Institute for Social Entrepreneurship in Asia

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Towards Measuring the Social Impact and Cost Effectiveness of Community-Centered Connectivity Initiatives: Insights from Case Studies in Asia and Africa

Integrative Report

by **Marie Lisa Dacanay, Albert Teo,** and **Jay Bertram Lacsamana**

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Executive Summary

By providing internet access to unconnected and underserved populations, community-centered connectivity initiatives (CCCIs) have emerged as critical actors in bridging the digital divide. As social enterprises or the social mission-driven segment of internet service providers (ISPs) in the digital industry, CCCIs demonstrate responsiveness and effectiveness in enabling the poor and marginalized to obtain meaningful connectivity.

However, few studies measure their social impact and cost-effectiveness. In response, the Institute for Social Entrepreneurship in Asia (ISEA), in partnership with the Association for Progressive Communications (APC) and Rhizomatica embarked on a case study research project of CCCIs in Asia and Africa. The study aimed to identify and describe the social impact of CCCIs using Development Indexing (DI) and to assess their cost-effectiveness through the Social Return on Investment (SROI) methodology. DI supports the quantification of social impacts where simple proxy measures are inadequate. SROI, meanwhile, is a ratio that compares financial and social outcomes to inputs and costs, thereby providing a measure of cost-effectiveness.

Two of the CCCIs studied are located in remote, rural, indigenous communities in Asia: one in the Sundanese indigenous village of Kasepuhan Ciptagelar in West Java, Indonesia (Kasepuhan Ciptagelar CCCI) and the other in the Warli tribal community in Pathardi, Maharashtra state, Western India (Pathardi CCCI). The other two CCCIs are in Africa: one is Tanda Community Networks, operating in an urban slum in Kibera, Nairobi, Kenya and the other is Zenzeleni CCCI, serving rural communities in Mankosi and Zithulele villages of Eastern Cape, South Africa.

The case studies reveal that CCCIs provide social inclusion and transformational services that generate significant social impact beyond what commercial ISPs typically offer. Social inclusion services address digital exclusion and other factors contributing to the usage gap. All the CCCIs studied deliver internet connectivity and capacity-building services to communities unserved or underserved[1] by commercial providers, resulting in effective access to social and economic services. Transformational services, on the other hand, aim to empower the poor and excluded to become active agents of their own development. In all four cases, marginalized communities strengthened their capabilities to govern and manage digital resources, leading to positive impacts on their lives and communities.

[1] Underserved refers to communities that have limited or inadequate access to essential services, such as internet connectivity, due to barriers like geographic, economic, or infrastructural constraints.

The social inclusion and transformational services provided by these CCCIs facilitated impacts that clearly demonstrate the value proposition for investing in them. Across the four case studies, significant scale and/or depth of impact was observed in communities served, particularly in the following key result areas (KRAs):

- Increased levels and capacities for inclusive human development
- Improvement in the economic position and conditions of community stakeholders
- More effective preservation of the cultural identity, heritage, and integrity of the community
- Increased levels and capacities for climate action and natural resource management
- Empowerment of community to control, govern, and manage internet and digital resources
- Inclusion and empowerment of women as stakeholders in digital transformation

Using the SROI methodology and protocols prescribed by Social Value International, the study found that all four CCCIs achieved SROI ratios above 1 over three years. The ratios ranged from 1.17 (Zenzeleni CCCI) to 1.50 (TandaNET) in Year 1; from 1.62 (Kasepuhan Ciptagelar CCCI) to 3.25 (Pathardi CCCI) in Year 2; and from 2.51 (Kasepuhan Ciptagelar CCCI) to 8.19 (Pathardi CCCI) in Year 3. Only the Kasepuhan Ciptagelar CCCI had data for Year 4, showing a ratio of 2.89.

All four CCCIs demonstrated an upward trend in SROI ratios year-on-year, indicating a consistent increase in social value created over time, as shown in the table below.

SROI Ratios of CCCIs studied

CCCI	Year 1	Year 2	Year 3	Year 4
Kasepuhan Ciptagelar (Indonesia)	1.45	1.62	2.51	2.89
Pathardi (India)	1.23	3.25	8.19	-
TandaNET (Kenya)	1.5	1.72	4.88	-
Zenzeleni (South Africa)	1.17	2.89	3.62	-

Overall, the case studies show that CCCIs are not only cost-effective interventions for bridging the digital divide but also powerful catalysts for progress across several Sustainable Development Goals (SDGs). This is evident in the multifaceted KRAs where significant impact, both in depth and scale, was observed.

List of Abbreviations

AePS	Aadhaar-enabled payment banking system
APC	Association for Progressive Communications
CBI	Community-based Institutions
CBO	Community-based Organization
CCCI	Community-Centered Connectivity Initiatives
CHP	Community Health Promoters
CIPESA	Collaboration on International ICT Policy for East and Southern Africa
CN	Community Network
CSO	Civil Society Organization
DI	Development Indexing
ECHIS	Electronic Community Health Information System
FGD	Focus Group Discussion
ICT	Information & Communications Technology
ISEA	Institute for Social Entrepreneurship in Asia
ISOC	Internet Society
ISP	Internet Service Provider
KES	Kenyan Shilling
KHIS	Kenya Health Information System
KRA	Key Result Area
MTP IV	Fourth Medium Term Plan
NDP	National Development Plan
NPC	Not-for-Profit Company
PI	Performance Indicators
Portkesmas	Portal Kesehatan Masyarakat

List of Abbreviations

PV	Present Value
SA Connect	South Africa Connect
SDG	Sustainable Development Goals
SE	Social Enterprises
SROI	Social Return on Investment
SVI	Social Value International
USAF	Universal Service and Access Fund
USD	United States Dollar
WEF	World Economic Forum

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Introduction

Community-centered connectivity initiatives (CCCIs) are social enterprises (SEs) within the digital economy. They are not merely internet service providers—they are mission-driven enterprises that prioritize purpose over profit, delivering meaningful connectivity to underserved populations. By combining sustainable business models with a focus on social impact, CCCIs empower marginalized communities to access, govern, and utilize digital resources, promoting economic inclusion and social transformation.

These initiatives reflect global trends in social entrepreneurship. The Global State of Social Enterprise Report (WEF, 2024), highlights that social enterprises collectively generate $2 trillion in annual revenue, create 200 million jobs worldwide, and actively contribute to all Sustainable Development Goals (SDGs). Despite their transformative potential, social enterprises, including CCCIs, continue to face challenges related to recognition, financing, and scalability, underscoring the need for stronger policy support and targeted investment.

Recognizing the importance of measuring their impact, the Institute for Social Entrepreneurship in Asia (ISEA), in partnership with the Association for Progressive Communications (APC) and Rhizomatica conducted a case study research on CCCIs across Asia and Africa. The study aimed to articulate the social impact of CCCIs and demonstrate their cost-effectiveness as innovative solutions for bridging the digital divide. Its findings contribute to the CCCIs' community of practice by introducing adapted social enterprise frameworks and impact measurement tools suited to their unique context.

CCCIs as Social Enterprises

As social enterprises, CCCIs deliver three core types of services: transactional, social inclusion and transformational services. Unlike traditional service providers, CCCIs go beyond providing access, creating sustainable digital ecosystems that enable communities to become active stakeholders in their own development.

- Transactional services focus on delivering affordable internet connectivity through financial or community-based exchange mechanisms. These services provide individuals and institutions with reliable access to the digital world, supporting education, commerce, communication, and essential services.

- Social inclusion services address the deeper issues of digital exclusion and the gap in meaningful connectivity. Designed to reduce affordability barriers and promote digital literacy, these interventions enable poor and marginalized groups to access education, healthcare, government services, and economic opportunities. They are tailored to reach both potential users and customers previously left behind by mainstream providers.

- Transformational services go further by equipping communities with the skills and capacities to govern and manage their own digital infrastructure. These services promote local ownership, inclusive governance, and long-term sustainability. Unlike the other two, transformational services target those who lead, manage, and operate connectivity systems, ensuring that the control of digital resources remains within the community and contributes to lasting empowerment.

Objectives and Methodology of the Study

This study contributes to the community of practice among CCCIs by enhancing their capacity to measure and communicate their social impact. To achieve this, the case research applies frameworks and tools used by social enterprises to help quantify the impact of CCCIs in the areas of economic inclusion, digital equity, and community empowerment.

Objectives

The overall objective of the study was to conduct a social impact analysis of CCCIs, using the Development Indexing (DI) and Social Return on Investment (SROI) methodologies. These tools offer structured approaches to assess impact and particularly for SROI, monetize the social and economic values generated by CCCIs.

Specifically, the study aimed to:

- Articulate the social impact of CCCIs by identifying key result areas, performance indicators, and transformational outcomes.
- Demonstrate that investing in CCCIs is an effective and efficient strategy for bridging the digital divide and connecting unconnected communities, ensuring long-term sustainability and digital inclusion.

The study's findings are expected to support CCCIs in advocating for policy recognition, financial investment, and expanded digital access, reinforcing their role as social enterprises that drive meaningful connectivity and community development.

Methodology

The study employed a case research approach, conducting both within-case and cross-case analyses of four relatively successful CCCIs across Asia and Africa. It identified patterns, successes, and challenges that shaped the effectiveness and sustainability of CCCIs in bridging the digital divide from the experience of the four CCCIs studied. *Table 1* outlines the organizational nature of each CCCI, its key partners, and its respective location and country.

Table 1. **Nature of Organization, Key Partners and Location of CCCI Cases**

CCCI	Nature of Organization & Key Partners	Location	Country
Kasepuhan Ciptagelar	Common Room (Foundation), Kasepuhan Ciptagelar (indigenous village), and Awinet (ISP company)	Indigenous village in West Java (rural)	Indonesia
Pathardi	Local association in partnership with Panchayat (a local self-government institution)	Pathardi, Maharashtra, West India (rural)	India
Tanda Community Network (TandaNet)	Community-based organization	Kibera, Nairobi (urban slum)	Kenya
Zenzeleni	Not for profit company; cooperatives	Mankosi & Zithulele, Eastern Cape (rural)	South Africa

Data Gathering. A multi-method approach was used to collect both primary and secondary data, ensuring a comprehensive analysis of the selected CCCIs. A review of related literature and organizational documents helped to provide the contextual background on digital inclusion, social enterprise models, and the policy environments surrounding these CCCIs in Asia and Africa.

Primary data was collected through key informant interviews and focus group discussions with stakeholders involved in implementation and governance.

- **Kasepuhan Ciptagelar (Indonesia):** Interviews were conducted with Common Room Networks Foundation officers and staff, as well as seven key informants from partner organizations, including the Lebak Disaster Response Agency, Economic Recovery and Development Center, Ciptagelar Governance, Awinet ISP, Portal Kesehatan Masyarakat (Portkesmas), ICT Watch, and representatives from the youth sector.

- **Pathardi (India):** Interviews with BAIF officers and staff were complemented by a focus group discussion involving five community residents: two e-DOSTs (tribal women entrepreneurs), two small farmers, and one Warli artist.

- **TandaNet (Kenya):** Data collection included key informant interviews and community-based assessments with individuals in network operations, local governance, and digital inclusion. The research team engaged with TandaNet's executive council and staff, as well as representatives from connected community centers, schools, and micro-enterprises. Focus group discussions were held with entrepreneurs, educators, and grassroots activists to gather perspectives on affordability, infrastructure, and cybersecurity risks.

- **Zenzeleni (South Africa):** Stakeholder interviews were conducted with cooperative members, technical staff, and digital literacy trainers to assess local internet governance and economic impact. The team also engaged with Zenzeleni Networks NPC and representatives from the Mankosi and Zithulele villages, as well as healthcare institutions benefiting from connectivity. A community survey measured the impact of internet access on education, healthcare delivery, and business growth. Policy and financial documents were reviewed to analyze network sustainability, cost structures, and the licensing dynamics within South Africa's telecommunications regulatory framework.

Photo Credit to Tanda Community Network

Development Indexing and Social Return on Investment

The study employed two key analytical tools: Development Indexing (DI), which assists in articulating multiple aspects of social impact, and Social Return on Investment (SROI), which evaluates cost-effectiveness by comparing investment to financial and monetized social benefits. Together, these methodologies offer a structured assessment of economic, educational, governance, and digital inclusion outcomes, providing a comprehensive understanding of CCCIs as social enterprises advancing meaningful connectivity.

DI is a structured methodology designed to quantify social impacts where simple proxy measures are inadequate. It functions as a tool for planning, monitoring, and evaluation, helping CCCIs align their interventions with their vision, mission, and stakeholder priorities. DI enables a comprehensive assessment of digital inclusion efforts, making it particularly valuable for evaluating the long-term social impact of CCCIs.

As this study was the first application of DI in the context of CCCIs, a new framework was developed to define Key Result Areas (KRAs), sub-elements, and potential performance indicators (PIs). To assess the significance of impact, the study assigned qualitative ratings of high, medium, or low (or significant and not significant) based on two criteria: extent of reach and depth of impact. An impact was considered significant if (1) both criteria were rated high, (2) both were medium, or (3) at least one was high. While the final stage of DI typically involves a scorecard system (ranging from 1-100) to quantify indicators with relative weights, this study did not reach that stage but was able to identify the most important key result areas and performance indicators where significant impact was notable.

SROI was the other key analytical tool used to evaluate the cost-effectiveness of the four CCCIs. SROI measures the financial and social value generated relative to the cost of inputs, expressed as a ratio. The SROI ratio compares the aggregate monetized value of all material financial and social outcomes experienced by stakeholders (numerator) to the total financial investment required to run the initiative (denominator). An SROI ratio greater than 1 indicates cost-effectiveness, meaning that for every dollar invested, more than one dollar was generated in terms of financial and social value.

Monetization of social benefits is one of the challenges faced in using SROI as a methodology. Tangible benefits, such as increased income, cost savings from internet use, or job creation, are relatively straightforward to quantify and monetize. However, intangible benefits like enhanced digital literacy, inclusive human development, and strengthened community governance present greater challenges. These require the use of well-designed proxy indicators to estimate value. Despite such complexities, SROI provides a robust and comparative framework, allowing CCCIs and their investors to assess the sustainability and efficiency of digital inclusion initiatives in bridging the digital divide and promoting economic empowerment.

DI and SROI are complementary methodologies in social impact measurement. Together, these tools create a holistic framework for evaluating the effectiveness and cost-efficiency of CCCIs in driving economic inclusion, expanding access to education and healthcare, and strengthening digital governance.

Context and State of Digital Connectivity in the Base Countries of the CCCIs Studied

All four countries recognize the strategic role of digital connectivity in advancing development, particularly for marginalized communities. However, systemic challenges persist in rural areas, such as inadequate infrastructure, high costs, and limited digital skills. Despite government-led initiatives to expand broadband infrastructure in each country, the effectiveness of these programs vary and are often hindered by policy limitations and uneven implementation. While CCCIs are emerging as vital complements to state-led programs, their growth is often constrained by regulatory or financial challenges. Each country's unique socioeconomic, geographic, and institutional realities shape both the promise and limitations of these initiatives. Addressing these requires tailored, inclusive, and sustainable policy approaches.

Common Development and Policy Contexts

There are common connectivity challenges faced by stakeholders in the four countries where the CCCIs studied are located. *Table 2* highlights the common connectivity challenges across Indonesia, India, Kenya, and South Africa.

Table 2. **Development and Policy Contexts of the CCCIs Studied**

Theme	Kasepuhan Ciptagelar (Indonesia)	Pathardi (India)	TandaNET (Kenya)	Zenzeleni (South Africa)
Rural-Urban Divide	Connectivity clustered in urban hubs	Rural areas lag behind in access	Urban-centric networks	Skewed rollout favoring urban areas
Digital Literacy Gaps	Gendered literacy divide, online harms	Low digital awareness, language barriers	Limited skills and low adoption in rural areas	High literacy in cities, lower in rural
Government-Led Initiatives	Palapa Ring, Village Law	BharatNet, PM WANI	National Broadband Strategy, MTP IV	SA Connect, NDP
Affordability Issues	Unequal bandwidth costs	High infrastructure and service costs	High device/data costs	High cost of broadband and mobile data

Specific Contextual Challenges Faced by CCCIs

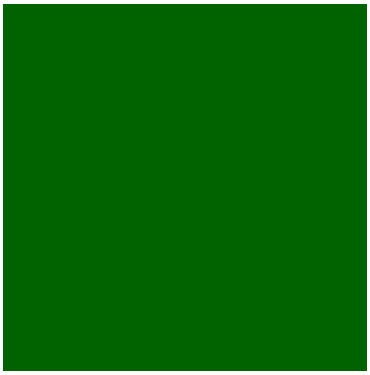
There are also specific contextual challenges faced by the CCCIs in the countries where they are situated. The specific contextual challenges faced by each of the CCCIs studied are provided below.

Kasepuhan Ciptagelar in West Java, Indonesia. Indonesia faces acute geographic challenges as an archipelago with over 18,000 islands. The emphasis on decentralization post-2001 has brought infrastructural gains, but indigenous communities remain excluded due to structural gaps in national policies like the Village Law. Stark gender disparities affect digital participation.

Pathardi, Maharashtra, Western India. India, despite having massive internet user growth, still grapples with the world's largest offline population. Its strength lies in multipronged federal initiatives like BharatNet and PM WANI, which aim at last-mile delivery. However, the lack of multilingual content and inclusive business models hinder deeper penetration, especially in linguistically diverse regions.

Kibera, Nairobi, Kenya. Kenya stands out for its "Silicon Savannah" branding and relatively progressive policy moves such as the affordable community network licensing. However, the benefits remain urban-centric. Continued community efforts, coupled with seed funding from social investors and enabling institutions and stronger digital literacy programs, are critical to expand affordable access in rural and informal settlements.

Mankosi and Zithulele villages, Eastern Cape, South Africa. South Africa has made substantial gains in national digital coverage but faces crippling cost and energy barriers. Policies like the SA Connect and spectrum reforms show government commitment, but institutional inefficiencies and uneven fund distribution (e.g., USAF) limit impact on community-led solutions.



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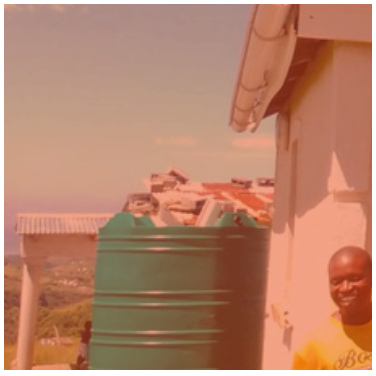

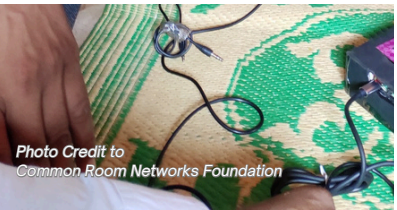

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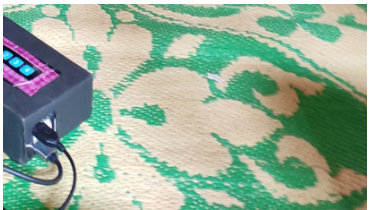

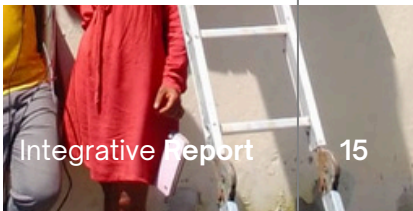

Main Attributes of CCCIs

What makes CCCIs well-positioned to provide inclusive and transformational services? CCCIs are often locally governed, demand-driven, and bottom-up solutions tailored to community needs. Unlike commercial providers, they are uniquely positioned to deliver inclusive and transformational services due to their community-led governance, adaptability, and strong focus on local priorities. CCCIs prioritize affordability, sustainability, and digital literacy, ensuring that marginalized groups gain technical skills, create digital content, and actively manage their own connectivity infrastructure.[2] This approach empowers communities as co-owners of their digital future rather than passive consumers, fostering long-term impact.

Beyond providing internet access, CCCIs act as catalysts for social transformation. They drive economic inclusion, improve access to education and healthcare, and help preserve cultural heritage. Whether supporting women entrepreneurs, facilitating indigenous knowledge-sharing, expanding youth education, or extending rural broadband access, CCCIs bridge digital gaps while promoting empowerment and self-sufficiency. Their success underscores the power of community-led models to build equitable, sustainable digital ecosystems and enable underserved populations to fully participate in the digital world.[3] *Table 3* shows the nature and key features of the CCCIs studied, which demonstrate these inclusive and transformational attributes.

Table 3. **Nature and Key Features of the CCCIs Studied**

CCCI	Location	Nature and Key Features
Kasepuhan Ciptagelar CCCI	Kasepuhan Ciptagelar in West Java, Indonesia	Indigenous-led initiative integrating local cultural values with affordable internet, fostering digital literacy, and enabling self-sustaining network management.
Pathardi CCCI	Pathardi, Maharashtra, Western India	Community-managed network serving seven tribal villages, featuring e-DOST for women entrepreneurs, cultural preservation initiatives, and an e-commerce platform with banking features for artisans and farmers.
TandaNet CCCI	Kibera, Nairobi, Kenya	Grassroots-driven initiative providing affordable connectivity, digital skills training, and advocacy for emerging CCCIs, focusing on schools, health clinics, and microenterprises.
Zenzeleni Networks	Mankosi and Zithulele villages, Eastern Cape, South Africa	Cooperative-led ISP offering locally managed, low-cost internet services, supporting digital literacy, economic participation, and governance in underserved communities.

[2] https://www.apc.org/en/pubs/typology-community-centred-connectivity-initiatives
[3] https://www.apc.org/en/pubs/principles-community-centred-connectivity-initiatives

Shared Features, Stakeholder Engagement, and Sustainability Models of CCCIs

The four CCCIs—Kasepuhan Ciptagelar (Indonesia), Pathardi (India), TandaNet (Kenya), and Zenzeleni (South Africa)—share a common goal: bridging the digital divide in underserved communities while tailoring services and governance to local needs. Whether in a rural or urban setting, each operates in marginalized areas where infrastructure gaps, high costs, or policy constraints limit access to affordable internet.

Each initiative demonstrates these notable features in serving marginalized communities:

- **Kasepuhan Ciptagelar** integrates digital access with indigenous governance and cultural preservation,
- **Pathardi** promotes tribal inclusion through women-led entrepreneurship and digital service delivery,
- **TandaNet** adopts a grassroots approach centered on community governance, training, and advocacy, and
- **Zenzeleni** functions as a cooperative ISP, providing affordable, locally managed internet services in rural South Africa.

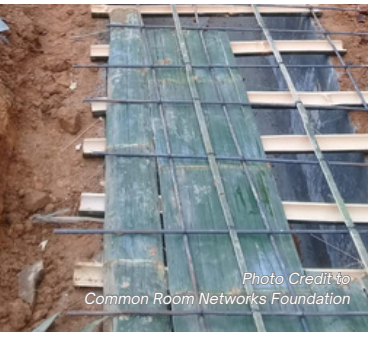

Photo Credit to Common Room Networks Foundation

These features, along with the nature of stakeholder engagement and financial sustainability strategies, are summarized in *Table 4.*

Community stakeholders play a pivotal role in establishing, managing, and expanding each CCCI. In Kasepuhan Ciptagelar, indigenous leaders and youth lead efforts in digital literacy and governance. Pathardi empowers tribal women to become e-DOST service providers, combining entrepreneurship with digital inclusion. TandaNet mobilizes schools, microenterprises, and advocacy groups to promote digital access through localized training and capacity-building. In Zenzeleni, community cooperatives manage the ISP, with local technicians and entrepreneurs determining pricing, service quality, and expansion. These approaches reinforce community ownership and ensure long-term impact, differentiating CCCIs from traditional commercial providers.

Photo Credit to Tanda Community Network

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Financial sustainability varies across the initiatives, each adopting innovative funding models suited to their economic context. Kasepuhan Ciptagelar and Zenzeleni rely on pre-paid voucher systems and active community engagement to maintain services. Pathardi secures funding through annual grants allocated through the Gram Panchayat Development Plan, facilitating consistent service delivery to tribal communities. TandaNet blends low-cost subscriptions, donor support, and training programs, leveraging partnerships for sustainability. While these models enhance accessibility, long-term sustainability depends on expanding user bases, strengthening local capacities, and securing supportive policy frameworks. These conditions are critical for CCCIs to sustain and scale inclusive digital transformation in underserved regions.

Table 4. **Features, Stakeholder Engagement, and Financial Sustainability Models of the CCCIs**

CCCI	Features & Location	Stakeholder Engagement	Financial Sustainability Model
Kasepuhan Ciptagelar (Indonesia)	Indigenous-led digital initiative integrating cultural preservation, governance, and affordable connectivity in rural West Java.	Indigenous leaders, youth groups, and technicians manage and expand services, ensuring self-sustaining network operations.	Voucher-based sales model (i.e., prepaid internet vouchers) fund service expansion and local maintenance.
Pathardi (India)	Community-managed network serving tribal villages, focusing on women-led entrepreneurship and digital inclusion.	Tribal women (e-DOSTs) provide digital services, while local farmers and artisans engage in e-commerce expansion.	Annual grants via the Gram Panchayat Development Plan secure funding for operations, ensuring affordability for rural users.
TandaNet (Kenya)	Grassroots-driven initiative in Kibera, emphasizing capacity-building, advocacy, and movement-building for CCCIs.	Schools, microenterprises, and advocacy groups actively shape policies and service models to ensure community governance.	Mixed model: low-cost subscriptions, donor funding, and capacity-building grants sustain long-term operations.
Zenzeleni (South Africa)	Cooperative ISP offering locally managed, low-cost broadband access, supporting digital literacy and economic participation.	Community-led governance and cooperatives dictate pricing, infrastructure investments, and long-term network expansion.	Voucher-based sales model ensures affordable prepaid subscriptions, with reinvestment in local infrastructure and training.

These CCCIs demonstrate diverse approaches to digital inclusion, ensuring community engagement, localized governance, and financial sustainability to deliver equitable and scalable connectivity solutions.

Comparative Analysis of Transformational and Social Inclusion Services Across CCCIs

The four CCCIs—Kasepuhan Ciptagelar (Indonesia), Pathardi (India), TandaNet (Kenya), and Zenzeleni (South Africa)—offer a blend of transactional, social inclusion, and transformational services, each tailored to the unique needs of their communities. All four initiatives provide basic transactional services, such as internet connectivity, using models like voucher sales, subscriptions, or government-supported programs. They also offer essential digital services, including printing, scanning, and mobile banking, with Pathardi notably integrating an Aadhaar-enabled payment system and support for a wide range of utility payments.

While social inclusion is a shared priority, the CCCIs adopt varied approaches. *Table 5* compares the common and distinct needs-based services across the four initiatives.

Digital literacy training is a common feature, equipping communities with basic computer skills and online safety awareness. However, Pathardi's e-DOST program and TandaNet's Women Engineers Program specifically target female digital entrepreneurship, promoting gender inclusion in the tech space. Local content creation and preservation also emerge as key strategies: Kasepuhan Ciptagelar focuses on indigenous storytelling, Pathardi promotes tribal knowledge-sharing; and TandaNet supports audio content production. Zenzeleni distinguishes itself by providing computer hubs that offer shared digital access.

Transformational services focus on community governance, digital autonomy, and infrastructure sustainability. All CCCIs emphasize capacity building, but implement it differently: Kasepuhan Ciptagelar and Pathardi train local residents in network maintenance; TandaNet works on movement-building and mentoring emerging CCCIs nationwide; Zenzeleni prioritizes identifying and connecting underserved communities through cooperative management. Kasepuhan Ciptagelar also uniquely features cultural media labs, enabling villagers to produce digital storytelling content and elevate indigenous voices in digital spaces.

This comparative analysis highlights shared strengths in providing connectivity and digital literacy, while also showcasing how each CCCI tailors its services to address local needs, such as gender inclusion, indigenous representation, and community-led governance. Strengthening transformational services across all CCCIs—through stronger governance, policy engagement, and infrastructure support—will help deepen their impact and ensure the growth of sustainable and equitable digital ecosystems.

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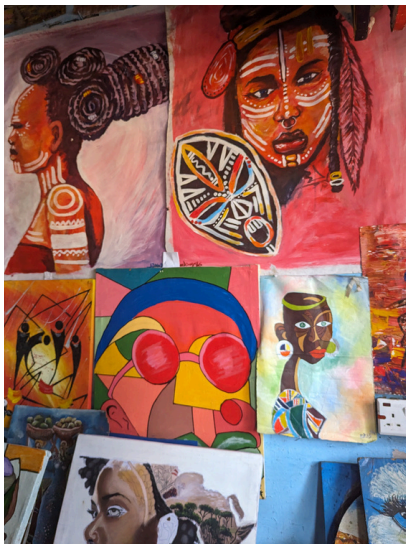

Photo Credit to Tanda Community Network

Table 5. **Comparison of Common and Distinct Needs-based Services Across CCCIs**

Service Type	Common Services Across CCCIs	Distinct Needs-based Services Per CCCI
Transactional	Internet access via vouchers/subscriptions Printing/scanning services Online financial transactions	**Pathardi:** Aadhaar-enabled payment banking system (AePs), utility payments **TandaNet:** Cloud storage & hosting services
Social Inclusion	Digital literacy training Local content development (audio, video, storytelling)	**Pathardi:** e-DOST female entrepreneurship **TandaNet:** Women Engineers Program **Zenzeleni:** Community computer hubs
Transformational	Capacity building for governance and network maintenance Digital advocacy and movement-building	**Kasepuhan Ciptagelar:** Cultural media labs **Zenzeleni:** Identification and connection of underserved communities **TandaNet:** Mentorship for new CCCIs nationally

Key Issues and Constraints Affecting Social Inclusion and Transformational Services

Despite their strengths and ability to innovate around challenges, CCCIs grapple with issues and investment constraints that limit the depth of their social inclusion and transformational services. *Table 6* outlines the key issues and constraints faced by the CCCIs studied.

Table 6. **Key Issues and Constraints Faced by CCCIs**

CCCI	Key Issues and Constraints Faced
Kasepuhan Ciptagelar (Indonesia)	• Structural marginalization of indigenous communities limits access to resources and governance rights under national policies • Limited digital literacy contributes to misinformation, fraud, and gender-based barriers in online engagement • High disparity in bandwidth costs between urban centers and rural areas, restricting affordable access
Pathardi (India)	• Rural connectivity challenges due to topography, low population density, and unreliable power affect digital inclusion • Gender disparity and digital literacy gaps limit women's representation and participation in online services • Limited localized content in multiple languages hinders engagement for Indigenous and tribal communities
TandaNet (Kenya)	• Uneven digital coverage, particularly in informal settlements, prevents widespread connectivity and adoption, implying investments needed in more hotspot infrastructure • Affordability constraints make access to smartphones, internet, and digital tools difficult for low-income users • Cybersecurity concerns (fraud, cyberbullying, misinformation) pose risks to safe digital participation
Zenzeleni (South Africa)	• Rural broadband expansion remains limited, leaving community-led networks struggling with infrastructure gaps • High internet costs restrict affordability for lower-income groups, hindering transformational access • Energy instability (load shedding) disrupts connectivity, affecting digital learning, healthcare, and economic participation.

While efforts are underway to expand connectivity, reduce costs, and address cybersecurity risks, sustained progress requires continued policy advocacy, targeted capacity-building, and strategic infrastructure investment. These actions are essential to ensure equitable and sustainable digital empowerment for underserved populations.

Photo Credit to Zenzeleni NPC


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Initiating the Use of Development Indexing to Measure Social Impact

The four case reports highlight the outcomes of their respective connectivity initiatives as attested by stakeholders and key informants. Through these cases, essential elements, parameters, and criteria for effectively measuring social impact were identified. These insights formed the foundation for developing a Development Index (DI), a tool designed to systematically evaluate CCCIs or community networks as social enterprises operating within the digital economy.

For each of the CCCIs studied, an initial DI framework and a matrix was developed based on observed outcomes. The four CCCI DI matrices served as input for evolving the elements of a proposed Development Index tailored to CCCIs. Given time and resource constraints, the case studies focused on defining key result areas, sub-elements, and performance indicators of social impacts deemed significant that may serve as basis for evolving a fully weighted scorecard in a follow-up CCCI DI study.

Major Themes of Key Result Areas (KRAs) and Performance Indicators (PIs) Across CCCIs

The four CCCIs, Kasepuhan Ciptagelar (Indonesia), Pathardi (India), TandaNet (Kenya), and Zenzeleni (South Africa), share several common Key Result Areas (KRAs), while also reflecting unique priorities shaped by their local contexts and stakeholder needs. Four major themes consistently emerged across these initiatives: **Economic Development, Inclusive Human Development, Environment and Climate Action, and Digital Governance and Community Empowerment.**

In addition to these common themes, one or two CCCIs generated distinct KRAs and performance indicators (PIs) that addressed specific community challenges and goals as shown by the following:

- Kasepuhan Ciptagelar's focus on cultural identity and heritage
- Pathardi's emphasis on gender-inclusive entrepreneurship, particularly in engaging tribal women to participate in their e-DOST program.
- TandaNet's prioritization of women's empowerment and environmental awareness, with strong advocacy components.
- Zenzeleni's highlighting the expansion of digital community networks and inclusive governance in cooperative models.


Photo Credit to Tanda Community Network

Table 7 summarizes the main themes in terms of KRAs and PIs from all four CCCIs. The summary reveals two key findings relevant to assessing the social impact of CCCIs. First, there are common and essential KRAs and significant PIs that consistently contribute to social impact among marginalized stakeholders. Second, these shared KRAs and PIs can serve as the foundation for developing a standardized Development Index template for CCCIs, while still allowing for customization based on specific local contexts. For example, while all CCCIs may share the six KRAs, those serving indigenous communities (as exemplified by Kasepuhan Ciptagelar and Pathardi) or rural communities (as exemplified by Zenzeleni) may have a different set of performance indicators from CCCIs serving urban slums (as exemplified by TandaNet).

Table 7. **Common and Differentiated Key Result Areas of the Four CCCIs**

	Main Headings / Themes of a Prototype DI Template	Full KRA Statement	Number of Significant PIs	No. of PIs monetized	Remarks
1	Economic development of the marginalized	**Improvement in the economic conditions of the community stakeholders**	14	7	Common to all 4 CCCIs
2a	Community empowerment	Increased levels and capacities for inclusive human development and **community empowerment**	17	6	Common to Kasepuhan Ciptagelar & Pathardi
2b	Holistic human development	Improved levels and capacities for inclusive and holistic human development	15	13	Common to TandaNet & Zenzeleni but PIs from Kasepuhan Ciptagelar & Pathardi were identified along with human development
3a	Environment (conservation, biodiversity)	Increased levels and **capacities for conservation and development of agricultural or ancestral lands** and biodiversity	2	1	Distinct to Pathardi
3b	Environment (awareness & action)	Increase in **awareness and action on environmental** issues and concerns	2	1	Distinct to TandaNET
3c	Adaptation to climate-related disasters	Better **adaptation of community to climate-related disasters**	7	2	Distinct to Kasepuhan Ciptagelar
4a	Digital governance	Empowerment of **community to own, govern, and manage** internet and digital resources	14	12	Common to 2 CCCIs
4b	Enabling environment for community networks	Improved **enabling environment** for Community Networks	4	1	Distinct to TandaNET
5	Women	Inclusion and **empowerment of women** as stakeholders in digital transformation	5	4	Common to 2 CCCIs; Mentioned in 2 sub-elements in Pathardi; Significant PI for Kasepuhan Ciptagelar
6	Cultural identity & heritage	More effective preservation of cultural integrity, identity, and heritage	5	1	Common to 2 CCCIs
			85	**48**	

Potential KRAs and PIs for a Proposed CCCI Development Index

Upon further distillation of the themes reflected in the KRA statements of the four CCCIs and the underlying intent of their respective PIs, and giving due importance to certain elements that merit distinct emphasis, the KRAs may be synthesized into six (6) key result areas:

- Improvement in the economic position and conditions of community stakeholders
- Increased levels and capacities for inclusive human development
- Increased levels and capacities for climate action and natural resource management
- Empowerment of community to control, govern, and manage internet and digital resources
- Inclusion and empowerment of women as stakeholders in digital transformation
- More effective preservation of the cultural identity, heritage, and integrity of the community

As can be seen from this synthesis of six KRAs, empowerment of the community to control, govern and manage internet and digital resources has been given due importance as a distinct KRA from inclusive human development. The inclusion and empowerment of women as stakeholders of digital transformation has also been given due importance as a distinct KRA, rather than just being included as a set of performance indicators impacting on women as stakeholders under various KRAs such as improved economic position, inclusive human development and community empowerment.

Based on the four case studies of Kasepuhan Ciptagelar (Indonesia), Pathardi (India), TandaNet (Kenya), and Zenzeleni (South Africa), *Table 8* presents a potential set of PIs under these six KRAs that can make up the DI template for CCCIs. For brevity, duplicate or similar PIs have been consolidated. Each CCCI wanting to use the DI template may choose the performance indicators that may be most appropriate or even create new performance indicators.

Table 8. **Potential KRAs and PIs of a Proposed Development Index for CCCIs**

Potential Key Result Areas (KRAs)	Potential Performance Indicators (PIs)
1. Increased levels and capacities for inclusive human development	1. Greater knowledge to achieve good health and wellbeing (e.g., health news and advisory, entertainment)
	2. Better capability to develop technical skills and special interests (e.g., recipes, home design, farming technologies)
	3. Greater achievement in formal education
	4. Faster and cheaper communication and coordination with the use of new digital technology
	5. Greater cost efficiency in undertaking day to day tasks and activities (e.g., reduced travel time and expenses)
	6. More enhanced social relations within households or among community members
	7. Heightened political awareness and/or engagement
	8. Better capacity to promote social order and fight unacceptable behavior (e.g., disinformation, scams)
	9. Increased involvement of youth as farmers (inter-generational sustainability of farming)

Potential Key Result Areas (KRAs)	Potential Performance Indicators (PIs)
2. Improvement in the economic position and conditions of community stakeholders	1. Increase in household assets (e.g., motorcycles, gadgets, home improvements)
	2. Increase in financial resources to support consumption or avoid over borrowing
	3. Increase in trade or transactions (traditional or online) of existing microentrepreneurs
	4. Increase in employment generation
	5. Improved capability to use adaptive farming techniques integrating traditional and new technologies
	6. Development of capacity to generate or increase income from new economic activities (e-jobs)
	7. Development or increase in capacity of community stakeholders to save (e.g., through opening of bank accounts)
	8. Development of community stakeholders as entrepreneurs in the digital economy
	9. Increased income resulting from improved productivity and sales through online platforms
3. More effective preservation of the cultural identity, heritage, and integrity of the community	1. More effective documentation of indigenous or local cultural activities and practices, archive records, and sharing with younger generations
	2. Improved capacity to produce and upload online content (images, videos, audio recordings of local or indigenous knowledge, activities, events)
	3. Increase in societal awareness on indigenous people and local communities (through increased sharing of locally-produced education and information materials with other communities and academic groups)
	4. Improved capacity to establish ancestral land rights (e.g., land mapping) for policy reform


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Potential Key Result Areas (KRAs)	Potential Performance Indicators (PIs)
4. Increased levels and capacities for climate action and natural resource management	1. Higher citizens' participation in generating and validating data from the ground
	2. More reliable and timely information dissemination with modern devices
	3. More proactive risk management through dissemination of risk information, hazard models, and vulnerability data
	4. Improved capability to avoid or minimize loss of lives and property amid disasters
	5. Greater awareness on climate challenges and disaster preparedness
	6. Broader reach of information for resource mobilization and improved access to appropriate assistance to recover and rebuild post-disaster
	7. Improved capacity to preserve, develop, and propagate indigenous seed varieties
	8. Improved capacity for crop diversification and increasing agricultural productivity
	9. Increased engagement (e.g., through social media and online platforms) of community members on environmental issues and action
5. Empowerment of community to control, govern, and manage internet and digital resources	1. Number and percentage of community representatives in management and governance positions in community networks (CNs) or CCCIs
	2. Number of community members serving as staff/technicians of CNs or CCCIs
	3. Number of CNs/CCCIs established and developed serving new unconnected or underserved communities
	4. Improved or increased capacity of new CNs/CCCIs to sustain their operations
	5. Development of community-based institutions or groups with capability to govern and manage internet and digital resources
	6. Increase in government resources effectively deployed to support existing and new CNs/CCCIs
6. Inclusion and empowerment of women as stakeholders in digital transformation	1. Number and percentage of women occupying governance, management, and technical positions in CNs/CCCIs
	2. Increase in the number of women beneficiaries and organizations inquiring and reporting cases of online gender-based violence
	3. Increase in awareness and action on gender issues and women's rights in the digital space
	4. Enhanced participation and capacities of women in governance and management of digital resources
	5. Increase in income gained by new women entrants as leaders and technicians of CNs/CCCIs

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KRA 1: **Increased levels and capacities for inclusive human development.** This focuses on enhancing individual and community well-being through improved knowledge, skills, education, social cohesion, and political participation. Common PIs include greater health and well-being awareness, achievement in formal education, development of technical and life skills, and strengthened social relations. Less common PIs in this KRA are the emphasis on faster, cheaper communication enabled by digital technologies, heightened political awareness, and community empowerment to promote social order and combat misinformation (as in the case of Kasepuhan Ciptagelar), reflecting the integration of digital tools in fostering inclusive development.

KRA 2: **Improvement in the economic position and conditions of community stakeholders.** This centers on economic empowerment through asset accumulation, business growth, employment generation, sustainable agricultural practices, and financial inclusion. Common PIs include increases in household assets, income, employment, and savings, as well as adoption of adaptive farming techniques. Unique to this KRA is the measurement of participation in the digital economy, such as employment in e-jobs and entrepreneurship through online platforms (TandaNet), highlighting the role of digital transformation in advancing economic conditions.

KRA 3: **More effective preservation of the cultural identity, heritage, and integrity of the community.** This emphasizes safeguarding and promoting local knowledge, cultural heritage, and indigenous rights. Common PIs involve improved capacities in the documentation and sharing of local knowledge and culture. A distinct set of PIs under this KRA is the use of digital tools to produce and disseminate cultural content online (as in the case of Pathardi) and the strategic use of land mapping to support indigenous land rights advocacy (as manifested in the case of Kasepuhan Ciptagelar), reflecting the intersection of cultural preservation and technology specially among indigenous and tribal communities as stakeholders of CCCIs. For non-indigenous communities, the PIs under this KRA may be focused on the development and dissemination of local knowledge and culture.

KRA 4: **Increased levels and capacities for climate action and natural resource management.** This aims to build community resilience through enhanced communication for disaster response, proactive risk management, biodiversity conservation, and climate education. Common PIs include timely dissemination of hazard information, improved disaster preparedness, and crop diversification. Unique to this KRA is the active engagement of community members on social media platforms regarding environmental issues (as manifested in the case of TandaNet) and the systematic preservation and propagation of indigenous seed varieties (as shown by the case of Pathardi), demonstrating a blend of traditional knowledge and modern communication.

KRA 5: **Empowerment of community to control, govern, and manage internet and digital resources.** This focuses on building local governance, technical capacity, and sustainable management of digital infrastructure and resources. Common PIs include the number of community representatives in governance roles, staffing of community networks by locals, and the establishment and sustainability of community networks serving underserved areas. For TandaNet and Zenzeleni, there is distinct emphasis on the development of community-based institutions and leadership specifically geared toward digital resource management, underscoring the importance of local ownership in digital inclusion. In the case of Kasepuhan Ciptagelar and Pathardi, the capability of the village authority or government to govern and manage digital resources was developed.

KRA 6: **Inclusion and empowerment of women as stakeholders in digital transformation.** This highlights increasing women's participation, leadership, and protection in digital spaces while also manifesting economic empowerment alongside social inclusion in the digital transformation process. TandaNet and Zenzeleni have separate and dedicated KRAs on the inclusion and empowerment of women as stakeholders in digital transformation. Common PIs cover women's representation in governance and technical roles within the CCCIs or community networks. PIs manifested by one or more of the CCCIs include increased reporting and awareness of online gender-based violence and income gains and leadership opportunities for women as new entrants in digital initiatives.

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Social Return on Investment: Findings and Indications of Cost-Effectiveness

The Social Return on Investment (SROI) analysis of the four CCCIs was undertaken following the identification of KRAs and significant PIs for each case. The analysis demonstrates growing cost-effectiveness and long-term social impact. By quantifying and monetizing the most significant outcomes, the findings reveal how these initiatives have enhanced digital inclusion, economic empowerment, local governance, and social equity in marginalized communities. Each CCCI exhibits unique strategies for sustainability, ranging from voucher-based sales and cooperative-led ISPs to gender-inclusive entrepreneurship and policy advocacy, resulting in increasing SROI ratios over time. This integrative analysis synthesizes their distinct approaches, illustrating how community-driven connectivity models serve as effective and scalable social enterprises that bridge the digital divide.

Table 9 provides the annual SROI ratios, and the corresponding stakeholder or beneficiary count, cost of inputs and aggregate monetized outcomes for years 1 to 4 from the SROI analyses conducted for the four CCCI cases.

Table 9. **Annual SROI Ratios and Relevant Data from the SROI Analysis of the CCCI Cases**

CCCI	Stakeholder/Beneficiary Count				SROI Ratios			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Kasepuhan Ciptagelar (Indonesia)	8,665	9,548	9,912	10,290	1.45	1.62	2.51	2.89
Pathardi (India)	6,240	6,300	6,300	-	1.23	3.25	8.19	-
TandaNet (Kenya)	3,409	5,678	5,723	-	1.5	1.72	4.88	-
Zenzeleni (South Africa)	886	1,095	1,377	-	1.17	2.89	3.62	-
CCCI	**Cost of Inputs (in US$)**				**Aggregate Monetized Outcomes (in US$)**			
Kasepuhan Ciptagelar (Indonesia)	115,535	127,085	120,244	113,557	167,129	205,565	301,340	328,425
Pathardi (India)	48,612	18,870	13,243	-	59,701	61,251	108,446	-
TandaNet (Kenya)	81,393	76,854	34,363	-	122,382	132,353	167,570	-
Zenzeleni (South Africa)	32,037	18,113	19,442	-	37,573	52,372	70,354	-

Analysis of the SROI Ratios of the Four CCCIs

The SROI ratios across the four CCCIs demonstrate varying levels of cost-effectiveness and long-term social impact. Overall, they reflect a progressive increase in cost-effectiveness, highlighting the capacity of CCCIs to generate greater financial and social returns on investment over time. Year 1 ratios for all the CCCIs were more than 1, indicating gains at the end of the initial year.

As shown in *Table 10*, among the four CCCIs, Pathardi CCCI leads with the highest year-on-year growth rate of 164.23% from year 1 to 2 and 152% from year 2 to 3. Zenzeleni CCCI grew by 147% from year 1 to 2 and slowed down to 25.26% from year 2 to 3. From year 1 to 2, the SROI of TandaNet grew by 14.67%, then surged to 184% from year 2 to 3. The SROI ratio of Kasepuhan Ciptagelar CCCI grew by 11.72% from year 1 to 2 and by 55% from year 2 to 3.

Table 10. **Annual SROI Ratios of CCCIs and Year-on-Year Growth Rate**

CCCI	SROI Ratios				Year 1 to 2	Year 2 to 3
	Year 1	Year 2	Year 3	Year 4	Growth rate	Growth rate
Kasepuhan Ciptagelar (Indonesia)	1.45	1.62	2.51	2.89	11.72%	54.94%
Pathardi CCCI (India)	1.23	3.25	8.19	-	164.23%	152%
TandaNET (Kenya)	1.5	1.72	4.88	-	14.67%	183.72%
Zenzeleni (South Africa)	1.17	2.89	3.62	-	147%	25.26%

The SROI trends showing year-on-year growth in impact indicate a positive trajectory across all CCCIs, reinforcing the long-term sustainability of community-driven digital inclusion initiatives. The Pathardi case, in particular, showcases a rapid escalation in returns, climbing from 1.23 in Year 1 to 8.19 in Year 3. This reflects the effectiveness of targeted local governance and empowerment programs. Similar upward trends in TandaNet and Zenzeleni demonstrate the scalability of cooperative and grassroots connectivity models, highlighting their role as viable alternatives to commercial ISPs in underserved communities.

The details of the SROI Summary per CCCI which provide the relevant data supporting the SROI ratios presented in this section, are presented in *Annex 1*.

Overall, the consolidated analysis affirms the effectiveness of CCCIs as social enterprises, demonstrating that investing in digital equity and localized governance models yields high social and financial returns. The data further underscores the importance of long-term financial sustainability, stakeholder engagement, and adaptive service models in maximizing impact. Strengthening cross-regional learning and policy integration among CCCIs could further enhance cost-efficiency and scalability, ensuring continued growth in digital inclusion for marginalized communities.

Factors Affecting the SROI Ratios

Across the four cases, several significant PIs were not monetized for inclusion in the SROI analysis. As such, the SROI ratios generated may be generally understated. It is thus important to analyze the types of impact that were monetized and not monetized.

Table 11 shows a comparison of the quantified/monetized and not quantified/unmonetized significant PIs across the four CCCIs studied.

Table 11. **Summary of Significant PIs per CCCI that were Quantified/Monetized vs Unquantified/ Not Monetized**

CCCI	Quantified / Monetized PIs	Not Quantified / Unmonetized PIs
Kasepuhan Ciptagelar (Indonesia)	• Savings from improved post-disaster recovery assistance • Increased income for micro-entrepreneurs • Enhanced employment generation • Cost savings from faster communication and reduced travel • Greater awareness of indigenous existence through cultural advocacy	• More proactive climate risk management • Improved indigenous knowledge documentation • Strengthened social cohesion and political participation • Expanded local governance capacity • Increase in household financial stability
Pathardi (India)	• Increased earnings from e-DOST women entrepreneurs • Growth in online agricultural and tribal product markets • Savings generated by digital banking and financial transactions • Cost reductions in accessing essential government services	• Higher acceptance and respect for women entrepreneurs • Expanded networking opportunities among small farmers • Strengthened technical capacity to maintain internet infrastructure • Increased participation of senior citizens in the digital economy
TandaNET (Kenya)	• Income generation through online employment (clerical work, e-commerce) • Cost savings for schools and businesses through cheaper connectivity • Reduced healthcare costs due to better digital access • Savings on digital advocacy training and policy engagement	• Increased awareness and action on environmental sustainability • Expanded digital inclusion in mental health support • Safer learning environments for youth during COVID-19 • Growth in women-led governance within the CCCI ecosystem
Zenzeleni (South Africa)	• Revenue generation from ISP voucher sales • Cost reductions in education materials for students • Increased digital workforce employment and skills development • Savings from localized digital literacy programs	• Improved effectiveness in governance participation • Strengthened access to digital healthcare services • Enhanced community-driven ISP expansion • Increased engagement in cultural preservation activities

In reviewing the monetized and non-monetized indicators across the four cases, it may be useful to point out the following:

- Most monetized indicators relate to financial savings, employment creation, and reduced cost to the end user, reflecting measurable economic benefits of CCCIs. Case in point, Zenzeleni and TandaNet show strong monetization in ISP revenue models.

- Unmonetized indicators often pertain to governance, cultural preservation, gender empowerment, and environmental sustainability, suggesting the need for improved social impact measurement frameworks. For example, Kasepuhan Ciptagelar and Pathardi display more intangible cultural and governance impacts, reinforcing the importance of non-financial evaluation metrics.

CCCIs generate both quantifiable and intangible social benefits. Direct financial savings and revenue growth can easily be monetized, while social, educational, and governance-related improvements that are more inclusive and transformative remain difficult to quantify.

There are several factors affecting monetization of PIs and KRAs. Time and resource constraints affected the length and quality of engagement of case researchers in probing appropriate monetary proxies. This also limited the capacity of case researchers to be on the ground for richer and more interactive face-to-face engagements with the stakeholders. Beyond time and resource constraints, there are difficulties in finding financial proxies for intangible outcomes specially in developing country contexts.

Annex 2 provides the details of the means of monetization (how the performance indicators were monetized) that were used per performance indicator for each of the CCCIs studied.

Insights on the SROI Analysis

The results of the SROI analyses of the four CCCIs, where ratios consistently exceeded one across all initiatives, demonstrate their cost-effectiveness. This shows that CCCIs are generating greater financial and social returns compared to their initial investments, reinforcing their sustainability as community-driven connectivity enterprises. However, these ratios may be understated, as not all significant social impacts, such as cultural preservation, empowerment, and environmental sustainability, have been fully monetized. Nonetheless, the consistent increase in SROI ratios over consecutive years indicates the progressive growth of social value and highlights how CCCIs are continually enhancing their impact through increased stakeholder engagement, service diversification, and adaptive governance models. These findings emphasize the growing potential for CCCIs to serve as scalable solutions for digital inclusion, warranting further investment and policy support.


Photo Credit to Zenzeleni NPC

Conclusion

CCCIs play a transformative role in bridging the digital divide by offering social inclusion and transformational services that extend beyond the capabilities of commercial ISPs. They facilitate meaningful digital access, ensuring that marginalized communities access and benefit from economic empowerment, governance participation, cultural preservation, and climate resilience. The impacts generated by CCCIs strongly align with key development priorities, including:

- **Increased levels and capacities for inclusive human development**;
- **Improvement in the economic position and conditions of community stakeholders**;
- **More effective preservation of the cultural identity, heritage, and integrity of the community**;
- **Increased levels and capacities for climate action and natural resource management**;
- **Empowerment of community to control, govern, and manage internet and digital resources**; and
- **Inclusion and empowerment of women as stakeholders in digital transformation**.

The positive and increasing SROI ratios across the four CCCIs demonstrate their long-term sustainability and effectiveness, proving that these models efficiently increase financial and social value over time. As their impacts continue to grow, CCCIs emerge as cost-effective solutions for expanding digital equity, reinforcing their role as essential pillars in community-led connectivity and governance. Strengthening funding mechanisms, stakeholder engagement, and policy integration will be critical in improving their scalability and ensuring their lasting success.

Annex 1. SROI Summary per CCCI

The tables below (1a to 1d) present the SROI summary per CCCI.

Table 1a. **SROI Summary for Kasepuhan Ciptagelar CCCI**

Outcomes	2020	2021	2022	2023
A. Financial Outcome: Net income of Kasepuhan Ciptagelar CCCI	$49,569.57	$9,256.57	$39,291.77	$37,135.07
B. Social Outcomes				
• Increase in business transactions and new business enterprises	$7,535.39	$22,606.18	$68,097.75	$90,424.71
• Instilled pride in following the desires of their ancestors	$28,242.45	$56,484.90	$65,899.05	$75,313.20
• Savings on health services, consequent to not having positive cases	$12,356.53	$12,356.53	$12,356.25	$0.00
• Better access to government's rehabilitation assistance	$23,716.43	$23,716.43	$23,717.05	$23,716.43
• Better access to more appropriate assistance	$15,000.00	$15,000.00	$15,000.00	$15,000.00
• Improved access to learning materials	$8,750.00	$17,500.00	$20,416.67	$23,333.33
• Income generation for new online resellers	$4,233.57	$12,700.71	$14,742.00	$16,934.28
• Increase in savings from not having to travel back to families	$11,100.00	$22,200.00	$25,900.00	$29,600.00
• Increase in savings from not spending on the old telecommunications services (e.g., internet shops)	$8,750.00	$17,500.00	$20,416.67	$23,333.33
• Sedentary lifestyle and lack of social and life skills affecting 4/10 of children	($696.00)	($2,088.00)	($2,784.00)	($4,640.00)
Aggregate Outcomes	$167,129.06	$205,565.19	$301,339.55	$328,425.36
Aggregate Inputs	$115,535.33	$127,085.12	$120,243.79	$113,557.14
SROI Ratio	1.45	1.62	2.51	2.89

Table 1b. **SROI Summary for Pathardi CCCI**

Social Outcomes: Performance Indicators	2020	2021	2022
Transportation costs saved and wages earned at work by villagers	$46,847.62	$46,947.60	$86,500.95
Started earning or increased earnings of the tribal women	$137.98	$125.43	$104.47
Turnover of digital service transactions processed by tribal women	$2,467.50	$1,930.44	$1,592.43
Increase in yield per hectare by the small farmers	$9,559.44	$11,559.15	$19,559.52
Increased income from new online customers by the Warli artists	$688.50	$688.50	$688.50
Aggregate Outcomes	$59,701.03	$61,251.12	$108,445.88
Aggregate Inputs	$48,612.25	$18,870.16	$13,242.49
SROI Ratio	1.23	3.25	8.19

Table 1c. **SROI Summary for TandaNet**

Outcome: KRAs/Performance Indicators	2021-22	2022-23	2023-24
KRA #1: Improvement in the economic position and conditions of community stakeholders			
PI 1: Number of community stakeholders employed in e-jobs and have become entrepreneurs in the digital economy	-	-	-
PI 2: Increased income from employment and sales resulting from use of online platforms	82,822.50	82,822.50	115,951.50
KRA #2: Improved levels and capacities for inclusive and holistic human development			
PI 1: Faster, more affordable, and more effective access and utilization of updated teaching materials through online research	447.85	447.85	447.85
PI 2: Improved access and use of digital educational resources by community schools and students (cheaper cost of education materials)	2,270.00	2,270.00	2,270.00
PI 3: Safer learning environment during the COVID-19 pandemic through online classes	-	-	-
PI 4: Improved capacity to deliver appropriate mental health information, education, and services online	5,622.72	176.84	8,943.72
PI 5: Increased number of children effectively immunized based on health standards and required protocols (Note: Better monitoring of immunization schedule)	1,818.16	1,818.16	1,818.16
PI 6: Faster and more affordable way of reports and orders submission from the centers' branches to the head office through the online facility	85.08	85.08	85.08
KRA #3: Increase in awareness and action on environmental issues and concerns			
PI 1: Increase in social media engagement of community members on environmental issues and concerns	6,468.00	6,468.00	6,468.00
PI 2: Increase in enrollment or engagement in online environmental courses and actions	-	-	-

KRA #4: Empowerment of community to own, govern, and manage internet and digital resources			
PI 1: Number of community-based organizations and individuals that are engaged in the governance, management, and operation of the Tanda CN in Kibera	1,472.40	1,472.40	1,472.40
PI 2: Share / increase in share in the digital market of CN	-	-	-
PI 3: Percentage / increase in percentage of community representatives occupying management and governance positions in the CN	8,834.40	8,834.40	8,834.40
PI 4: Number of community members serving as staff / technicians of CNs	14,135.04	14,135.04	14,135.04
PI 5: Number of CNs established and developed serving new unconnected and underserved communities beyond Kibera	1,052.70	1,052.70	1,052.70
KRA #5: Inclusion and empowerment of women as stakeholders in digital transformation			
PI 1: Increase in the number of women beneficiaries and organizations inquiring and reporting cases of online gender-based violence	-	6,765.00	6,765.00
PI 2: Number and percentage of women occupying governance, management, and technical positions in CNs	981.6	981.6	981.6
PI 3: Increase in awareness and action on gender issues and practice of women's rights in the digital space	-	3,555.57	3,555.57
KRA #6: Improved enabling environment for Community Networks			
PI 1:Increase in the number and capacity of CNs serving unconnected and underserved communities	654.4	654.4	654.4
PI 2: Improved or increased capacity of new CNs to sustain their operations	-	-	-
PI 3: Number of new CNs and community stakeholders reached as a result of policies and programs of the government	-	-	-
PI 4: Resources effectively deployed to support existing and new CNs resulting to increase in the number and quality of outreach among unconnected communities	-	-	-
Monetized Outcomes (Net income gain, cost savings)	126,664.85	136,985.43	173,435.42
Present value of each year	122,381.50	132,353.07	167,570.45
Total Present Value (PV)	122,381.50	132,353.07	167,570.45
Investment Cost	81,393.40	76,854.40	34,363.40
TandaNet Operating Expenses			
APC & others (the Internet Society, the Collaboration on International ICT Policy for East and Southern Africa (CIPESA), Deutsche Welle, the Center for Youth Development, and the Massachusetts Institute of Technology(integrated in investment cost)			
TOTAL COST	**81,393.40**	**76,854.40**	**34,363.40**
Net Present Value (PV minus the investment)	**40,988.10**	**55,498.67**	**133,207.05**
Social Return (Value per amount invested)	**1.5**	**1.72**	**4.88**

Table 1d. **SROI Summary for Zenzeleni CCCI**

Outcome: KRAs/Performance Indicators	2021-22	2022-23	2023-24
KRA #1: Empowerment of community to own, govern, and manage internet and digital resources			
PI 1: Development of community-based institutions, groups, leaders and technicians with capability to govern and manage internet and digital resources, to build new CCCIs and to expand to new communities	8,737.46	8,287.77	9,883.70
PI 2: Improved capacity of community to develop, disseminate, and use local information, education, and communication materials	-	-	-
PI 3: Increase/expansion in the establishment of CCCIs serving other rural communities	1,112.80	3,240.78	4,651.11
KRA #2: Increased levels and capacities for inclusive and holistic human development			
PI 1: Increased utilization of government and other services accessed through the internet	7,750.00	4,958.40	3,917.18
PI 2: Increase of youth applying, enrolling, and graduating in various higher educational institutions	3,875.79	7,546.28	9,564.25
PI 3: Increased effectiveness and efficiency in accessing educational resources by students	9,729.87	18,463.11	29,707.27
PI 4: Improved effectiveness and efficiency in availing of quality healthcare services	-	-	-
KRA #3: Improvement in the economic position and conditions of community stakeholders.			
PI 1: Increase in the number of community members securing new jobs in and becoming new entrepreneurs of the digital economy	5,010.00	7,700.00	11,083.99
PI 2: Increased income resulting from improved quality of employment and sales through online platforms - Significant but not quantifiable	-	-	-
KRA #4: Increased inclusion of women as stakeholders in digital transformation			
PI 1: Enhanced participation and capacities of women in the governance and management of digital resources (significant but not quantifiable; no baseline information established)	-	-	-
PI 2: New women as leaders and technicians in CCCIs	2,672.51	4,008.77	4,008.77
Monetized Outcomes (Net income gain, cost savings)	**38,888.44**	**54,205.10**	**72,816.27**
Present value of each year	**37,573.37**	**52,372.08**	**70,353.88**
Total Present Value (PV)	**37,573.37**	**52,372.08**	**70,353.88**

Outcome: KRAs/Performance Indicators	2021-22	2022-23	2023-24
Investment Cost:			
Zenzeleni Operating Expenses	$2,102.70	1,514.15	4,024.00
APC Outlay	29,934.42	16,598.67	15,417.90
TOTAL COST	$32,037.12	$18,112.82	$19,441.90
Net Present Value (PV minus the investment)	$5,536.25	$34,259.26	$50,911.98
Social Return (Value per amount invested)	1.17	2.89	3.62
Total count of stakeholders	886	1,095	1,377
Monetary Value / stakeholder	$6.24	$31.28	$37.00

Annex 2. Monetization of Impact

Tables 2a to 2d show the Monetization of Impact per CCCI case.

Table 2a. **Monetization of Impact – Kasepuhan Ciptagelar CCCI (Indonesia)**

Performance Indicator & Stakeholder Count	KRA (or Link to KRA)	Monetization
Increase in business transactions and new enterprises (12–145 beneficiaries)	Economic Conditions of Community Stakeholders	Estimated income per business transaction x women population x 25% involved in trade/business
Income generation for new online resellers (24–96 beneficiaries)		Average reseller income x marginal increase in users
Savings on health services due to lack of COVID-19 cases (3,954 beneficiaries)	Inclusive Human Development and Community Empowerment	Cost savings per avoided treatment x positivity rate (13.3%) in West Java
Improved access to learning materials (75–200 beneficiaries)		Estimated cost savings on travel for accessing educational resources
Increased savings from reduced travel for family visits (300–800 beneficiaries)		Estimated travel costs saved per person annually
Better access to government rehabilitation assistance (3,865 beneficiaries)	Climate Adaptation & Disaster Resilience	Cost of emergency kits x disaster risk rate x percentage of survivors needing aid
Instilled pride in following ancestral traditions (300–800 beneficiaries)	Cultural Integrity, Identity, and Heritage	Estimated cost of cultural celebrations x cumulative users

Table 2b. **Monetization of Impact – Pathardi CCCI (India)**

Performance Indicator & Stakeholder Count	KRA (or Link to KRA)	Monetization
Easy and convenient access to digital services (5,796–46,000 beneficiaries)	Inclusive Human Development and Community Empowerment	Transportation costs saved + wages retained from avoiding unnecessary travel
Improved economic well-being and social standing (7 e-DOSTs)		Earnings of tribal women in digital service roles
Empowering women in digital literacy and communication skills (7 e-DOSTs)	Economic Position & Conditions of Stakeholders	Turnover of digital service transactions handled by e-DOSTs
Conservation of agro-biodiversity and improved land productivity (480 beneficiaries)	Agricultural & Ancestral Land Conservation	Increase in crop yield per hectare

Table 2c. **Monetization of Impact – TandaNet (Kenya)**

Performance Indicator & Stakeholder Count	KRA (or Link to KRA)	Monetization
Increased income from online employment & entrepreneurship (25 Out-of-school teen mothers in 3 years, 15 Usafi Boyz members per year)	Economic Position of Community Stakeholders	Net income from clerical/data annotation (KES 270,000/year) and online commerce (KES 660,000/year)
Improved access to digital educational resources (community schools & students – 10 educational materials made available per year)	Inclusive Human Development	Cost savings from lower-cost educational materials (USD $227/year)
Improved capacity to deliver appropriate mental health information, education, and services online (4 mental health professionals per year; 50 youth & mental health professionals & patients per year participating in mental health fellowships)		From: 20 shillings/hour to 6.25/ hour (unlimited)
		Savings of KES13.75/hour x 260 times a year = savings per capita of KES 3,575.00 or USD $29.24
Increased number of children effectively immunized based on health standards and required protocols (40 community health promoters (CHPs) per year ECHIS and KHIS; 4 health professionals monitoring the health programs		Savings of KES 20 per access x 260 days = KES 5,200 or USD $42.53 a year
		Savings of KES 13.75/hour x 260 times /year = KES 3,575 or USD $29.24
Faster and more affordable way of reports and orders submission (4 health care providers per year)	Inclusive Human Development	Savings of KES 50 x 52 weeks = KES 2,600 or USD $21.27
Increased awareness and action on environmental issues (3,234 beneficiaries)	Environmental Awareness & Advocacy	Savings on entry fees for environmental facilities (Arboretum cost: USD $0.49/adult, USD $0.20/child)
CBOs that are engaged in the governance, management, and operation of the Tanda CN in Kibera (10 CBOs for 3 years)	Community Empowerment & Digital Governance	KES1,500 x 12 = KES 18,000 (net) or USD $147.24
increase in percentage of community representatives occupying management and governance positions (2 representatives per year for 3 years)		IKES 45,000 x 12 = KES 540,000 or USD $4,417.20
Improved enabling environment for Community Networks (CN governance positions & technicians)		Salaries & consulting fees for CN technicians and managers (KES 540,000/year for governance, KES 432,000/year for technicians)
Number of CNs established and developed serving new unconnected and underserved communities (11 CNs per year for 3 years)		Cost of a network consultant is KES 975 per hour; assume 12 hours per CN per year (KES 975 x 12 = KES 11,700 or $95.70)
Increase in the number of women beneficiaries and organisations inquiring and reporting cases of online gender-based violence (2,200 for 2022-23 and 2023-24)	Empowered women as stakeholders in digital transformation	Savings on domestic abuse case services (e.g., hospitalization, counselling, legal, etc). KES 502 or USD $4.10
Number and percentage of women occupying governance, management, and technical positions in CNs (6 women per year for 3 years)		Savings from not being scammed; KES 300 to 1500 shillings per potential victim of illegal job placement KES900 x 7 = KES6,300 ($51.53)
Increase in the number and capacity of CNs serving unconnected and underserved communities (4 Community representatives per year for 3 years)	Improved enabling environment for Community Networks	KES 475/hour x 4 hours/month x 12 = KES 22,800 (USD $186.50)

Table 2d. **Monetization of Impact – Zenzeleni CCCI (South Africa)**

Performance Indicator & Stakeholder Count	KRA (or Link to KRA)	Monetization
Development of community-based institutions, groups, leaders and technicians with capability to govern and manage internet and digital resources (134 counts of CBIs, hubs, household hosts, tribal authorities, technicians)	Community Empowerment & Digital Governance	Net income from servicing CBIs; net income from 2 tower hosts; rental or hosting fees earned; Household hotspot– Earnings by households hosting Wi-Fi hotspots Monetized benefits: Capacitating tribal authorities for enabling purchase in the community; Technicians' income gains
Increase/expansion in the establishment of CCCIs serving other rural communities (8 enterprises & 14 new client households)		Net income & savings gained of enterprises in 2 villages Mankosi & Zithulele; Expansion of client-households led to savings due to connectivity
Increase in the number of community members securing online jobs and entrepreneurship in the digital economy (433 persons for 3 years)	Economic Position of Community Stakeholders	Cost savings from job applications & business setup (without vs with CN scenario; US $23,794 for 3 years)
Improved access to government services (printing, laminating, applying for IDs, social grants); 1,134 persons for 3 years	Inclusive Human Development	Cost savings from accessing services locally instead of traveling (USD $16,626 for 3 years)
Increase of youth applying, enrolling, and graduating in various higher educational institutions (400 community members; 41 graduates for 3 years)		Cost savings without versus with scenario ($12,005 saved by community members – youth/students and $8.982 higher salary valuation for graduates)
Increased effectiveness and efficiency in accessing educational resources by students (1,020 students doing research; 166 persons availing of digital literacy programs for 3 years)		Students doing research: Cost savings of $41,126 for 3 years; and Attendees to digital literacy: cost savings of $16,774)
New women as leaders and technicians in CCCIs (8 women for the whole 3 years)	Women as stakeholders in digital transformation	Income gain, value of acquired skills and capacities ($10,690)

About the Authors

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About the Cooperating Organizations

The Association for Progressive Communications (APC) is an international network of Civil Society Organizations (CSOs), operating since 1990. Its work focuses on supporting Information and Communication Technology (ICTs) for social justice. In 2017, APC has embarked in exploring and supporting Community Networks, now called as Community-Centered Connectivity Initiatives (CCCIs), in bridging the digital divide worldwide. APC is present in 20 countries from the Global South. Visit APC's website here: **www.apc.org**

Rhizomatica is driven by its mission to make alternative telecommunication infrastructures for vulnerable, poor, and isolated communities in Africa and Latin Africa. Using approaches combining regulatory activism and reform, critical engagement with, and development of, technology, design of novel sustainability models, and direct community involvement and participation, Rhizomatica aims to support communities towards building and maintaining self-governed and owned communication and energy infrastructure. Visit Rhizomatica's website here: **www.rhizomatica.org**

The Institute for Social Entrepreneurship in Asia (ISEA) is a learning and action network set-up by social enterprises, social enterprise resource institutions and scholars in 2008 to undertake research, education, advocacy and building of platforms for social entrepreneurship towards sustainable development. It pursues various platforms for multistakeholder collaboration to advance social entrepreneurship towards accelerating the achievement of the Sustainable Development Goals: Technological Innovations for Sustainable Development; Women's Empowerment, Livelihoods and Food in Agricultural Value Chains; Decent Work for All in Sustainable Value Chains; Rural Revitalization, Youth and Social Entrepreneurship; Health for All and Poverty Reduction through Social Entrepreneurship. It has a membership spanning 15 countries and territories in Asia and is based in the Philippines with a regional office hosted by the Ateneo Center for Social Entrepreneurship. Visit ISEA's website here: **www.isea-group.net**

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