity in the innovation process (Tushman 1977). The author could not rely on the word "brainstorming" to convey the intent but had to explain the underpinning rationale for this activity, and the aim or function of every new tool or method or process. This was so that when the team communicated with the participants they would be able to achieve the intended aims and the outcomes of the concept design regardless of what language they used to facilitate the sessions with the participants. The iterative process of prototyping also helped clarify choice of creative techniques and practices selected for each session. The feedback after each pilot session was instrumental in adapting concepts and tools for building bridges across knowledge system. Facilitation was conducted in a mix of Swahili and Sheng (Githiora 2002) - literally the languages of the people in Nairobi's informal settlements.

Agency for all decision making during the knowledge production process was therefore also devolved to the facilitators. On the ground, the power struggle between "researcher" and "researched" that Chilisa calls for us to problematize for decolonizing methodologies (2019:X) was defused by the power that language put in the hands of the young team. Incorporating the young team's inputs and feedback into design changes contributed to their confidence as valued members of the project and reflected back to

them their own sense of their agency for creativity and innovation. Ownership also allowed the team to plan sessions based on relationships and social networks - relationality being a critical component of any post-colonial indigenous research paradigm (Chilisa 2019). As the team leader said: "The most difficult session for us to facilitate was the one where none of us had a personal contact or residence to help us connect with participants." They had literally chosen to return to the base as their first way forward (Ndlovu-Gatsheni 2018b).

2. Clarifying Roles Facilitated Cognitive Justice

Again, it was the young team's commitment to learning new skills that led to the recognition and respect offered to the participants being made explicit, beyond that which had been embedded in the design of the sessions and the LPM tool. After the very first prototype workshop, one of the facilitators asked the author during the feedback session what he should do when he feels lost for words in response to participant questions. He felt pressure to give them advice on their business but he knew nothing about selling vegetables. What his question raised was a need for the author to clarify and scope the facilitator's role in this experimental intervention and situate the expertise and experience of the participants. Standing up in front of a group can be daunting at the best of times, all the more so when the group had been sharing all their problems and challenges in the first session. He felt the mama mbogas were looking to him for answers.

In design studies, one of the guiding principles of participatory design research approaches is to situate the non-designer/researcher participants as the "experts of their own experience" (Dell'Era and Landoni, 2014). That is, the participants were the experts with the experience in vegetable vending not the facilitators. It was not necessary, given that their facilitation skills training was based on design principles, for the facilitator to have answers, nor was it expected of him. He should not feel that way. Instead, as an expert in "collaborative innovation facilitation" he should see his role as a facilitator of participants' own journey of solution discovery through experimentation and innovation. Here, he could

leverage his natural curiosity to ask them questions framed in such a way as to make them think in new ways. Offer them assistance with the new tools and practices. And guide them with cues. This took the pressure off him to be the expert in the room in technical or domain specific knowledge and instead focus on facilitating participants' creativity and its expression through innovation practices. The team was inspired by this clarification to use it as the opening introduction with the rest of the groups as it recognized their own knowledge separately. The team leader pointed out the benefits of this:

> "Because Mike (his co-facilitator) would always start our sessions by saying "Mama, we don't know anything about the vegetable trade, you are the experts, we are just here to learn from you" I think the mama mbogas were emboldened to discuss ideas openly and without fear during this challenging time and also gained confidence to push back on the ideas we suggested if they didn't make sense. They felt safe to even reject them." (*Call with author, 5th August 2023*).

Clarification of roles and scoping of expertise areas during the training sessions contributed to the team's confidence in implementing the rest of the sessions independently. More importantly, making the case for participants' expertise through an illustrated slide presentation on informal traders (see Author 2017) also facilitated a significant shift in the team's perspective of *mama mboga*s as valued and important members to their communities, thereby fostering the experience of respect and recognition. From the team reflection video [0:32min]:

> "It was just I think an eye opener, I was like, wow, they are trying to understand what the ladies who are in informal market are going through ... These are people who would normally not be considered by anyone doing research because they are at the bottom of the scale compared to the big people in big industries. And so I was like maybe this is really interesting."
>
> *Facilitator Team Member, Reflection Video, October 2020*

And an echoing statement from a mama mboga's exit interview, translated by a team member:

"Before the sessions I never thought we are an important segment of our economy. With the sessions we felt appreciated, valued, and treated like an important member of society who contributes to the economy and the food chain in the country."

Mama Mboga, age 58, exit interview, August 2020

One could make the case for cognitive justice as paving the way for forging bridges across knowledges.

Concluding Statements and A Way Forward

The covid-19 pandemic offered an unprecedented opportunity for experimenting with a rapid response to enhance resilience and facilitate self-determined transformation among vegetable vendors in Nairobi's slums. The author introduced design and innovation in a participatory social intervention centering the creative spark inherent in humankind since our ancestors first put fingertips dipped in ochre on the walls of a cave. The team of 6 youth from the same communities completed 26 workshops with 8 groups in July and August 2020. Based on longitudinal data collected in May-June 2021 and video interviews conducted October 2021, the author situates the design research experiment as an unexpectedly successful example of the formal definition of participatory action research with transformative intent using Bagele Chilisa's definition (2019) with one distinctive outlier. Due to pandemic travel restrictions, the "researcher" was not present during knowledge production and bridges across knowledge systems were forged by innovation facilitators in their role as boundary spanners (Tushman 1977). Factors seen to be contributing to outcomes are summarized below:

1. Transcending boundaries of Languages, both disciplinary and local.
2. Transferring Power through a live test of the intervention design considered as a working prototype.
3. Respecting Expertise and Knowledge among stakeholders without equivalent or comparable education.
4. Recognition of an Ecology Knowledges and facilitating Active Engagement between them.

Language, Power, and Respect are core principles for any post-colonial mode of knowledge production that involves the mass of the people (Nyamnjoh 2004b; Kinyanjui 2010; Chilisa 2017; Ndlovu-Gatsheni 2018; Chilisa 2019; Smith 1999). Recognition of a plurality of knowledges, as advocated by Shiv Visvanathan allowed the intervention to be designed to devolve control over the knowledge production process to stakeholders. The results speak for themselves. Transdisciplinarity recognizes that such modes of knowledge production will never meet scientific standards of the Euro-Western academy, but the empirical case demonstrates their potential to motivate self-determined journeys of transformation through innovation beyond the "educated". Cognitive justice therefore speaks to epistemic freedom that strives to transcend boundaries of entire knowledge systems (Odora Hoppers 2021).

A next way forward might be to offer tentative additions to Figure 1 to make explicit the additional cognitive labour involved for scientists, academic researchers, practitioners and other specialist experts involved in modes of knowledge production with stakeholders not only from outside the academy (transdisciplinary) but also those from beyond the entire knowledge system (transcendental). This makes visible the effort invested in transcending ontological, epistemic and axiological boundaries to redesign or adapt established tools and practices for knowledge production for better fit for purpose. Transcendence is the condition of being that is outside or beyond (Lippens & Hardie-Bick 2012:1) and the boundaries here are more than simply inter-disciplinary ones. Simple acknowledgement of working across disciplinary boundaries when non-scientists are included in knowledge production may not be sufficient to raise the importance of the nature of the task, particularly when active dialogue is required between knowledge systems in order to prevent serious harms (Hadorn et al. 2008). Knowledge production in an ecology of knowledges (Santos 2014; Coolsaet 2016) must necessarily transcend more than disciplinary modes, it must transcend the boundaries of "knowledge" itself in order to cocreate knowledge that ultimately benefits society first and foremost. Figure 2 below makes this transboundary work explicit.

<table>
<tr><th>STAKEHOLDERS INVOLVED</th><th>MODE OF KNOWLEDGE PRODUCTION</th><th>DEGREE of EPISTEMIC INTEGRATION</th></tr>
<tr><td rowspan="3">Professional research practitioners, Scientists, doctoral students</td><td>MONO disciplinarity</td><td rowspan="2">Disciplinary identity maintained</td></tr>
<tr><td>MULTI disciplinarity</td></tr>
<tr><td>INTER disciplinarity</td><td rowspan="2">Transcendence of disciplinary mode</td></tr>
<tr><td>Non-scientists & scientists (within a shared knowledge system)</td><td>TRANS disciplinarity</td></tr>
<tr><td>Inclusive of groups who may not share knowledge system and/or formal education</td><td>TRANS boundary</td><td>Transcendence of ontological, epistemic & axiological boundaries</td></tr>
</table>

Figure 2: Transcending boundaries for cognitive justice in practice (addition by author)

Chilisa cites post-colonial intellectuals such as wa Thiong'o and Mazrui on the importance of language in the knowledge production process (2019:15). However, as the experience of the author shows, in this empirical case, the task of converting a program into the language of the people had to be interpreted in more than one way. That is, not only conversion into the actual languages involved such as English, Sheng, and Swahili; but also the task of democratizing expert knowledges and practices. Tools and techniques must fit the shared lifeworld of the facilitators and the participants, not that of the research. This epistemic response to the imperative for social transformation brought about by the conditions and constraints of the pandemic could only be made possible through cognitive justice - recognition that there are more ways to knowledge than just one (Santos, Nunes, & Meneses 2007). And the imperative for active engagement between knowledge systems (Visvanathan 1997). The addition of Sheng to Swahili by the young urban Kenyan team hints at the code-switching nature (Mazrui 1995) of this task. Transcending boundaries between knowledge systems is now seen as critical by the academy but as Chilisa points out (2017), multiple issues still remain to be addressed in the context of African peoples, and the continent's own sustainability challenges. This paper's contribution is only one step towards a cognitive justice-based framework for innovation-led transformation that transcends the boundaries of what is considered knowledge itself for liberation from the tyranny of dominant logic that denies peoples their own creative spark for innovation.

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