LOCAL SERVICES AND TECHNOLOGIES: MEANINGFUL CONNECTIVITY FROM A COMMUNITY-CENTRED PERSPECTIVE

APC
ASSOCIATION FOR PROGRESSIVE COMMUNICATIONS

RHIZOMATICA

TABLE OF CONTENTS

Local services and technologies: Meaningful connectivity from a community-centred perspective

Authors
Nils Brock
Bruna Zanolli
Kathleen Diga

Copy editing
Zara Ismail

Proofreading
Sugandhi Ravindranathan
Lynn Welburn

Layout and design
Cathy Chen

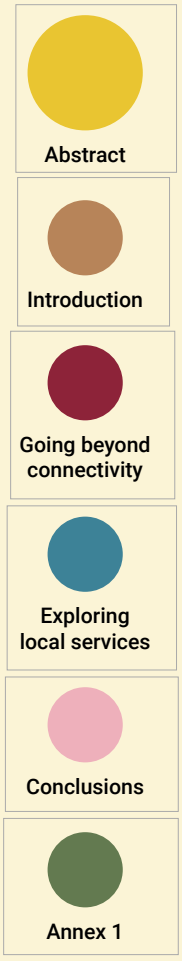
Acknowledgements

We would like to acknowledge the substantive inputs from our Local Networks (LocNet) community and team members, specifically the collective inputs from the 2023 in-person LocNet team meeting, interviews with LocNet regional coordinators Sarbani Belur, Catherine Kyalo, Josephine Miliza, Talant Sultanov and Lilian Chamorro, and comments on various drafts from Carlos Rey-Moreno and Peter Bloom.

This paper was produced as part of the "Meaningful community-centred connectivity" project being implemented by APC, Rhizomatica and partners within the LocNet initiative with financial support from the Swedish International Development Cooperation Agency (Sida) and UK International Development from the UK Government through its Digital Access Programme. The views expressed here do not necessarily reflect the supporters' views.

The Local Networks (LocNet) initiative is a collective effort led by APC and Rhizomatica in partnership with people and organisations in the global South to directly support community networks and to contribute to an enabling ecosystem for their emergence and growth.

1. ABSTRACT: PURPOSE OF PAPER



This paper's aim is for the Local Networks initiative (LocNet) team to internally reflect on and better articulate the work we do around local innovation for community networks.[1] Specifically, we look at these activities to inform our future approaches, particularly around local services and technologies for community-centred connectivity initiatives.[2] This paper addresses a recommendation from the 2022 LocNet external evaluation report stating that a further exploration of current and desired usage of local services and technologies[3] would be important for the next LocNet phase.

Global definitions of connectivity fall short when expressing community-centred perspectives, because they are guided by top-down mechanisms. The reality is that grassroots communities have a strong understanding of what is meaningful or of high value to them. Those with a community-oriented approach are centring a local definition of "meaning" as their starting point. Our role in LocNet is to find ways to strengthen local ties, well-being and digital activities attached to on-the-ground definitions of meaning and value.

Over the last five years, the LocNet initiative has been communicated as a "connecting the unconnected" concept, emphasising a community-driven approach to universal connectivity projects. We want to clearly state that while this fundamental aspect of connectivity is important, in order to achieve community-centred connectivity, it needs to go hand in hand with multiple locally involved processes at the community level – be they technical, organisational and/or social aspects. Between 2018 and 2023, the LocNet team worked on community-level projects that, at times, went over and beyond connectivity to specifically address the identified needs of a community. This more holistic effort contributed towards us realising that

1. A community network is an internet access infrastructure set up, owned and/or run by a local community for the community's benefit.
2. Community-centred connectivity initiatives are shaped by the community in a manner that reflects its various interests and relationships, even if the community does not directly provide the infrastructure and services itself. This is slightly different from a community network due to the nature of operations and ownership. Community-centred initiatives can also be a starting point for a community network, gradually approaching the latter's defining criteria.
3. By local technologies we mean both analogue and digital solutions that are part of the passive and active infrastructure of community-centred approaches to meaningful connectivity and local services.

universal connectivity is not our only target. A collective stocktaking of what is meaningful for local people, and of their demands for a better quality of life, can be done. Then, corresponding action or activities can be translated into local services and technologies.

In this next phase (2024 onward), we would like to better articulate these complementary processes: not just what it means to work on connectivity, but also to describe the participatory approaches and activities that are informed by the community. The idea is that by addressing community demand or even local "analogue" needs through local services and technologies, greater use and application of community-centred connectivity can be catalysed.

In order to make this argument, in this paper we try to unpack specific terms and approaches. Firstly, this document lays out what "meaningful access" and "value-added services" mean relative to existing global definitions. Our departure point is to state that democratic principles and community participation are fundamental values in the LocNet approach. These aspects differentiate LocNet's approach from other global approaches. We recommend the use of the terms "meaningful community-centred connectivity" as well as "local services and technologies" for the purposes of the LocNet initiative. Secondly, we share what we have learned in the last five years from implementing the LocNet initiative's local services and technologies work. We reflect on the lessons of how community demand or understanding a community's needs can lead to implementing appropriate local services and technologies. We share not only the local services LocNet identified as being particularly useful, but also how these services go beyond connectivity, and how they are grounded and "re-localised" – "re-localise" refers to a re-imagining of the community notion of local services and technologies.[4] Thirdly, a discussion section reflects on what considerations should be taken when internet connectivity advances within a community. Specifically, communities can reach a state of maturity around local services and technologies, and there will be decisions around next steps such as what to do with local content or the possible demands of a higher quality of internet connectivity. We finally close the paper with recommendations and next steps when considering local services and technologies for the next phase of the LocNet initiative.

4. We also explain the "re-localise" process and activities involved in returning control of a connection to the hands of the people. When doing so, we ground the work through a hand-in-hand accompaniment centred on locally defined starting points, whether this be around community mobilisation, assessments or providing information to help decide on appropriate connectivity options.

2. INTRODUCTION: THE EMERGENCE OF MEANINGFUL COMMUNITY-CENTRED CONNECTIVITY

During the last five years, we stated that LocNet's primary purpose was to extend internet connectivity to unconnected, geographically remote areas.[5] In practice, however, this narrative did not sufficiently define the complementary local services and technologies work LocNet has been undertaking with grassroots communities and certain community network (CN) support organisations.[6]

The LocNet initiative has, from the start, taken an ecosystem approach, with the ultimate goal of creating an enabling environment for community networks. We worked with specific partners, whether by providing direct funding to a CN project, or through accompaniment, advice and facilitated dialogues. This holistic approach highlighted areas where we envisioned change could happen: for example, we thought that through creating a peer learning group of CN support organisations, learning and technical work around on-the-ground realities could be shared. We anticipated that a peer network would allow the exchange of lessons between member organisations or be a space of mutual support. Other areas where we envisioned change include accompanying CN support organisations who facilitate training and mentorship projects for communities, participating in enabling policy and regulation activities, and demonstrating community innovation through locally adapted and customised technology, innovation and sustainability practices and activities targeted for gender-transformative practices and women's participation.

Over time, we started to see various results from these contributions, such as support organisations mobilising and

5. We note that several of LocNet's projects did test technologies in areas where there is mobile connectivity, but there may have been other barriers to access such as affordability, poor speed or quality of connection, and so on.
6. We refer to the 2024-2027 Strategic Plan to define "support organisations" as the entities who will be accompanying communities through various processes towards their community-centred connectivity, whether it be community mobilisation/awareness raising, capacity building, technical accompaniment, policy contributions/endorsements, etc.

engaging grassroots communities on their collective dreams, desires and ideas. In some cases, CN support organisation representatives, from both inside and outside a community, were able to carry out purpose-driven training and mentorship activities. In many cases, the training related to identified needs, whether it was the internet or communications' technical design aspects, or building social business model cases. Based on these identified needs, small projects were supported. Some wanted to improve their community mobilisation efforts, others wanted improvement of their infrastructure or a better understanding of digital local services that could be offered within the community, and there were those who wanted to strengthen their internal capacity as an organisation. Some CN support organisations also integrated processes to ensure women's representation within communities, while others engaged in more transformative discussions around intra-household dynamics, gendered roles and gender-based violence. There was an effort in each region and, to a smaller extent, across the Global South – increasingly understood as the "Global Majority" – to bring these same CN support organisations together to share their experiences and count on each other for learning and exchange. Finally, some CN support organisations have worked hand in hand with the LocNet team to provide evidence of CN models and their successes and challenges, influencing different policy and regulatory regimes at the local, national, regional and/or global levels.

This paper on local services and technologies homes in on these lessons, specifically those around a narrative that centres community work at the grassroots level and through CN support organisations.[7] The economic, social or cultural activities that were supported by LocNet were generally locally developed and were largely based on the demands, actions and/or commitments voiced by community members themselves. It is hoped that in some cases, these same activities will receive greater interest from the community over time and could further activate the "connectivity" available and be customised to their respective community. This local demand can drive the sustainability of a community network. This work is a contribution towards the notion of a revived imagination: seeing a different way to build and propose infrastructure, local services and technologies that support other ways of living in the context of a

7. LocNet has sometimes referred to "meso"-level organisations, a term we used in the FCDO-funded (2020-2023) project to refer to country-level partners we would work with on peer exchange, national training and country-level policy change.

digital society.[8] To a broader extent, it can also be looked at as a way of valuing a community's self-determination to obtain improved social ties, a better quality of life and build towards shared community prosperity.

The starting point for local services which complement connectivity is therefore centred around the local grassroots community and, in the case of LocNet, the Global Majority (Global South).

We acknowledge that there are technical groups that are also in this ecosystem, trying to fill a gap around internet connectivity not reaching remote areas and regions. At times, we find that some of these groups remain guided by a strict, binary connectivity paradigm. Non-sensitivity around gender, race and cultural relevance within connectivity spaces holds true for many other broad terms and methodologies used by digital inclusion and development agencies. Some agencies are driven by quantifiable roll-outs and total user statistics rather than qualitative information such as the quality of a user's engagement with communication technology. Some groups also do not necessarily take a community-centred (or Global Majority) approach, nor do we see some technical groups engaging with the community before design or deployment. Though this can be due to situational restrictions (i.e. limited time, resources, skills), these restrictions alone cannot fully explain the choice of a "top-down thinking" approach at the cost of a more holistic ecosystem approach. We note that there is a disinterest in or lack of acknowledgement of the structural issues that affect communities, and working alongside communities, so as to make connectivity truly meaningful.

Around this important turning point, the LocNet team feels prepared to issue a unified position on the community-centred connectivity approach. Specifically we are able to articulate the differential impact taking a bottom-up, holistic approach would have on local services and technologies internally, as well as in public spaces. Being able to uphold our community-focused standpoint will also help us select appropriate future partnerships and work with entities whose values align with our own. This position paper will help us navigate through global context and terminology, allowing the LocNet team and our respective partners to clearly articulate our community-centred approach to local services and technologies with confidence and a unified voice.

8. Camacho, K., el khoury, c., & Prado, D. (2024, 23 January). Imaginando infraestructuras digitales desde el afecto y el cuidado personal, colectivo y planetario. *GenderIT*. https://genderit.org/es/editorial/imaginando-infraestructuras-digitales-desde-el-afecto-y-el-cuidado-personal-colectivo-y

3. GOING BEYOND CONNECTIVITY

3.1 Defining meaningful connectivity from a community-centred perspective

This section provides some of the current definitions of "meaningful connectivity" or "meaningful access". There is a great deal of focus from different actors on how to address the so-called digital divide, and the concept of meaningful connectivity is on the rise as a way of qualifying an improvement in this understanding of digital inclusion. When analysed, global or macro-level institutions are also moving away from a paradigm that claims that, by having supplied connectivity mainly through mobile coverage, the work of "connectivity" is complete. They also realise that, even when a broadband supply is established, there remain other factors holding people back from using this connectivity – what is called the "usage gap".[9] This low or non-usage in technical terms also means unused spectrum and telecommunication infrastructure. The same global or macro-level institutions are also imagining and articulating this concept through the term "beyond connectivity". For example, some trends to increase usage include telecom companies creating incentives for use, such as zero-rating campaigns. Involving little to no cost for the user, zero-rating encourages internet use through major social media or messaging applications. Although it can provide uninterrupted access to these applications and facilitates further communication, it also limits the online experience that largely lower income users have of the internet, further shaping their

9. GSMA. (2022, 21 September). Addressing the Mobile 'Usage Gap' is Key to Achieving Sustainable Development Goals. https://www.gsma.com/newsroom/press-release/addressing-the-mobile-usage-gap-is-key-to-achieving-sustainable-development-goals/
10. As an example of misinformation via zero-rating campaigns in Brazil, see Rennó, R., & Novaes, J. (2022, 24 February). Zero rating and the infrastructure of political (mis)communication in Brazil. *Periferies Urbanes*. https://periferiesurbanes.org/zero-rating-and-the-infrastructure-of-political-miscommunication-in-brazil/

demands exclusively through specific apps and platforms. By reducing and limiting the online experience, zero-rating policies can contribute towards platform-directed scams, misinformation, and can even manipulate public debate.[10] They end up creating different levels of users according to income and country/region of residence and amplifying major platform monopolies, while conveying a false impression of connectivity coverage. In examples like this, one is driven to ask what the purpose of additional user services is, and in what ways do they bring meaning or value, particularly to the previously excluded.

Below, we go through global groups who have provided different concepts drawing on the word “meaningful”. Some of the latest aspects of meaningful connectivity come from these global institutions: the International Telecommunication Union (ITU), the Global Digital Inclusion Partnership (GDIP, formerly known as the Alliance for Affordable Internet or A4AI) and the Internet Governance Forum’s Policy Network on Meaningful Access (IGF PNMA). Each one’s position on meaningful connectivity or meaningful access is listed in the table below.

Organisation	Definition	Indicators
ITU	**Meaningful connectivity:** "A level of connectivity that allows users to have a safe, satisfying, enriching and productive online experience at an affordable cost."[11]	Five "connectivity enablers": infrastructure, affordability, device, skills, and security and safety.[12]
GDIP (formerly A4AI)	**Meaningful access:** "Someone has meaningful access when they have affordable access to an internet connection of sufficient quality to be meaningful and they are able to use that connection in a supportive social environment that allows them to apply their full agency in how the internet affects their life."[13] **Meaningful connectivity:** "[A] tool to raise the bar for internet access and set more ambitious policy goals for digital development."[14]	Four meaningful connectivity indicators: • 4G-like speed • An appropriate device • Unlimited broadband connection • Daily use.[15]
IGF PNMA	**Meaningful access:** "[T]he potential of the Internet as a way to create, communicate and produce contents and services locally and in local languages – acknowledging users as citizens with their own online civic spaces."[16]	Three areas of focus: connectivity (infrastructure and business models); digital inclusion through citizen approach (accessibility and multilingualism: local services and content in local languages based on local needs and resources); and capacity development (technical skills training).[17]

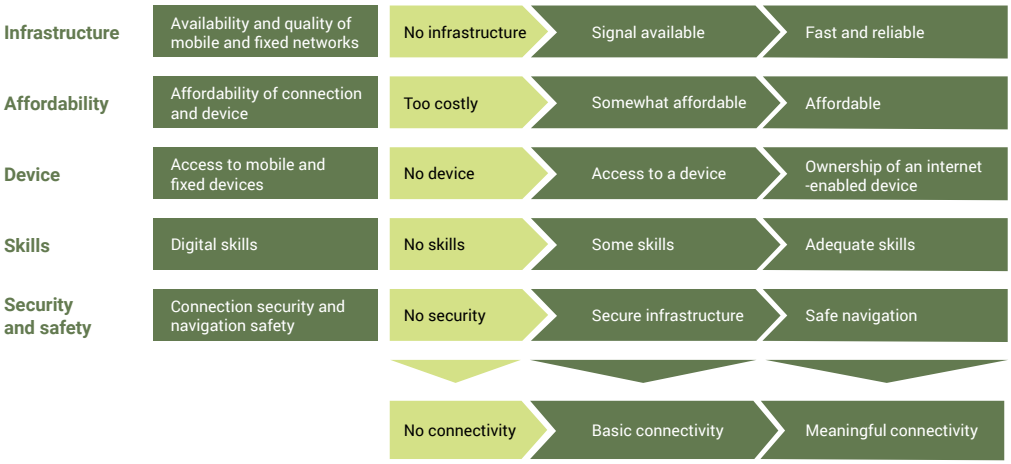
11. International Telecommunication Union. (2022). A*chieving universal and meaningful digital connectivity: Setting a baseline and targets for 2030*. International Telecommunication Union. https://www.itu.int/itu-d/meetings/statistics/wp-content/uploads/sites/8/2022/04/UniversalMeaningfulDigitalConnectivityTargets2030_BackgroundPaper.pdf
12. Ibid.
13. Jorge, S., & Woodhouse, T. (2022, 21 December). What is meaningful internet access? Conceptualising a holistic ICT4D policy framework. *Global Digital Inclusion Partnership*. https://globaldigitalinclusion.org/2022/12/21/what-is-meaningful-internet-access-conceptualising-a-holistic-ict4d-policy-framework/
14. Thakur, D., & Woodhouse, T. (2020). *Meaningful Connectivity: A New Target to Raise the Bar for Internet Access*. Alliance for Affordable Internet (A4AI). https://a4ai.org/wp-content/uploads/2021/02/Meaningful-Connectivity_Public-.pdf
15. https://a4ai.org/meaningful-connectivity
16. IGF Policy Network on Meaningful Access. (2022). *From Policy to Implementation: Lessons and Good Practices to Advance Meaningful Access (PNMA 2022 Output Report)*. https://www.intgovforum.org/en/filedepot_download/255/24314
17. IGF Policy Network on Meaningful Access. (2023). *Meaningful Access to Include and Connect (PNMA 2023 Output Report)*. https://www.intgovforum.org/en/filedepot_download/277/26685

In reviewing the literature, many spaces define “meaningful” in different ways. According to indicators from the ITU, “meaningful connectivity” depends on five axes: the speed and robustness of the connection, financial accessibility, the availability of access-capable devices, digital literacy and online security.[18]

Several definitions seem to concentrate on these technical connection indicators. For example, the GDIP brings up meaningful connectivity “as a way for differentiating levels of internet access,” a target which concentrates on remedying underserved technological aspects.[19]

Some go further to look at the human experience, whether it be skills or daily use. The IGF PNMA has some interesting areas of focus beyond connectivity, specifically looking at digital inclusion through a citizen approach and capacity development, and their documentation provides several examples of meaningful connectivity.

Figure 1: ITU’s expected status of enablers by stage of connectivity



18. International Telecommunication Union. (2022). Op. cit.
19. Thakur, D., & Woodhouse, T. (2020). Op. cit.

3.2 Shortcomings of the current definitions of meaningful connectivity

In looking at the aspects of meaningful connectivity and meaningful access given in the definitions used thus far, the metrics used are found to be largely quantitative and involve top-down narratives on access, their ultimate aim being to be technically measurable within and across countries. There is certainly a place for widely comparable metrics that track indicator change over time at a country or global level.

In aspects that try to incorporate the human experience, there are some individual or household-level measures around competence or digital skill and how often the internet is used, while others remain without such indicators. For example, the ITU chooses not to engage with value-added services or applications as well as indicators around the benefits of connectivity. Specifically, the ITU states that it is out of their scope to look into "What is connectivity used for?" and to explore the question "What social and economic impacts does connectivity have?"[20] In these "out of scope" elements, you indeed find the application of connectivity (i.e. accessing information, communication and participation, e-commerce, trade, learning, working and professional life, entertainment) as well as the economic, social and environmental impacts listed in their diagram (given above), but the ITU clearly states that this is outside of their realm of work.

In the case of the IGF PNMA, while digital inclusion with a citizen approach and capacity development are two of their focus areas, there is not much further detail provided on their conceptualisation of these terms or technical guidance around them.

The questioning of the current technical meanings and indicators around meaningful access/connectivity is echoed by current and former regional coordinators of the LocNet team, who have engaged closely with community networks over the last five years. Proposing a change of perspective, Sarbani Belur insists that the starting point should not be this "still too much top-down" roll-out of any connectivity model, even if it promises to be decentralised or to enable the unconnected to connect themselves. Rather, we should start by looking at the already existing

20. International Telecommunication Union. (2023). *Measuring digital development: The ICT Development Index 2023*. https://www.itu.int/hub/publication/D-IND-ICT_MDD-2023-2/

activities organised in a community "by and for the people". "Connectivity becomes meaningful," Josephine Miliza tells us, "when it enables, supports and amplifies what the communities are currently doing"[21] – and these can be very different things. "Meaningful connectivity has to enhance the life of the community," says Catherine Kyalo. However, she also says that the community itself is yet another complex collective of actors that holds multiple use cases based on "age segmentation and different cultural and economical positionings."[22]

The LocNet approach or narrative around meaningful community-centred connectivity can be defined by its awareness of and interest in strengthening local interests, social ties and relevant activities undertaken in the communities it works with. In other words, connectivity is not created as an external "add-on", but rather as a part of an ongoing dialogue with all who are "already put in common" (a nice definition of communication, by the way) in a community. These locally expressed activities, based on specific needs, are preconditions to creating ownership and trust, and thereby also ensure support for new local services, technologies and communication formats.

Another issue is that those who define "meaningful" seem to only deal with an "after-the-fact" context: there needs to be an established internet link before the meaningful indicators can be worked on. The question then arises as to whether there was a pre-assessment of the "meaningfulness" of connectivity in the locally unconnected area by community members before a link was even established. It also brings into question whether there would be any meaningful use of the internet once it was installed. If the connectivity is utilised, say, mainly in one language, one font, or portrays a single homogeneous global culture, would this deliver meaning? Not least, we can ask if connectivity can be used in a meaningful and beneficial way by every individual and collective user in a given context. In cases where access is restricted, or the content provided is inappropriate, this can create what Heeks calls "adverse digital incorporation", which pulls people away from use and may thereby widen the digital gap or increase existing inequalities based on social, economical or cultural differences.[23]

21. Interview with Josephine Miliza, 24 April 2023.
22. Interview with Catherine Kyalo, 20 April 2023.
23. Heeks, R. (2022). Digital inequality beyond the digital divide: conceptualizing adverse digital incorporation in the global South. *Information Technology for Development, 28*(4), 688-704. https://www.tandfonline.com/doi/full/10.1080/02681102.2022.2068492

In the absence of looking at the local value or meaning of this connectivity, access can intersect with power and control. Aside from the potential introduction of the digital monoculture which constitutes much of today's global internet, there are some communities LocNet has worked with, especially Indigenous communities from Latin America, that are very aware of the harms internet connectivity can bring. This includes cultural and social alienation, exposure to harmful content, financial and social scams, opinion manipulation, attention and relationship problems, individualisation, facilitation to commit environmental crimes, among others. Because of this, there are situations where communities do not want to consume what currently exists online and thereby do not feel ready to connect to the internet. In some cases, they want to have a more controlled experience of connectivity in relation to content and time of use. The first example of this is a community network envisioned by the Cabécar women in Costa Rica. The support organisation, Sulá Batsú, has worked closely with this community, and the women have specifically verbalised that they did not feel safe or confident about having internet connectivity in their territory. The community was also not well informed about the risks of internet connectivity, and did not have a mitigation plan for the possible harms it could entail. In the end, they chose to use walkie-talkies as the communication technology in their initial community network initiative. Another example is the Guarani's project in Brazil, supported by Intervozes. Here, the Indigenous communities have opted to reduce the exposure of youth to harmful content by blocking IPs and limiting the time allocated to certain online activities such as gaming. This decision was made by local leaders in discussion with the community. In turn, these limitations have fostered some local content production and a local video streaming platform called Nhandeflix[24] as a way to counterbalance the impacts of the internet and stimulate Indigenous media. On another extreme, the lack of good alternative content that mitigates the potential harms of the internet may convince communities to remain unconnected.[25]

Overall, current global definitions of meaningful connectivity appear to fall short when trying to understand the meaning of the internet or connectivity from the perspectives of people on-ground, especially from

24. Prado, D. (2023) Seeding change: How Indigenous villages in Brazil built Nhandeflix, their own streaming platform. *Association for Progressive Communications*. https://www.apc.org/en/blog/seeding-change-how-indigenous-villages-brazil-built-nhandeflix-their-own-streaming-platform
25. Prudencio, K., & Bloom, P. (2021, 8 June). Keeping it Analog: A framework for opting out of connectivity. *Rhizomatica*. https://www.rhizomatica.org/keeping-it-analog-a-framework-for-opting-out-of-connectivity

those located in the Global Majority. Current definitions fail to consider the aspects of community participation and community-based digital production. Rather, the metrics appear to be based on people being merely passive consumers in the consumption value chain.

3.3 Exploring meaningful connectivity from a community-centred perspective

When unpacking the term “meaningful” within a community-centred perspective, this section looks at five important elements in practice: cultural and political relevance, emerging community processes, gender inclusion, agency and local economic development/value. Also, when referring to “meaningful”, it is in these five areas where there is space for grassroots organisations and local rural and indigenous communities to self-determine what is “valuable” within their digital pathway or to shape meaningful community-centred connectivity. They can contribute collectively, and it is through their mutual agency that an appropriate local or community communication activity or digital pathway is designed. What is more, if applied in a strategic and reflective manner, the fostered connections can serve as tools to further enhance cultural sovereignty, local economies and the maintenance of life on the planet, as well as the planet itself. Examples of this are the ways in which traditional and Indigenous communities have used the internet and local services to make public their activities of environmental protection and sustainability, such as using local mapping apps (i.e. the Mapeo tool) to denounce illegal lodging and mining, or using independent sensors to measure air contamination – i.e. the Media Awareness and Justice Initiative (MAJI) in Port Harcourt, Nigeria. Technology is used as a tool to better document and fight violations against the environment and its defenders. In other cases, communities also use local biodegradable materials, such as bamboo, to build their networks’ poles and towers. At the same time, digital platforms can be used to sell organic local farming and craft products, and can be connected to and participate in regional, national and international environmental organisations and agendas. What is more, in minds that have not been formatted by existing commercial technologies and limited by existing forms of connectivity, there is a great power to imagine new and better ways for human communications with these five elements in mind.

1. Cultural practice or relevance: Some meaningful community-centred connectivity activities have emerged from everyday practices, and we share some examples of this from the past years with LocNet. We have seen some of these mobilising activities become motivation for communities to bring people together and agree to strive for communally beneficial activities. Regular activities could include identifying an individual and/or organisations who use the facilities of a community network and further assist people's access to, say, government services. When MAJI in Nigeria needed accurate data collected from remote sensing devices to monitor pollution, this catalysed neighbouring villages to ask for the same, driving demand for specific connectivity needs. Support organisations or outside expertise can source or develop locally made educational materials mandated by education ministries and demanded by parents. A support organisation can help upload digital educational content to a local server and Wi-Fi platform that students can then access on their devices, which ultimately supports their learning. These community-defined practices and processes are examples of LocNet working with partners, where local services and technologies were demanded by communities and, in many cases, catalysed further community-centred connectivity. In other words, "meaningful" comes from activities often done on a regular basis which address people's existing demands for specific community services on the ground.

2. Engaging community processes: Engaging these processes when communities actively come forward with an interest in bringing about change in the current connectivity situation is important, particularly in relation to community "meaning" because of the transformative potential of collective efforts. The bottom-up and local action approach will make a difference in terms of local ownership. Community-centred connectivity can create this drive to local and participatory action, bringing people closer together. Cultivating local ties, whether this be the economy, socially-driven activity or the mobilisation of local persons, brings meaning. It has the intrinsic capacity to promote self-determination not only in the field of connectivity, pushing communities to further mobilise in relation to other areas that have been structurally absent in their content. It is noted that not all communities are ready for this, or interested in it, and there is also the practical reality that they may not all have sufficient resources or energy to take on the demands of community processes.

3. Increasing gender equity and reducing prejudice: Although addressing gender and other power imbalances and prejudices may not be the main priority for community-centred connectivity projects, we see particular projects are led largely by men or people not yet sensitive about this subject. Yet we have seen that when women and gender-diverse people have active roles in communities' projects and have a strong sense of gender justice, connectivity also becomes an allied force through which to address gendered imbalances and gender-based violence. There are many examples of how the process of building community-centred connectivity can increase gender awareness and improve the lives of women and gender-diverse people. For instance, fostering the participation of women in technical and management capacity-building processes usually increases people's sense of self-value and capability. In many cases, it motivates them to keep studying and to occupy spaces advocating for community connectivity, and this can even lead to a paid job. In addition, women and gender-diverse persons tend to be better at seeing and understanding both a community's needs and individuals' struggles, so putting them in important community-centred roles usually leads to an increase in awareness. For instance, a women-led quilombola community network in Vale do Ribeira, Brazil, arranged for an antenna and pole to be able to provide connectivity to a lone woman who previously lived beyond the reach of the network. This decision was taken mainly because she was an elderly person who lived with an abusive husband in a more isolated area, but needed connectivity. So, for the women in the community, the meaning of having connectivity is related to being able to reach out to their fellow members and secure their well-being, even if that entailed extra resources to reach a single person. Additionally, occupying roles in community-centred projects makes women more visible to their own community and challenges gendered prejudices surrounding their abilities outside domestic and care-related spheres.

4. Agency: One perspective that can help us think of meaning, or to think beyond the "connectivity" measure, is a 2022 piece by Richard Heeks,[26] who asks us how people are connecting. Essentially, whether people connecting to the internet will lead to greater inequality, or what he calls "adverse digital incorporation" (mentioned above). Adverse digital incorporation refers to people who are connected to the internet and are being used in extractive ways, participating mainly in consumptive practices that only benefit the larger players in power. Heeks then

26. Heeks, R. (2022). Op. cit.

explores ways to counter or reverse such adverse digital incorporation. Specifically, the paper suggests that increasing the agency of under-served groups is part and parcel of the meaningful change we should be seeking around connectivity. It also attempts to address, in some way, underlying structural inequalities. Heeks gives the example of platform cooperatives, which organisationally are more equal than the current top-down models of existing platforms and are more likely to distribute resources in a fair manner through the course of their work.

5. Local economic development/livelihoods: In this regard, ideally, communities and individuals are, through their actions, collectively instrumental in determining not only their own digital pathway but also pathways towards developing alternative conceptualisations of what is "meaningful" through local economic development. In other aligned perspectives, the paradigm around "localisation" arrives at a similar assumption. Localisation is about production for one's own community and it can enhance local bonds of interdependence, whether economic, social or environmental.[27] Localisation involves activities such as small-scale yet diverse local farming production, ecologically sound practices and thoughtful use of natural resources. For example, during the COVID-19 period, communities that had strong local food systems and other localised systems managed to adapt for food security when there were countrywide shutdowns. The practice of localisation aims to protect biodiversity and provide for community well-being and resilience. This localisation paradigm seems to have a strong alignment with meaningful community-centred connectivity perspectives.

Overall, the LocNet initiative work has aimed towards incorporating these five elements when working with communities in participatory ways and to ensure domestic quality of life or the improvement or revitalisation of livelihoods. During the pandemic, one community network amongst the Ribeirão Grande/Terra Seca quilombo shared its ability to manage communication for education, social purposes and food security.[28] It is also noted that many of the rural and informal urban communities where LocNet has partners resonate strongly with the land and/or water and domestic food security. These communities are closely aware of how much they depend on nature for their livelihoods. The development of

27. https://www.localfutures.org/learn-take-action/getting-the-facts/localization-is-it-the-solution/
28. Zanolli, B. (2021, 13 December). Sharing human and internet bandwidth of a community network in the middle of a pandemic. *Gender IT*. https://genderit.org/feminist-talk/sharing-human-and-internet-bandwidth-community-network-middle-pandemic

local services and technologies strives to enhance these localised efforts, whether this be through the sharing of agroecology practices, improved trading of local produce amongst local regions or the increased protection of land, all of which we have seen through partners' experiences in the last five years of the LocNet initiative. By investing meaningfully in the local socio-economic system, the attitude of communities towards change in production, creativity and cultural preservation is enhanced. When coming from a participatory approach, it is paramount that "meaningful" be defined from the point of view of the communities most affected, and the "local" contextualises what brings meaning to these people.

Related to local socio-economic systems, we recognise that communities existing in rural and underserved regions have historically been under-counted vis-à-vis the value they bring not only to their own communities but also to the larger territory and ecosystem. Indigenous knowledge systems, labour and low-cost products in formal economic terms are typically treated as "informal sector" activities. It is demeaning to dismiss a wide range of Indigenous activities under a single term, "informal", especially when their complex systems and labour are in many cases highly valuable to the people within their communities. These communities are also at the frontline of defending and protecting the land and natural resources that keep the world intact. But in a global system of measure or the national gross domestic product sector, they are seen as intangible and non-monetised and therefore not counted as having value. Many Global Majority economies are largely made up of informal sector activities and this therefore means that, structurally, the aforementioned communities are not counted amongst what brings value to their own country or globally. In some cases, the LocNet team draws on the analogy of the jar of stones, in which larger stones and smaller pebbles fill a jar, representing the mobile operators and smaller operators that fill the connectivity space. There is still space for grains of sand: micro or grassroots communities can be recognised for bringing connectivity sector activities. To understand the full value these underserved communities provide the economy with, a recognition of their value and a revision of appropriate measures is needed. We need to take into consideration the indirect contributions of these community members.[29]

29. https://www.wiego.org/informal-economy/poverty-growth-linkages/

For the LocNet team, the articulation of what "meaningful" means to us hinges on the premise that the ultimate approach remains community-oriented. A future wherein local communication services reach those who remain disconnected or poorly connected will not be reached merely by concentrating on the technical: devices, better broadband quality, affordability; nor will it be achieved by seeing individuals merely as consumers. Josephine Miliza concludes that what becomes apparent when comparing the top-down paradigm of universal access to the bottom-up concept of meaningful access is "a missing link between internet as such and all the grassroots activities: high levels of illiteracy, language, relevance and affordable devices. Those gaps of language, content, information and devices should be addressed."[30] Although these technical axes are very important, there are cultural and historical dimensions that deserve to be further explored, as, for connections to be really meaningful for a population, it is essential to recognise the value in said population's production of knowledge, their understandings of the world and the ways of life of those inhabiting these territories. So we reject the notion that the internet's primary purpose is to incorporate new consumers into the digital economy of products, services and, essentially, attention.

A projection of a long-term outcome for LocNet relates to meaningful community-centred connectivity: people and communities shape, use and benefit from community-centred connectivity, local services and technologies to meet information and communication needs and strengthen local economies and culture.

Rather, we propose below (see Section 2.2) some technical aspects or criteria that would work better when combined with community orientation. The focus should be on specifying the local purpose of communications for a community. In knowing its ultimate purpose from the grassroots, it is easier to identify appropriate connectivity infrastructure as well as local services and technologies that would help achieve the larger purpose desired by the community. Practising meaningful community-centred connectivity from the bottom-up, according to Lilian Chamorro, requires a response to two essential questions: (1) in what kind of fields (e.g. education, health, environment) meaning is constructed by specific uses and models of connectivity, and

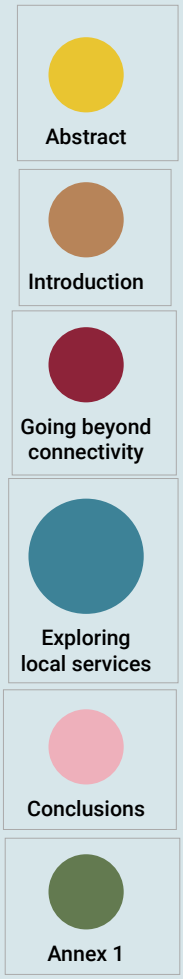
30. Interview with Josephine Miliza, 24 April 2023.

(2) how the technology is used and socialised in relation to community values and participation.[31] If these answers fall short when looking at digital inclusion, the "persons will obtain connectivity that is not meaningful," says Carlos Rey-Moreno. It might even be possible to create universal access for everyone and to comply with the technical parameters of meaningful access and still: "The lights would be on but nobody is at home."[32] In other words, even when speed, quality and affordability, and the required skills are met, there may still be additional barriers which make access incompatible with the Global Majority population.

In summary, the LocNet narrative emphasises that meaningful community-centred connectivity is defined by a purpose or by existing activities that work towards strengthening local ties or improving communal quality of life through digital communication services. These will be defined by participatory processes as an expression of involved individual and collective actors. In turn, it is how this local purpose can be activated through the implementation of local services and technologies, with the larger aim of catalysing greater demand for community connectivity. The next section investigates local services and technologies, particularly from support organisations' experiences in the last five years with LocNet.

31. Interview with Lilian Chamorro, 24 April 2023.
32. Interview with Carlos Rey-Moreno, 5 May 2023.

4. EXPLORING LOCAL SERVICES THAT ADD VALUE TO COMMUNITY LIVELIHOOD



It may seem obvious that local services should ideally reflect local agency in terms of their design, customisation, ownership, technological autonomy and economic benefits. Yet in practice, many processes are using digital infrastructure (e.g. platforms and cloud servers) that is not located in or democratically managed by communities. Why, for instance, should the sensitive data of a biodiversity seed bank or commerce involving local goods be hosted on a server parked thousands of miles away that potentially has no concern for privacy or safety? How efficient and secure is it to use global messenger services for local and regional communication? Could we imagine educational services and e-learning content running on local infrastructure to decrease the dependency on permanent backhaul connectivity and increase the community autonomy of digital resources?

On the other hand, “local” should not be understood as “geographical atomisation”. To reinvent the wheel in parallel would not be viable especially given that sharing development costs for sustainable software and hardware solutions is vital for ecosystems of open innovation. What is more, there are also benefits to federating local services (e.g. e-learning resources or community media) and collaborating with support and content services. In other words, trade-offs between “hyperlocal convictions” and “fully federated visions” are necessary and stimulating. Those and similar questions and ideas have been discussed with CN partners over the last few years to ensure communities have the information needed to make informed decisions on their local digital needs. While the interest in such and similar kinds of local services is high, when it comes to framing and setting out the dimensions of these services, we are still in the early stages.

4.1 Arguments which frame support for the term “local services”

If we look at the aforementioned examples, all those services potentially add value to the livelihoods of local communities. Therefore it seems logical to just localise a common term from the telecommunications industry: value-added services (VAS). However, feedback from an array of stakeholders shows that this wording is not self-explanatory, and it was even rejected for being “very corporate language” and “sales speech” in some discussions.[33] In addition, the term itself has a very narrow meaning in the field of telecommunications, describing “non-core services, or, in short, all services beyond standard voice calls and fax transmissions.”[34] But still: why not “hack” this terminology, “re-evaluate the VAS increasingly provided by small-scale operators in emerging markets and elsewhere,”[35] and apply them to community-centred connectivity? There seems at least to be some leeway to coin a more open definition that would understand VAS as the services available at little or no cost, to promote community-centred and community-owned connectivity initiatives.

Apart from the already raised doubts about the “appeal” of the concept, there are three further arguments that speak against the VAS framing. First, because of the history of the term, most persons with a technology background would limit their imagination to software services – and as we will see further ahead, the needs and visions of community-centred services go beyond this. Rather, they propose services based on more heterogeneous assemblages and set-ups that include hardware, infrastructure and non-digital components. Secondly, the VAS framing is also misleading in the sense that added value would refer only to digital services made available by increased connectivity. It would remain unaware of situations where connectivity permits one to add value to already existing (analogue) services, making them more relevant or sustainable for a local community. For example, internet access could potentially create new digital spaces and channels of communication for community broadcasting and other local media activities. However, the “local service” that informs and communicates with a community does not just pop into being when a community gains access to the internet,

33. We “tested” the term in dialogues with community network builders, supportive private sector representatives (e.g. Wakoma) and LocNet team members in the first semester of 2023.
34. https://en.wikipedia.org/wiki/Value-added_service
35. Suggestion made by Eric Nitschke, CEO of Wakoma, during an online discussion on 16 May 2023.

but in many cases is created before the fact. Thirdly, the idea of "localising" VAS brings with it the risk of being understood as employing a top-down approach involving standardised services. While the term is eventually appraised and understood by telecommunication experts and serves as a "meta code" in the field of international cooperation, its technical framing and relation to "big telcos" might be uncomfortable baggage, creating resistance at the local level. Similar phenomena can be observed when "community radios" refuse to recognise their online content as "podcasts", or when local repair cultures criticise circular economies for being ignorant of their traditions and practices. In other words, we should be careful when using concepts that do not take into account already existing local cultures and their services.

Rather, we acknowledge that in some contexts of rurality, or where communities are isolated, money is less existent and reciprocity has more "currency", or the informal economy is dominant, communities have their own value systems of living. Therefore, we suggest dropping the term VAS and instead using "local services and technologies" when addressing community-centred digital communication services.[36]

To ground our discussion of community-centred connectivity operations, we stick to the following questions: (1) what kinds of local services and technologies add value to local communities, and (2) why is the identified value of those local services and technologies important for local communities? In other words: let's leave terminological questions for later and first follow the actors into their territories.

4.2. Flying over emerging and envisioned local services

Spoiler: there is no small-scale data or detailed needs assessment available that summarises the local services and technologies provided by/servicing local communities and community networks. So in this document, we do not really answer the questions above based on responses at the "ground level". Yet we can offer an interesting entry point, an "overflight", some overarching guidelines by assembling the findings of current and former regional coordinators of the LocNet team

36. Local services and technologies are customisable building blocks for meaningful community-centred connectivity. Their use is not limited to local network settings in geographical terms and with regard to digital infrastructure. Rather, they proclaim local agency to be a defining criterion in terms of being locally informed by its design, usefulness, customisation, ownership, technological autonomy and economic benefits.

who have been in the territories discussing and are in constant exchange with community-centred connectivity projects and a great variety of other relevant social initiatives.

So what do communities in rural Africa, Asia and Latin America imagine local services to be? A first common vision refers to a general layer that could be called “community-owned infrastructure”.

In the three regions listed above, there is a shared understanding that local services work can go beyond extending and sharing the first layer of community-owned infrastructure, or internet backhaul access points (i.e. through broadband fibres, low earth orbits – or LEOs – point-to-point relays, etc.) to service communities with internet content only. Communities/community conceptualisations go beyond this by developing another infrastructure layer which are called local digital networks. Some describe local digital networks as off-grid deployments for “communities [that] just want to have local mesh networks.”[37] These networks give access to “local data repositories”,[38] also described as “digital hubs” or “local digital archives”, which bundle information, something already achieved many times.[39]

In the aforementioned descriptions of emerging and envisioned infrastructures, the local digital networks utilise local server architecture, which is key for the deployment of local services. In some narratives the local server becomes the material basis for an appropriation of the “platform concept”,[40] or a fundamental digital space for local archiving and services at an affordable cost to community members. Yet, for others they could represent the central building block for a new generation of “telecentres”, or a physical or central locale for the server and the local people. This time, however, the entities involved are not expressions of government-driven, top-down deployments. Instead, these “local ICT centres”[41] are being co-created by communities and support organisations. Communal spaces equipped with personal computers (as well as links to the local servers) are identified as inclusive “physical access points for persons without devices”.

37. Interview with Sarbani Belur, 10 April 2023.
38. Ibid.
39. The first quote is from an interview with Catherine Kyalo, 20 April 2023, and the second from an interview with Lilian Chamorro, 24 April 2023.
40. In interviews, this hack of the platform concept is referred to as “offline platforms”, “locally available platforms” or – already loaded with specific intentions – “emergency response platforms”.
41. Terms used in an interview with Josephine Miliza, 24 April 2023.

The common ground inhabited by communities in their understanding of community-centred infrastructure only differs in relation to one question: How far should support or effort go towards "local networks" and their respective services, local server and hosted content, versus building infrastructure which contributes towards access to the internet? In India, for instance, the "federation of local networks" is not seen as a priority – though it is "slowly happening"[42] – yet, in Kenya, a certain digital connectedness beyond the local physical space is seen "as an opportunity", be it "to access government public services" or to create "better access to health, agriculture and business services".[43] What is envisioned here is the interoperability of local networks and global (or national) services, and finding the right balance of local services and technologies which benefit communities and their members.

The last quote already introduced three important areas to which local services are related. A provisional list distilled from the interviews undertaken for the purposes of this paper include local services for:

- Health and community care
- Territorial and environment protection
- Agriculture and local production
- Education and capacity building
- Local and circular economies (including digital financial services)
- Language diversity and preservation
- Communication facilities
- Access to public services

Though these responses were based on an open question about important kinds of local services, all these thematic fields were mentioned in relation to every region under discussion here; what varies is the prioritisation, though the top three are the same: health, agriculture and education. Another recurring area is circular or local economic practices.

42. Interview with Sarbani Belur, 10 April 2023.
43. Interview with Josephine Miliza, 24 April 2023.

4.3. What have we learned: What were identified as local services?

When comparing existing or envisioned local services, despite their great diversity,[44] the top responses revealed at least four distinguishable sets of needs that traverse all themes, including (1) services which facilitate the sharing of local knowledge, (2) provision of previously unavailable information from outside the community, (3) development of new local content and materials from within the community and (4) facilitation of locally-aligned extension services in collaboration with other stakeholders.

We begin with the first group of needs: (1) services that share existing local knowledge and the community's indigenous practices for local benefit. Sarbani Belur gives an example from when she began work in 2018, where the initial local content idea from the community she was working with was around the provision of outside entertainment content such as movies, as well as educational content.[45] Today, we see communities also exploring local content and archiving different meanings together, such as mapping their cultural resources and biodiversity.

Digital local content can be seen as an enabler of other human development such as in the preservation of Indigenous languages and the retention of local skills, all of which existed prior to establishing a community-centred connectivity initiative. Other examples from LocNet partner experiences include sharing audio-visual records of midwives and other traditional health workers, mapping biodiversity (particularly indigenous plants, with their different types of benefits), monitoring the environment and related threads (such as involving diverse environmental sensors and other tools), preserving and facilitating the active use of local languages and cultural expressions, and brokering contact with local professionals (e.g. links to plumbers and electricians). In many cases the added value of this existing knowledge, when converted to local data and content curation, is immediate when ways are found to manage and share said data within the community. Data centres can provide venues for connecting people or communities with the same culture, thereby strengthening their communal links and/or

44. There is a list of all the services mentioned in Annex 1.
45. Interview with Sarbani Belur, 10 April 2023.

interdependence. However, different repositories and databases can also constitute the grounds for activities and services that go beyond the local level, and this will be discussed later.

There is a second type of service run on local networks, which is (2) the provision of information and learning formats that were created outside the community and were not previously available to it. The most prominent examples of this are digitised national school curricula, other educational content, and locally hosted e-learning platforms or encyclopedias. Outside health care information and online methodologies or tools for more sustainable agriculture and farming also fit into this category, as well as all kinds of other community-relevant content (e.g. different media formats like videos and games, etc.). These services respond to the digital right of "universal access", not by creating direct 24/7 access to online resources, but by expanding their circulation towards and within largely offline spaces. This can take many forms, from periodically updating news and media repositories like Cuba's "El Paquete" system, or "internet-in-a-box" delivery by donkeys in Kyrgyzstan.[46] What these approaches have in common is that they offer content and services when there is no consistent connectivity to huge cloud servers and digital content is available at an affordable cost. Yet they differ a lot in terms of local hosting (from very individual to collective approaches) and in terms of the curation and management of content. For example, content curation can happen outside the community and sometimes it can be driven by the community, their interests and needs. Either way, a periodic update and maintenance of information within these set-ups/projects ensure that the information and learning formats are kept relevant and ensure greater resilience, because even if backhaul connectivity is turned off, the local network does not lose its ability to share the hosted content.

Local services are not only concerned about content consumption but also about (3) the creation of new community content, communication formats and other tools. It is important to mention that the scope of content goes way beyond journalistic and educational formats. Local content can be specific to a purpose. For example, in some communities

46. For more information, see Center for Media, Data and Society. (2021, 21 September). When the Medium is the Message: The Cuban "El Paquete" System. *Medium*. https://medium.com/center-for-media-data-and-society/when-the-medium-is-the-message-the-cuban-el-paquete-system-cea1328efed2; Yang, Z. (2021, 8 February). Where the internet was delivered by a donkey. *Rest of World*. https://restofworld.org/2021/delivering-the-internet-by-donkey/. Kiwix is yet another example of how to distribute digital content without internet access. See https://kiwix.org/en/

it is important to have content that is created for the purposes of defending or communicating information about a threatened territory. Others wish to develop content through digital applications of existing barter/trade or via a local currency exchange. In a way, the documentation of existing knowledge is also a kind of content creation. In putting emphasis on "creating" and "making" new things, for instance the development of local digital currencies, it also becomes apparent that the current definition of content is too narrow. "New" here implies not a creation "from scratch" but rather a re-assemblage of established (analogue) practices (e.g. a community radio or oral traditions) and digital formats provided by local infrastructure (e.g. an audio repository for local storytellers). The Bharatiya Agro Industries Foundation (BAIF) example from Pathardi in Maharashtra, India, shows the agricultural communities' particular interest is in recording photos and descriptions of plants and the creation of seed banks to preserve both their culture and the area's biodiversity.[47] The focus on local languages reappears in this creative process, making content and tools more inclusive for the community. In a similar way, local forums and customised digital communication spaces extend and activate existing formats of dialogue, for instance the "sharing [that occurs] on customised captive portals on human rights defenders group, gender based violence, safe spaces for women."[48]

Our exploration of the customisation of local services thus far has not addressed a fourth need that adds value by leaving local ground and looking for (4) meaningful extensions, federations and cooperation with other actors – and their services. Meaningful extensions point to a "huge chunk of e-services from the government that could simplify the life of persons in local communities."[49] This relates to previously mentioned shared topics of interest in rural spaces, especially public health, education and agricultural services. This reiteration is very much aligned with public initiatives for digital inclusion and a digital rights perspective formulated from a "citizen perspective". In contrast to public top-down approaches reaching out to so-called "dark zones",[50]

47. APCNews. (2021, 6 October). Seeding change: BAIF partners with community members to create a digital ecosystem in the tribal village of Pathardi, India. https://www.apc.org/en/blog/seeding-change-baif-partners-community-members-create-digital-ecosystem-tribal-village
48. Interview with Josephine Miliza, 24 April 2023.
49. Interview with Talant Sultanov, 2 May 2023.
50. It is important to point out the implicit colonial dimension of this term, which relates to a Eurocentrist narrative of "enlightenment" bringing the virtues of the civilised world and, later, modernity to supposedly peripheral spaces. The narrative remains the same, while the "technical fixes" (and inherent political logic) distributed to receivers, clients and customers change over time. A genealogy that stems from electrification to telegraphy, and survives into radio and TV broadcasting, the internet, mobile phone networks and other media and services.

in the visions documented below the community is a collective co-creator and co-author of the infrastructure and content being developed. Instead of being constructed as a mere receiver of public services, the local community actively shapes them as an intermediary, and gains agency as a distributor, co-host or as part of a federated repository system, etc. This also becomes apparent in ideas aiming to re-create former analogue public services (e.g. state field agents) or proposals for meaningful public services targeting rural communities.[51] The local population is seen as a mediator, planning and maintaining internet access to the necessary backhaul connectivity and possibly its physical locale, be it by "local ICT centres that provide access to public services"[52] or by emerging mesh architectures taking care of "the federation of local networks that is slowly happening already."[53]

Besides this access to existing external public services, shared backhaul connectivity is also described as an enabler for the use of further relevant services, primarily related to agricultural, commercial and financial activities (e.g. special weather forecasts for farmers, funding opportunities and loans, etc.). This includes the creation of broader commercial activities and interactions. For instance, the successful I-Dot programme in India provides a great variety of online "platforms for the exchange or commercialization of products" such as selling seeds or paint.[54] Secondly, communication services are also seen for their value-adding elements, again linking tools and formats used locally (e.g. community radios, voice over internet protocol or VoIP, content exchange, etc.), but gaining additional relevance when used in a broader, federated context or permitting communication with external persons. For example, we see Indigenous communication links through the High-frequency Emergency and Rural Multimedia Exchange System (HERMES) in the Amazon, where isolated communities can maintain radio data links with each other on secure lines and exchange information.[55]

51. An example of this is the proposal to "re-create agricultural officers in the digital field" (Interview with Josephine Miliza, 24 April 2023), a platform-based service for rural communities that would re-create an extinct but very relevant public policy in Kenya.
52. Interview with Josephine Miliza, 24 April 2023.
53. Interview with Sarbani Belur, 10 April 2023.
54. Ibid.
55. Romano, M. (2022, 11 August). Seeding change: Rhizomatica's high frequency radio showcases the power of communication in remote regions of the Amazon. *Association for Progressive Communications*. https://www.apc.org/en/blog/seeding-change-rhizomaticas-high-frequency-radio-showcases-power-communication-remote-regions

What is shared by these visions that imagine better access to external services, extension of local services towards other networks and an increased range of communication, is the interest in participating in value chains that can go beyond the local level and do not depend on conventional internet access, looking for alternative backhaul solutions instead.

4.4. What have we learned: Why are local services important?

After this short tour de force through the topmost relevant community need for local services, the concept of value chains brings us back to our second and no less important question: why are these services seen as important for local communities? Can we think of their importance beyond the immediate needs that the local services respond to? The answers to this are manifold, but by entering the debate we can at least provide guiding perspectives that span from impact or outcomes around livelihood aspects, to rights-based arguments, broader notions of autonomy and immediate concerns of community survival. Four of the top reasons for local services and technologies in community-centred connectivity were put forward: (1) improving livelihoods and quality of life, (2) galvanising human and digital rights action, (3) enhancing autonomy and resilience within a community, and (4) ensuring the survival of a territory and community. There is a binding element shared by all four of these top outcome/impact viewpoints: only through services and connectivity created from the "bottom" and through active local participation will connectivity be catalysed, sustainable and permit democratic and community-driven articulation.

This becomes very clear when examining how (1) underserved communities look for ways to improve their livelihood outcomes and largely by being in the "driver's seat" of this development. In this context, local services are seen as a leverage with which to "resolve challenges a community is facing" or create digital bridges when "governments have problems [reaching] out to farmers" or other local actors.[56] Local meaningful connectivity is seen as key to "provid[ing] affordable access" that "adds value and powers social and economic development" – whether because it "permits [one] to do things in a more affordable way" or "set[s] the atmosphere to make the local economy come out

56. Interview with Josephine Miliza, 24 April 2023.

[or thrive]."[57] Josephine Miliza states that should local services and technologies contribute in some way to a person's income, it would drive people to use and support these services and drive higher demand for community-centred connectivity. In other words, local services have the potential to be catalysts for better market and financial interactions for community members beyond the local scope, especially since "older [people, 28 years old and above] are [only] interested [in] connect[ing] if there is economic value."[58] Adequate, community-centred infrastructure is seen as being key to reaching improved livelihood goals. To achieve and maintain such an enabling technological ecosystem, the creation or inclusion of "digital skills" are seen as an equally crucial determinant.[59]

The digital skills mentioned above indicate a second important perspective: digital rights. The vision to extend digital experiences and services "to offline communities and persons without devices"[60] is clearly framed as a rights-based approach. Yet, only sustainable and relevant skill development will permit local communities to actively shape local services and (2) to become active holders of digital and human rights.[61] Such services are conceived as essential "to provide space to voice cultural issues and to express self-identity", to "be in control of the data" and to construct inclusion, "serving all levels of literacy" and "providing relevant content in local languages".[62] For example, MAJI utilised citizen science by community members who used air pollution sensor tools and data to inform the public on issues of air quality near the highly polluted areas of oil reserves in the Niger Delta.[63] The "gaps of content

57. The first two quotes are from an interview with Catherine Kyalo, 20 April 2023, the third from an interview with Josephine Miliza, 24 April 2023, and the last from an interview with Lilian Chamorro, 24 April 2023.
58. Quote from an interview with Catherine Kyalo, 20 April 2023. Expectations include "better access to new markets" (Talant Sultanov, 2 May 2023), or in other words, trade and commerce with non-local partners and clients "making known the goods in the territories" (Lilian Chamorro, 24 April 2023). At present, "people have the means to order things but no one delivers" (Sarbani Belur, 19 April 2023) and "online services for remote villages are often not part of the banking system" (Talant Sultanov). So, related to the vision that "CNs help to open up a wider access of resources" (Catherine Kyalo) to markets is the aspect of information relevant for expanded financial exchanges and interactions. Beyond banking, this also refers to visions of "digitally formalising work and access to loans" since "successful local traders lack skills and access to tools for documentation" (interview with Josephine Miliza, 24 April 2023). Another ambitious vision defines local services at the "intersection of circular economy and community experiences with micro-financing and local banks" (Carlos Rey-Moreno, 5 May 2023), putting communities in a position to circulate what they want.
59. Thakur, D., & Woodhouse, T. (2020). Op. cit.
60. Interview with Catherine Kyalo, 20 April 2023.
61. It would be interesting to further explore this rights perspective, which also includes notions of "tribal" and "forest" rights. In this context, Sarbani Belur is calling for "grounded rights thinking" (interview on 19 April 2023).
62. Quotes from interviews with Lilian Chamorro (24 April 2023), Sarbani Belur (19 April 2023) and Talant Sultanov (2 May 2023).
63. Prado, D. (2022, 13 September). Seeding change: Communities mobilise open data to challenge oil industry pollution in Nigeria. *Association for Progressive Communications*. https://www.apc.org/en/blog/seeding-change-communities-mobilise-open-data-challenge-oil-industry-pollution-nigeria

and information" are countered, not through improved access to external digital resources, but through an active customisation and prioritisation of the local digital rights agenda.[64] This is why it is so important to serve the "need for training to be able to create" content and to shape concepts – and local services can become the driving "interfaces" of such co-creation processes.[65]

Such a creative shift to the local opens up paths to yet another desired effect of local services: (3) an increase in autonomy, agency and resilience at the community level. This might be sparked by a general "distrust of the internet for storing information, especially by Indigenous tribes," but also by a desire to further collective digital rights in relation to a specific territory.[66] Communities who know "their rights" and are skilled at using them can, for instance, expand and modify their community-centred connectivity initiatives to reach specific stakeholders, thereby creating a kind of "local universal access, without any pre-design of maximal users" or similar restrictions.[67] To create more relevant means of communication also involves the localisation of the reimagined possibilities of social networks like "TikTok and Facebook" which are described as "[in]adequate tools for local content creation".[68] This argument is further elaborated on in terms of trustworthiness and an awareness that there are already local formats of communication and media that can be digitally extended without the need to join corporate platforms.[69] Ultimately, what results from such an increased attention to local services could be efficient "tools available for coordination in offline communities" and practices of collective infrastructure: "mesh is the place where the community spirit is represented best."[70]

64. Suggestion made by Eric Nitschke, CEO of Wakoma, during an online discussion on 16 May 2023.
65. Ibid. "Interface" is understood here as a socio-technical contact zone, as Gui Bonsiepe proposed in the 1970s when he insisted that "the dosing mechanism of a sowing machine could now be understood as an interface: it had to be readable and understandable, it had to convey a sense of the possible uses of the machine and provide access to its operative resources, and in doing so, it structured a common sphere of communication and interaction between people and their artefacts." Meyer, R. (2019). From Artefacts to Interfaces: Gui Bonsiepe and the Re-Definition of Industrial Design, c. 1970. *Interface Critique Journal*, 2, 235–241. https://interfacecritique.net/journal/meye/
66. Interview with Sarbani Belur, 10 April 2023. Ibid.
67. Ibid.
68. Interview with Josephine Miliza, 24 April 2023.
69. A lack of trustworthy communication is described by Talant Sultanov in an interview on 2 May 2023 as especially dangerous for young people who belong to rural communities in Central Asia. Sultanov goes so far as to ask for a necessary "cyber hygiene". In terms of data security, the claim is made that certain types of data should never be owned by someone/an organisation outside the community/territory (Sarbani Belur, 19 April 2023), and proponents of this standpoint therefore ask for an autonomous storing of local knowledge. When talking about local communication, there is a perceived chance to increase agency and autonomy by "digitising community broadcasting" while "oral processes or artistic creativity can be reinforced when [digitally] shared with more people in the territory" (Lilian Chamorro, 24 April 2023), for instance, using "the local mesh for others to access" the content of "community radio, folk songs, debates and panel discussions. And people share more if it does not go outside" (Sarbani Belur, 19 April 2023).
70. Quotes from interviews with Lilian Chamorro, 24 April 2023, and Sarbani Belur, 19 April 2023.

Maybe we go too far in our general enthusiasm assuming that all "persons want to customise and fit tech to their own needs."[71] On the other hand, maybe this is no longer a choice. Maybe this is now a necessity through which one can (4) contribute to the resilience of communities and territories. This framing is not meant to be dramatic, but is based on often-shared challenges that really put at risk the future existence of – especially rural – communities.[72] First of all, there are perceived threats related to climate change and related issues like food security that specific local services could offset.[73] A second point made is that "local services are crucial in emergency situations" as seen during COVID-19 and other "health challenges with malaria, cholera and AIDS, where it is of the utmost importance to get [out] information [provided by] health workers [...] without having to do trips [in person]."[74] What gives the whole thing additional weight is the "complete lack of any health care facilities in many rural communities."[75] Without an adequate community health plan, communities remain vulnerable and a third vital threat to them is fuelled: "the migration of youth from rural communities to urban spaces". Many other aspects add to the migration drive. From a gender perspective, "the participation of girls in traditional communities" can be highly restricted, and socialisation might happen "only on the street during daylight."[76] Instead of leaving their communities for urban spaces, girls and young persons may be likely to stay if provided with participatory communication formats and safe spaces via a local network.

This survival challenge is happening in a context where many rural and Indigenous communities are "slowly losing out on language, land and identity."[77] For example, illegal mining and violent land-grabbing in the Amazon region are current examples of how Indigenous communities can come under existential pressure. The rapidly advancing deforestation in the Brazilian region, in spaces far removed from state control and commitment, clearly indicates an urgent need to support communities

71. Interview with Sarbani Belur, 10 April 2023.
72. When political visions and solutions stop addressing all persons in national territories (or other spaces of rule) in relation to health care, mitigation of climate change and food security, agency on the community level becomes more vital. This also includes practices around "technological autonomy" and "local services", not as a solution per se, but as a possible lifeline worth being further explored.
73. Interviews with Josephine Miliza and Lilian Chamorro, 24 April 2023. Without going into details about possible "solutions" that are highly localised, most of the people interviewed agreed that "services at the intersection of agricultural practices and digital transformation" are very important (Carlos Rey-Moreno, 5 May 2023).
74. Interviews with Talant Sultanov, 2 May 2023, and Josephine Miliza, 24 April 2023.
75. Suggestion made by Eric Nitschke, CEO of Wakoma, during an online discussion on 16 May 2023.
76. Interview with Lilian Chamorro, 24 April 2023.
77. Interview with Sarbani Belur, 10 April 2023.

looking for designs working on deforestation resistance mechanisms at the local level. Projects like Mapeo,[78] which permits Indigenous communities to create offline digital maps of their territories, illustrate how local services can contribute to this struggle. Rhizomatica's HERMES[79] project is yet another building block that makes it possible for local content to circulate encrypted on digital shortwave signals for hundreds of kilometres. This connectivity solution enables communities to design and own communication channels for their needs – in this specific case, to record proof of illegal activities for legal prosecution or public denouncement.

What echoes beyond the specific examples here is an important notion of connectedness and belonging that is cherished – and well expressed in cosmologies like "sumak kawsay" (i.e. good living in the Kichwa language) or the concept of ubuntu.[80] It is not by accident that worldviews which challenge the construct of the Cartesian subject and suggest that "a person is a person through other persons"[81] (and further entities) are organically based on collective action – a pretty good starting point for the further conceptualisation, design and realisation of local and community-centred services.[82]

78. https://www.digital-democracy.org/mapeo
79. https://www.rhizomatica.org/hermes/
80. See https://en.wikipedia.org/wiki/Sumak_kawsay and https://en.wikipedia.org/wiki/Ubuntu_philosophy
81. Birhane, A. (2017, 7 April). Descartes was wrong: 'A person is a person through other persons'. *Aeon*. https://aeon.co/ideas/descartes-was-wrong-a-person-is-a-person-through-other-persons
82. Props for raising this point go to Steve Song, who already pondered on these issues a while ago. See Song, S. (2008, 21 January). Ubuntu and Descartes. *Many Possibilities*. https://manypossibilities.net/2008/01/ubuntu-and-descartes/ A productive and provoking comment on the debate of leaving behind the individual perspective and embracing a social bonding approach can be drawn from George Bataille's work on "sacrificial communities" when suggesting that a community especially recognises its collective existence when facing its extinction.

5. CONCLUSION

Almost 20 years ago, when the World Summit on the Information Society (WSIS) was meant to lay out guidelines for global and inclusive digitalisation, the terms “meaningful connectivity” and “local service” were not coined yet, or at least not debated. However, many of the reflections and findings of this paper echo the general lines of the Geneva Plan of Action, as well as civil society claims and the prominent campaign Communication Rights in the Information Society (CRIS). In the final section of this paper, we will: (5.1) shed light on these global reference points, (5.2) analyse the specific challenges CNs face in the implementation of local services, and (5.3) share recommendations to make community-centred connectivity/CNs working alternatives or provide a practical entry point for enabling local services in terms of livelihood, democratic participation and a sustainable life on earth.

5.1 From WSIS to local services

If there should be any doubt about the historical call for “community-centred” communications and information and communications technology (ICT), the WSIS Civil Society Declaration: “Shaping Information Societies for Human Needs” serves well to clear them up.[83] Much emphasis is placed on explaining the crucial role of collective agency in bridging digital divides and seeing us reach the goal of universal connectivity. We need to readjust the focus of technology to something less profit- or market-driven, and enhance efforts in a community needs-based manner instead. Our conclusion, in regard to the specific challenge of meaningful connectivity, is similar: the value of the digital will not reach communities solely in scenarios where

83. World Summit on the Information Society. (2003). *“Shaping Information Societies for Human Needs”: Civil Society Declaration to the World Summit on the Information Society*. International Telecommunication Union. https://www.itu.int/net/wsis/docs/geneva/civil-society-declaration.pdf

telecom infrastructure operators install and deliver connectivity services and where global platforms have a focus on passive consumerism and data extraction. Particularly at the rural level, we still are guided by the previous WSIS call in communication services whereby value will come from the local communities themselves and through their ability to act and deliver actions based on their own agency.

To increase such agency, the aforementioned 2003 declaration suggests: "where community-based technologies are concerned the study and practice of community informatics must be applied in order to respond adequately to the particular characteristics and needs of communities in design processes."[84] Very much in line with this, two decades later, in Kenya, for example, CN partners desire a greater participation by grassroots communities in rural areas to enter ICT spaces and thereby design the services that they need and want. Communities should be able to offer opportunities to create new digital places to interact in and to bring various local voices together. True change will arrive when a community's interest, awareness and action are the starting points for digital transformation. Ultimately, we remain in agreement with the 2003 WSIS civil society declaration and believe that community connectivity will be catalysed when local services and technologies are designed and developed to strengthen the community's local ties, economies and activities.

Mobilising civil society and creating regional synergies were seen as key to a participatory and democratic path into an information society in the 2003 declaration. While this vision has not yet been fully realised, thanks to community mobilisation and engagement the concept of the global internet is now discussed widely. It is better understood in relation to its benefits as well as risks, which helps people make informed decisions (i.e. do we connect to the global internet or not). There is also space for people to think creatively about alternative "connectivity" options, particularly in rural areas: local services and technologies best suited to retaining local values, economies and cultures as well as being affordable and accessible. For example, Talant Sultanov anticipates another generation of content creators whose works will be highly localised within their own communities.[85] This may mean that the replication of their content may be difficult, given the effort that goes

84. Ibid.
85. Interview with Talant Sultanov, 2 May 2023.

into ensuring the works are in local dialects and formats. But on the other hand, it will be this very content that brings the most meaning to these isolated communities. Lilian Chamorro echoes this localised message, stating that the content will be significant based on the needs of each of the respective territories.[86] This indicates an interesting shift: during the 2003 WSIS, the focus was on integration or the premise that we do not leave behind remote local communities. Today's community-centred connectivity initiatives can be seen as ways for their local collectives to contribute to germinating cells of change and enabling spaces to ideate, improve, test, adapt or customise diverse digital content and technologies that respond to human needs. Many of these collectives can feed into larger civil society mobilisation and regional or global spaces of participation.

Local services and technologies are practical responses to the questions raised above about the "what" and "why" of connectivity from a meaningful community-centred perspective. When asking what kinds of valuable services are most relevant to communities, the regional coordinators (based on their interactions with CNs in different regions) identified three major themes: agriculture, health and education. It is no surprise that all these three are mentioned in the 11-point Geneva Plan of Action[87] of 2003, since they remain crucial for human well-being and sustainable communities. Most of the other action lines, for instance employment, media and cultural diversity, also appear in our analysis but are imagined in this paper's discussions as relevant local services. This relocation of these action lines for us is important, especially with regard to ensuring that: (1) the action lines are grounded and become operable,[88] and (2) communities do not appear as service takers at the end points of digital networks, but propose themselves as primary constitutive nodes or contributors to the network.

When engaging with this dynamic of relocation of some of the action lines and reviewing their potential extension to the work of CNs beyond connectivity, the first internal question to pose to ourselves is how far, within the next LocNet strategic period, should we extend efforts towards contributing to local services and technologies around these three major themes (i.e. agriculture, health and education)? Or should our

86. Interview with Lilian Chamorro, 24 April 2023.
87. https://en.wikipedia.org/wiki/World_Summit_on_the_Information_Society
88. Interestingly, the groundedness of ideas or proposals makes all the difference to many Indigenous communities when evaluating options towards social change. While utopias as in the Western tradition of thought (by definition non-places) remain incomprehensive in their political appeal, visions are embraced as the basis on which to take action.

efforts concentrate only on one or two of these themes? In practical terms, we also have to ask if we should partner with other support organisations on themes that we do not specialise in or cannot work on alone. For example, Onda Rural works with the United Nation's Food and Agriculture Organisation (FAO) to focus on communal communication and agriculture. We may want to create a deeper, synergistic partnership with this support organisation in this instance. While these are the three themes we[89] propose for further discussion, we would like to share some guiding ideas on local services and technologies that we reached a consensus on while writing this paper:

- Local services (including the hosting of servers) could be offered by experts or partners to relieve the support organisation or the grassroots community themselves from additional tasks they are unable to undertake (e.g. the African Centre for Women, Information and Communications Technology – ACWICT – in Kenya has expertise in and has worked on content and information for farmers).
- Local content depends on its meaningfulness in relation to the needs and visions of the community.
- Local educational services (especially those related to school curricula) usually depend on available or existing digitised material; if not, they are difficult to implement.
- Local content creation platforms currently do not exist or are not well known. These sorts of platforms, similar to community radios or local media captive portals, are important.
- Local commerce platforms are often talked about and asked for, but there is a gap in the knowledge and applicable models required to make them a reality.
- The ability to search for simple and easily customisable tools and then show communities how to take advantage of these tools is important.

Whatever guiding ideas we will continue to work with, there is an early academic observation of the forthcoming WSIS +20 review of outcomes which we can contribute to with this analysis of meaningful community-centred connectivity and its relation to local services and technologies. Furthermore, there is a specific attempt to build in

89. Of course, this "we" includes all the valuable experiences and visions shared by the persons interviewed for this paper.

communication rights in what appears as an ambiguous global agenda. This communication rights approach might be relevant to reflect on when it comes to inputting into the agenda in relation to local services and technologies as well as meaningful connectivity.[90] Finally a question raised in 2003 was why this WSIS roadmap for the internet to come – that differs from today's problematic configuration and ownership – was not achieved. Some possible answers could be because the campaign for change was (1) over-committed, (2) overly academic and (3) lacked practical ownership of subaltern and grassroots groups within relevant sectors. These factors may constitute relevant warning signs for our own work in this forthcoming period. They already come with useful recommendations, and specifically the LocNet team can narrow the focus, and concentrate on solving aspects of everyday communication deficits.

5.2 Emergent challenges

Our expected outcome is that local services and technologies will see its adoption by communities and this will further catalyse a demand for the community-centred connectivity initiative and/or community network. Yet, we also foresee challenges. For example, once local services are installed and running, there may be advanced aspects and new fields of activity around community engagement which will need further consideration. In other words, what are the challenges anticipated in implementing local services and technologies within community-centred connectivity initiatives? While the following list is by no means exhaustive, we propose four factors to take into account:

1. **Personnel:** For example, what is envisioned with regard to system administration or technical personnel for the maintenance of local content upkeep, content moderation (i.e. digital hygiene), data usage controls or updates to servers within communities? In many rural settings, there will be challenges in identifying and retaining trained staff who can interact with the technology. Once trained, one can expect that there might be high turnover once persons are upskilled and can take on other work. Succession or

90. Thomas, P. N. (2005). CRIS and global media governance: Communication rights and social change. *Centre for Social Change Research; QUT Carseldine – Humanities & Human Services*, 1-11. https://www.semanticscholar.org/paper/CRIS-and-global-media-governance%3A-Communication-and-Thomas/53673086a0f39d40dec6b6ea73667a21d41b27f9

personnel commitment plans would need to be imagined from the outset. Further, what level of digital services can local community members be capable of managing or maintaining, given the structural issues they deal with in their day-to-day lives?

2. **Readiness factors:** While there are communities who are enthusiastic about taking on new technologies, there is also the challenge of ensuring new tools are adopted by the majority. Lilian Chamorro states that the lack of experimentation and thinking around methodologies of adoption in the early stages of the application model may hinder usage later down the line.[91] Fostering user-experience (UX) techniques on local service platforms could help with early tests and see the ways in which the technology is adopted and how it is maintained based on the availability of technical equipment, parts and supplies. Adoption should consider the different groups this technology is catering to, such as older persons, youth, women and other intersectional aspects (i.e. income levels, ownership of devices, etc.). Specifically, there is need for thought about what may be required for uptake across these intersections. This can involve different paces or timelines as well as a need to consider what was previously an analogue activity and how groups can move their engagement towards the digital through a guided hybrid process. Talant Sultanov also notes that development projects or techies are enthusiastic about creating new apps, which can become overwhelming for new users. In some cases, it could become a deterrent for rural usage as it involves new steps such as offline downloading in conditions of poor connectivity and additional unique aspects in its adoption. Rather, existing apps that are already in use by the people in question could reduce this anxiety and the need for additional adoption steps.
3. **Digital moderation, digital security and mitigating risks:** There is also a need to adapt to changes in technologies, as evolving responses to need can change human use. For example, Sempreviva Organização Feminista, along with its partners, wished to improve the control of and access to the community network and thereby levied small fees to be charged to members in order to pay for and facilitate the system improvement.[92]

91. Interview with Lilian Chamorro, 24 April 2023.
92. Lobo, N. (2023, 29 May). Communities of practice in community networks: Exchanging knowledge on the Pirania captive portal. *Association for Progressive Communications*. https://www.apc.org/en/blog/communities-practice-community-networks-exchanging-knowledge-pirania-captive-portal

4. **Local services cannot exist in an isolated way, but need federated ecosystems:** As many mentioned and as use cases of local services now show, the design, exploration and customisation of technologies can take place in offline spaces. Sometimes this might be an explicit goal – too often "being digital" is equated too hastily with "being online".[93] However, if we look at locally deployed technologies, it is apparent that communication and collaboration beyond the local level is also necessary to develop and maintain those technologies in a sustainable way. The goal is definitely not to reinvent the wheel and push for complete local self-reliance. Different from protectionist concepts of "technological sovereignty" driven by geopolitical thought and the corresponding, competing economic blocks, local services very much depend on open innovation. They also actively dialogue with digital ethics like the Feminist Principles of the Internet[94] and decentralised, federated network architectures. So, conceiving local services and ensuring their use and longevity also necessitate the creation of broader spaces that respect local values, and facilitate collaboration and the centring of consent. Communities of practice, agreements on shared protocols (e.g. ActivityPub),[95] feminist hackathons and contributions to digital commons and practices of digital care could be read as heterogeneous expressions of a federated ecosystem which local services depend on and contribute to at the same time. The challenge is to better understand and strengthen those intersections.

Further we ask, what type of demand on the quality of communication experiences will be possible, or what will be the changing dynamics of the system over time as community members get used to a certain level of service? For example, what type of data protection or digital safety needs to be considered when communities are handling their citizens' personal data? There is also the preparedness or digital literacy or hygiene that also would need consideration for new users. Talant Sultanov mentions some early adoption risks, including internet scams, particularly around money transfer fraud or illegitimate banking information requests.

93. Prudencio, K., & Bloom, P. (2021, 8 June). Op. cit.
94. https://feministinternet.org/
95. https://en.wikipedia.org/wiki/ActivityPub

With improved adoption of local content can come community requests for increased access to the global internet and its competing platforms. Since hybrid scenarios (i.e. access to both the global internet and server-specific local network and offline content) will be a reality in many places, the co-design of local services also has to take into account wider ranging questions. For instance, practically, there is a real risk of sustaining a level of interest to connect with local community-based content alone when the global internet accessibility is also available on the network. What is a fair balance when considering the online/offline interaction between the mutual aspects of connectivity?

Subsequent professionalism is needed as community-specific technological adoption improves due to the provision of services demanded. For example, the factors that drive better community adoption can range from the customisation of local services and putting appropriate new services to test with users from specific communities to the mutual co-creation specific services. All these experiences can catalyse demand for the advancement in connectivity, whether it be for digital content, services, the internet or other digitally-enabling requests. At the same time, there are some practical aspects around local content and service provision to think about once the global internet rises in demand in terms of quality and speed of the connectivity within a community. Community adoption can go positively with the customisation of local services or their co-creation, yet pragmatic issues also arise from advancements made in maintaining a community-centred connectivity initiative. Local services and technologies will help to catalyse connectivity and with that we acknowledge many challenging considerations once such initiatives advance in community adoption.

5.3 Recommendations and action steps

Based on the above report, the recommendations we make to help inform LocNet's strategic plan moving forward will focus on certain aspects, specifically the shaping of the term meaningful community-centred connectivity. For example, recommended activities with regard to local services and technologies would best align with the 2024-2027 strategic plan, particularly around:

> Outcome 2: People and communities in focus countries shape, use and benefit from local services and technologies, catalysing meaningful community-centred connectivity.

Another recommendation is for the LocNet team to arrive at a consensus on whether they agree with the principle of utilising a meaningful community-centred connectivity (CCC) approach. This is specifically important when speaking about topics that centre around the terms “meaningful connectivity” or “meaningful access” in public events and spaces. As a team, we would also need consensus on the use of the term local services and technologies when articulating local adoption of digital activities which communities need or demand. If we do agree on this approach, it means we can work towards our team’s sensitisation on the terms, as well as work on external communications.

5.3.1 Meaningful community-centred connectivity approach

This section provides some of the 2024-2027 activities which the LocNet team can help to support which aligns with the outcome of shaping meaningful community-centred connectivity.

- Accompanying CCC/CN support organisations
  - We encourage inclusive face-to-face dialogues with the grassroots community and prior assessments around community values and needs, in order to determine the “meaning” and explore how that may catalyse digitisation efforts.
  - Through our partner or support organisations, we support grassroots communities as they try to shape and co-design their connectivity, local service and/or technology proposals. Dialogue and facilitation should involve and empower voices that are usually unheard and encourage active participation by the community around technology choices, use and adoption.
- Communities of practice (CoPs)
  - The LocNet team accompanies the development of safe and open spaces for exchange, which allows peers to learn from each other and share their expertise or experiences.
  - Red del Viento[96] from Colombia, for example, works to create different working groups that can serve as inspiration; the focus of such groups ranges from the technical to the cultural. The group formation process is important even before things

96. Ángel, R. (2023, 23 February). ‘Red del Viento’: La propuesta comunitaria que Petro quiere replicar en toda Colombia (y que el mundo debería conocer). *El Ciudadano*. https://www.elciudadano.com/reportaje-investigacion/red-del-viento-la-propuesta-comunitaria-que-petro-quiere-replicar-en-toda-colombia-y-que-el-mundo-deberia-conocer/02/23/

become content production related (e.g. the groups in the respective territory relate to technology, production of content and cultural incentives).
    - CoPs provide knowledge resources: some learnings can be useful for others, and documentation can extend such learning. For example, the community of practice for sustainability has been used to produce a series of manuals on specific aspects such as community vouchers and locally-hosted services. Another example involves the Centre for Information Technology and Development (CITAD), which is working to translate technical terms into the Hausa language in a handbook for their next School of Community Networks.
- Capacity building and long-term support
    - There is a need for spaces targeted at women and/or gender diverse people, to further their technological understanding and adoption at a pace that matches the skill and digital sensitisation present in the group. Some previous and current examples of these spaces include Hackers Comunitarias,[97] the Nodes that Bond project[98] and Sempreviva Organização Feminista.
    - With the Common Room team, different and accessible content is produced for teaching to support their Training for Trainers project. For example, for digital skills enhancement (i.e. demonstrating how to operate smart phones, etc.), it is done by creating pictorial content. This same Training for Trainers information is then provided to the community.

5.3.2 Customised accompaniment of communities and other stakeholders

This section provides some preliminary criteria around the type of partnerships and some criteria or prerequisites when starting a LocNet activity. This guide will help the LocNet team on whether support

97. APCNews. (2022, 1 April). Seeding change: Meet Hackers Comunitarias, the women challenging communications, tech and access inequalities in Mexico. *Association for Progressive Communications*. https://www.apc.org/en/blog/seeding-change-meet-hackers-comunitarias-women-challenging-communications-tech-and-access
98. APCNews. (2021, 9 June). Seeding change: Nodes that Bond women overcome access gaps at the Portal sem Porteiras community network in Brazil. *Association for Progressive Communications*. https://www.apc.org/en/blog/seeding-change-nodes-bond-women-overcome-access-gaps-portal-sem-porteiras-community-network

organisations, grassroots communities, sector experts as well as partners who will support CoP spaces are aligned with our values and goals for the initiative.

- Support organisations: We want to work with existing or new support organisation entities who have close relationships with grassroots communities and who are already engaging in community networks or community-centred connectivity initiatives. Some criteria for choosing support organisations include those who work with participatory methods of engagement and less from a top-down approach. They are able to co-work with grassroots communities when assessing their needs and what is of the most value or meaning. These support organisations can also bridge this assessment by recommending appropriate connectivity, local services and/or technology services (with accompaniment from the LocNet team, if needed). They understand the community-centred connectivity ecosystem and can specifically identify possible local sector entities or experts for partnership, should the support organisation be unable to provide specific advice on technical or other aspects.
- Grassroots communities: The grassroots communities should have some form of existing community-centred connectivity initiative. They should have expressed an interest to advance their work based on an identified local need, and be based on community values and meaning. The communities would have some involvement from local governance mechanisms or structures to ensure community mobilisation and awareness.
- Other service experts/entities: There are sector experts or a group of experts who could be called upon for advice around specific local services or technologies which could help a support organisation or grassroots community advance towards their identified needs or goals. Beyond CCC/CNs, there are also further stakeholders who follow a community-centred approach when it comes to the creation of technologies, for example the Nimble/Lokal project of Wakoma.
- Communities of practice: We see examples of learning exchange amongst interested parties (including amongst sector experts, grassroots community representatives, CCC/CN support organisations, etc.) that lead to stronger mutual or peer technological understanding and adoption. For example,

Murambinda Works in Zimbabwe and Tunapanda in Kenya were able to exchange lessons through peer exchanges around their e-learning platforms. Both groups had platforms with mutual goals of educational data management services to implement within their community network.[99] The same exchange of lessons was seen in Brazil between Sempreviva Organização Feminista and Portal sem Porteiras around lessons learnt from adopting the Pirania captive portal. The methods for this exchange can be a mix of in-person, online or hybrid, depending on the availability of resources.

5.3.3 Continued exploration of aligned donors or partnerships

We would benefit from exploring which donors or partners are aligned with the mission of meaningful community-centred connectivity approaches to local services and technologies. There are some organisations that focus on particular community services. For example, we have identified some potential partnerships among the following:

- Partner organisations like REDES are exploring microfinance as a financial option within their communities in Mexico.
- Donors such as GIZ are supporting small enterprises in formalising and digitising their businesses to make better decisions or have access to funding.
- Institutions like Mozilla Africa has launched their new micro business platforms which could be of interest to grassroots communities.
- Foundations such as Grameen Foundation are active in Africa and India on matters of financial inclusion applications.
- In addition, access centres organised by local or municipal governments (i.e. to provide agricultural extensions, etc.) can align well with a greater digital inclusion ecosystem.

99. APCNews. (2021, 16 September). Seeding change: Murambinda Works on building community networks and ICT solutions that respond to people's needs. *Association for Progressive Communications*. https://www.apc.org/en/blog/seeding-change-murambinda-works-building-community-networks-and-ict-solutions-respond-peoples

5.3.4 Document and encourage the ethical customisation and development of technological platforms

The idea knowledge exchange refers to sharing with grassroots communities and support organisations the technological options that currently exist and advise which may assist them in undertaking their local services more efficiently. Documentation and creating spaces for online or in-person exchange will be important ways to ensure this knowledge exchange and learning occurs. For example, we have seen requests from Indigenous communities for controlled and meaningful access to the broader internet ecosystem, and advice, training and the installation of captive portals have been key to this endeavour. We have undertaken local and digitally-meshed activities and services in order to extend particular local services such as the providing the availability of digital educational materials on servers. For example, in Zenzeleni's mesh network, there are plans to make agricultural content available in the local languages. In Kilifi and Nakuru counties in Kenya, there are plans to form partnerships, likely with the local or municipal government, to pass pertinent agricultural information on to their respective farmers. In Turkana county, they plan to do the same but with health information. Community networks in the DRC and Gulu, Uganda, also have offerings for developing an emergency platform should there be risks to vulnerable persons. CITAD has a community radio station and its radio content is also available online. CITAD hopes it can make content more relevant, available and inclusive, particularly in relation to spaces where people have been excluded in the past. Common Room, MAJI and Onda Rural work with some communities who are using their community network as a foundation on which to improve their work with environmental sensors for agricultural or environmental practices (i.e. irrigation, or wildfire detection). In Oriza, for instance, people wanted to set up a mesh to map their territory and the water quality as there are mines close by which increase the risk of water pollution to the community. Finally, REDES and Tanda Community Network actively participate in the development of Colmena, a digital tool for content creation and sharing. Specifically, all its operating systems are provided as software as a service (SaaS) in their regions and are readily available for self-hosting. All these examples involve process activities that would benefit communities to understand their step-by-step methods of implementation. The LocNet team would have to ensure documentation from the learning outcomes of these processes which would help further exchanges around community-centred connectivity initiatives.

In conclusion, local grassroots communities have incredible knowledge to offer the world as well as their own people. It is through their diverse activities of local production, cultural artefacts and preservation, which the digital can enhance, that they bring value and meaning to us all. For a long time, the world has been miscalculating the value rural communities bring. The LocNet initiative hopes to redefine the narrative; there are inclusive and collective action of rural and remote communities in these digital spaces, and local ownership is realised when ideas are constructed by the communities themselves. Through this change of narrative, we see and recognise more of the collective or aggregated benefits towards a thriving, sustainable world.

ANNEX 1 – CATEGORIES AND LOCAL SERVICES MENTIONED IN THE INTERVIEWS

Community-owned infrastructure

- Local mesh networks (off-grid) and federations of the same
- Local data repositories and digital archives to bundle information
- Digital hubs to host services
- Local ICT centres to provide access to public services (add-ons to connectivity)
- Local (offline) platforms for all topics relevant to a community
- Emergency response platforms
- Physical access points for persons without devices
- Offline communication tools

Health care

- Digitised public health services and outreach to rural communities
- Connection of local health care structures (midwives) with health care providers (to get training from hospitals, register patients on platforms, etc.)

Territorial protection and the environment

- Climate monitoring (e.g. uncovered micro-climate stress)
- Sharing space for issues concerning the territory in question
- Sensors for environmental organisations to use in the field
- Mapping of biodiversity, the territory, water quality, etc.

Agriculture and local production/services

- Micro-level e-commerce with livestock
- E-agricultural content for farmers
- Weather information
- Information on alternative farming practices and plants to respond to climate change
- Tools for more sustainable agriculture and farming
- Improved financing mechanisms
- Online financial services (online payments)
- Sensors in the field of agricultural practices
- I-Dots
- E-commerce platforms (e.g. for selling seeds, paint jobs, etc.)
- Voucher-based internet access as a local income strategy
- Electronic purses (in local currencies) in the territory, to reduce the risk of moving money around
- Access to funds for local farming
- Platforms to broker contacts for plumbers and electricians, (e.g. job bots used to advertise work or services on a local platform)

Education and public services

- Existing educational content on local servers
- Video tutorials (i.e. facilitating the repetition of information for learning)
- Access to e-governance services
- Provision of digitised (school) curricula
- Connect schools
- Exchange of products at a local level (not always to be commercialised)
- E-services from the government
- Recreate agricultural officers in the digital field (platform based)
- Create one's own educational content (e.g. training of producers, documentation of production processes)

Language

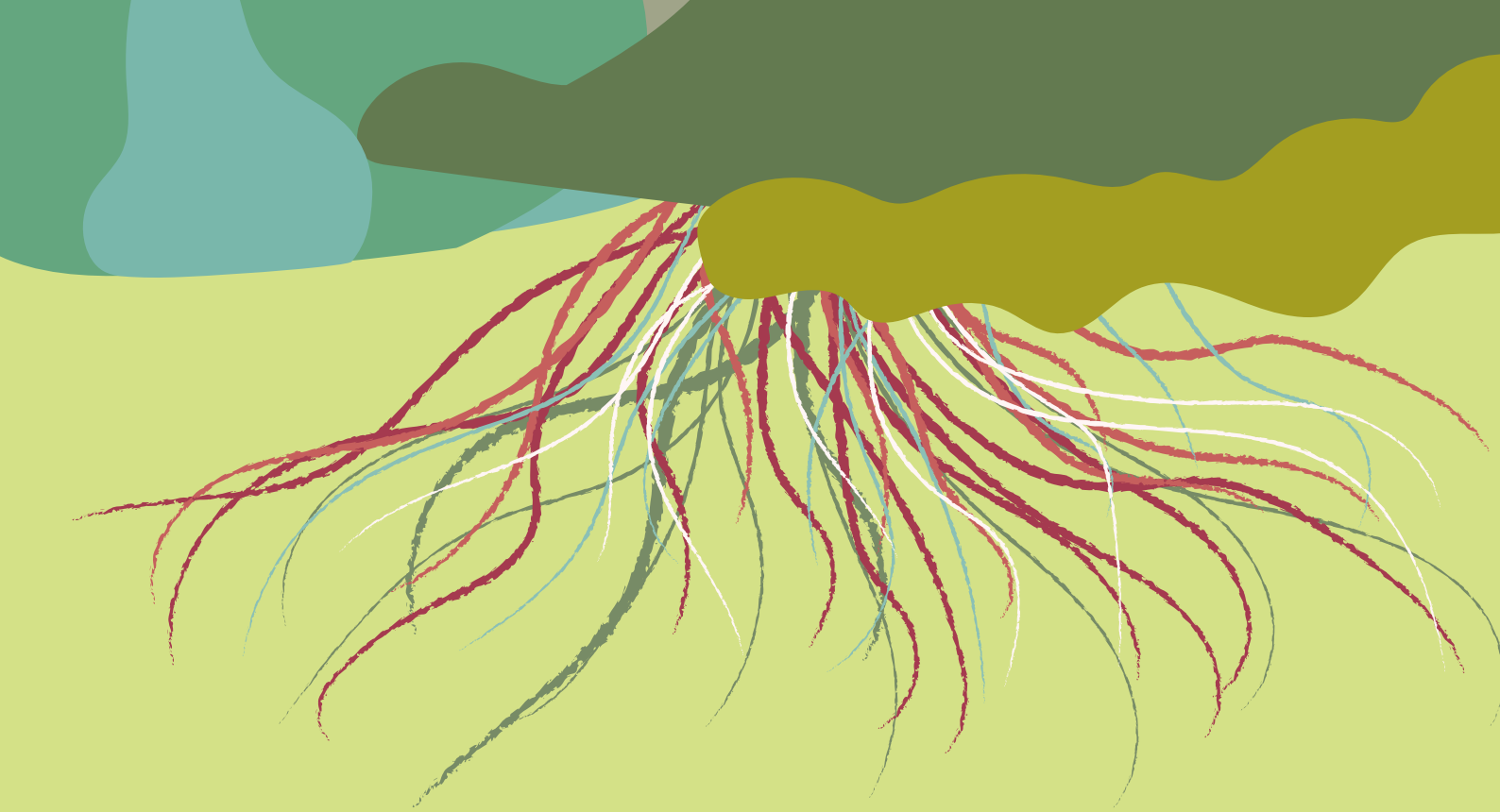
- Need for natural language processing
- Digital literacy in own languages
- Provide and create relevant content in the local language that you speak

Communication facilities

- Safe and fun online meeting spaces (especially youth-specific spaces)
- Calling facilities in telecom dark zones
- Sharing digital content dynamics (music, videos, etc.)
- Games on local access servers
- Content management and creative platforms (locally customisable)
- Local information-sharing (civic platforms)
- Community radio (a transversal element)
- Offline chat, voice and messaging tools for communities
- Mesh networks as new spaces for discussion
- Digital archives of music, photo or video collections
- Recording and sharing relevant practices (e.g. farming events)
- Knowledge-sharing platforms
- Information sharing on customised captive portals specific to human rights defenders, fighting gender-based violence, creating safe spaces for women, etc.

Local capacity building

- Provide digital training
- Machine-independent language (MIL) training for teachers
- Local commerce
- Platforms for the exchange or commercialisation of products



APC
ASSOCIATION FOR PROGRESSIVE COMMUNICATIONS

RHIZOMATICA