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*Trustworthy AI  
for Improving  
Health:  
The Case for  
Community  
Learning and  
Living Labs*

**A persistent growing digital divides** cast a shadow, negatively impacting health, social connections, and economic opportunities. We propose people-centered innovative methodologies like the Cross Sector Digital Regulatory Sandbox, Independent Trust Agents, Prosperity Data Networks, and Community Learning and Living Labs to foster community-driven well-being and resilience for adverse events, like epidemics, conflicts, economic crisis

**Collaboration across networks of communities** can improve collective well-being. Real-time data collection and inclusive participation in health and healthcare innovations can prioritize trust-building with stakeholders in-situ.

**Extensive feedback on the efficacy of AI** can increase transparent and trustworthy AI in improving health and healthcare. Any sustainable path of progress towards a holistic improvement in national and global health, requires confronting the digital divide and addressing differences in health outcomes due to economic and social disparities.

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**Community-level data cooperatives can** maximize positive impact for minimum wasted investment. We propose a roadmap for scientific and digital transformation enhanced by AI – augmenting human collective intelligence by continual improvement and stakeholder feedback. We can navigate towards better health outcomes step by step, community-by-community. What works can be adapted country-by-country through iterative improvement cycles benefiting the people in communities, their families and future generations.

**Regulatory frameworks for aligning decisions in diverse contexts** can reduce harms by learning together. In an inclusive, people-centered, and energy-efficient approach, AI and digital technology can contribute to the science of well-being in a sustainable, climate-friendly manner. Equality of AI access is imperative, requiring transparent deployment across diverse communities: the wisdom of indigenous peoples can be sensitively tapped with tools well designed to be accessible and useful to people worldwide, especially including the use of basic mobile phones.

**The concept of community learning and living labs emerges as a crucial strategy** for AI Governance to ensure collectively wise AI application and deployment. Managed correctly, Digital Public Infrastructure and AI can help communities around the world avoid costly mistakes, generating trust in AI as a force for good.

**Technology, guided by a humanitarian ethos, requires a community-centric approach.** We envision a world where well-being, community health, individual empowerment, planetary health, and economic opportunity take center stage.

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# Does the Digital Divide matter for health and well being?

YES

Digital Divide is a Widening Gap	Impact on Health and Well-being
<p><b>Access to Infrastructure and Technology</b></p> <ul style="list-style-type: none"><li>- 37% of the world's population (2.9 billion people) have never used the internet (UN, 2021)</li><li>- rural, low-income areas lack infrastructure and are up to 12% less likely to have broadband access compared to urban areas (FCC, 2020).</li></ul>	<ul style="list-style-type: none"><li>- Limited access to telemedicine, especially crucial during events like the COVID-19 pandemic</li><li>- An information gap that hinders access to health information, public health updates, or effective online health condition management</li></ul>
<p><b>Digital Literacy and Education</b></p> <ul style="list-style-type: none"><li>- “<b>Haves</b>” acquire essential digital skills to find, evaluate, create, and communicate. Only 56% of the global population has basic digital skills (ITU, 2020)</li><li>- “<b>Have-nots</b>” don't get to learn or practice the skills</li><li>- 90% of jobs in the EU require some level of digital literacy (European Commission, 2020).</li></ul>	<ul style="list-style-type: none"><li>- Challenges in accessing or evaluating online health resources, leading to potential misinformation</li><li>- Difficulties in navigating health services, scheduling appointments, accessing test results, or communicating with healthcare providers</li></ul>
<p><b>Socio-Economic Status</b></p> <ul style="list-style-type: none"><li>- those from lower socio-economic backgrounds often can't afford ongoing internet service fees and devices, with the lowest 20% income earners 10 times less likely to have internet access compared to the highest earners (Pew Research, 2021).</li></ul>	<ul style="list-style-type: none"><li>- Healthcare access inequality, leading to disparities in healthcare access and outcomes</li><li>- Increased isolation, especially for the elderly or disabled, affecting mental health</li><li>- Mental health issues are 1.5 to 2 times more prevalent among the low-income population (CDC, 2021).</li></ul>

# Is there a Digital Divide between Advanced Countries and the Global South?

YES

ASPECT	ADVANCED COUNTRIES	GLOBAL SOUTH
<b>Investment in Health Research</b>	Often <b>exceed 2.5% of GDP</b> , with countries like the USA spending around 2.8% of its GDP on health research (about \$511 billion in 2021).	Typically <b>less than 1% of GDP</b> , with many countries struggling to meet the WHO's recommended 2% of national health budget for research.
<b>Infrastructure for Research</b>	In 2021, the United States spent 3.46% of its GDP, the European Union spent 2.27% of its GDP on research and development.	South Korea spent 4.4% of GDP in 2021. China's R&D, 2.55%. India's R&D spending has been 0.6-0.7% of GDP for past 2 decades. Latin America less than 1%, African Union's target of 1% of GDP to research is rarely met.
<b>Human Resources</b>	High density of researchers, e.g., the USA has over <b>4000 researchers per million</b> inhabitants.	Low density of researchers, e.g., Sub-Saharan Africa averages about <b>198 researchers per million</b> inhabitants.
<b>Research Output</b>	High. The USA and Europe contribute to <b>over 50% of global scientific publications</b> , with around 10% of the population	Comparatively lower with 76% of global population. In 2020, China was at 23% with India marking a compound annual growth rate of 9% from 2010 to 2020. Latin America estimated at less than 10% of total while Africa contributes about <b>2%</b> of the world's total scientific publications.
<b>International Collaboration</b>	Extensive, with countries like the USA and Germany investing billions in international health research collaboration.	Limited, often relying on partnerships with advanced countries, and sometimes subjected to 'brain drain.'
<b>Access to Research Funding</b>	Robust, with multi-billion-dollar budgets from various sources. For example, pharmaceutical R&D in the USA exceeds \$80 billion annually.	Limited, often heavily dependent on international aid including philanthropic, is typically earmarked for specific projects or diseases.
<b>Impact of Research</b>	Global, driving worldwide health policies and innovation. For example, the USA's pharmaceutical market is valued at over \$500 billion.	More localized, though with some global impact in specific programs like the Global Fund, which has a budget of over \$4 billion annually.

# Trust Building with Participative Regulation and Research: Scaffolding of a people-centered, digitally inclusive future

## Cross Sector Digital Regulatory Sandbox's

- A framework for testing digital solutions in a real-world environment without significant risks.
- Encourages innovation while ensuring compliance and safety.

## Independent Trust Agents

- Ensure transparency and trust by verifying compliance with digital standards.
- Operate as non-governmental entities, bridging private, public, and social sectors.

## Prosperity Data-Cooperative Networks

- Facilitate equitable economic opportunities by providing access to global finance for SME's
- Support the creation of AI-powered data cooperatives for cross-border financing.

Can We Bridge the Digital Divide to Promote a resilient, Inclusive, and Prosperous Society?

**YES**

# Can we enhance Community Resilience?

## **YES** with Community Learning and Living Labs

### Citizen and Resident Participation as Primary Priority

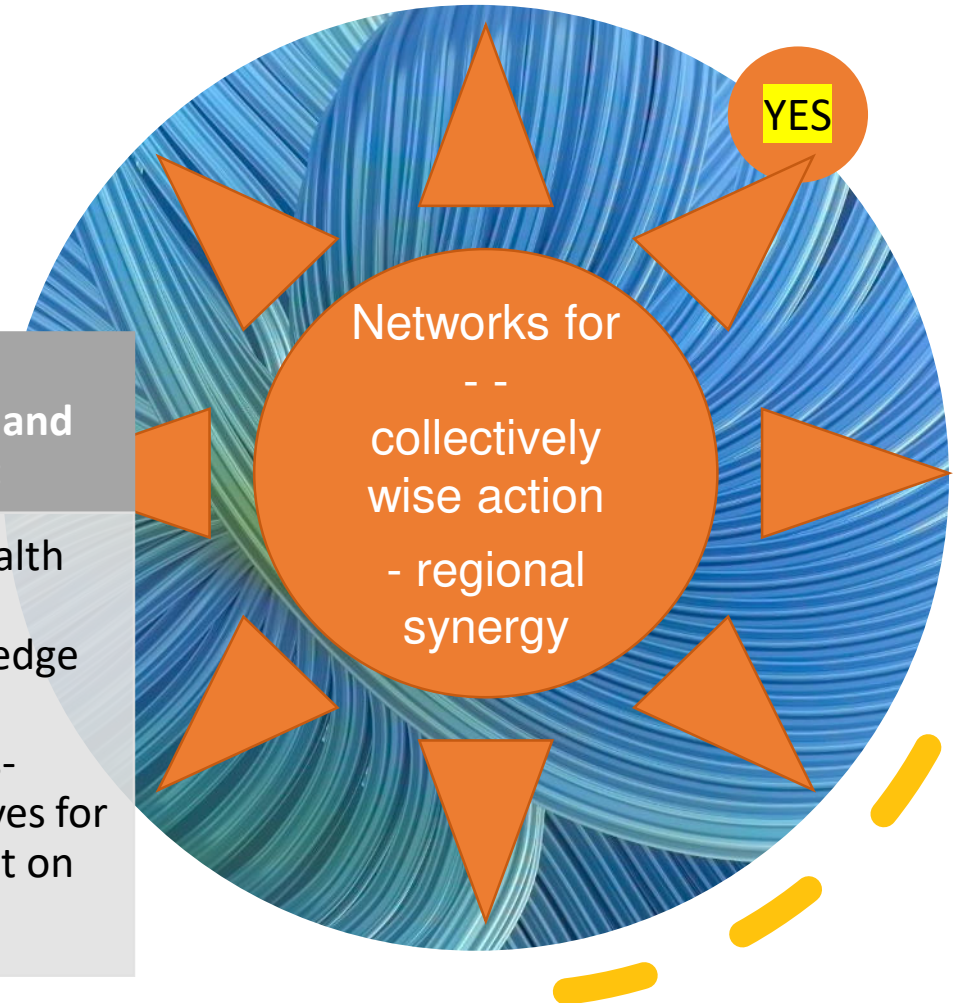
- For community engagement and empowerment.
- Local innovators connecting citizens, researchers, and policymakers.

### Community-Driven Resilience:

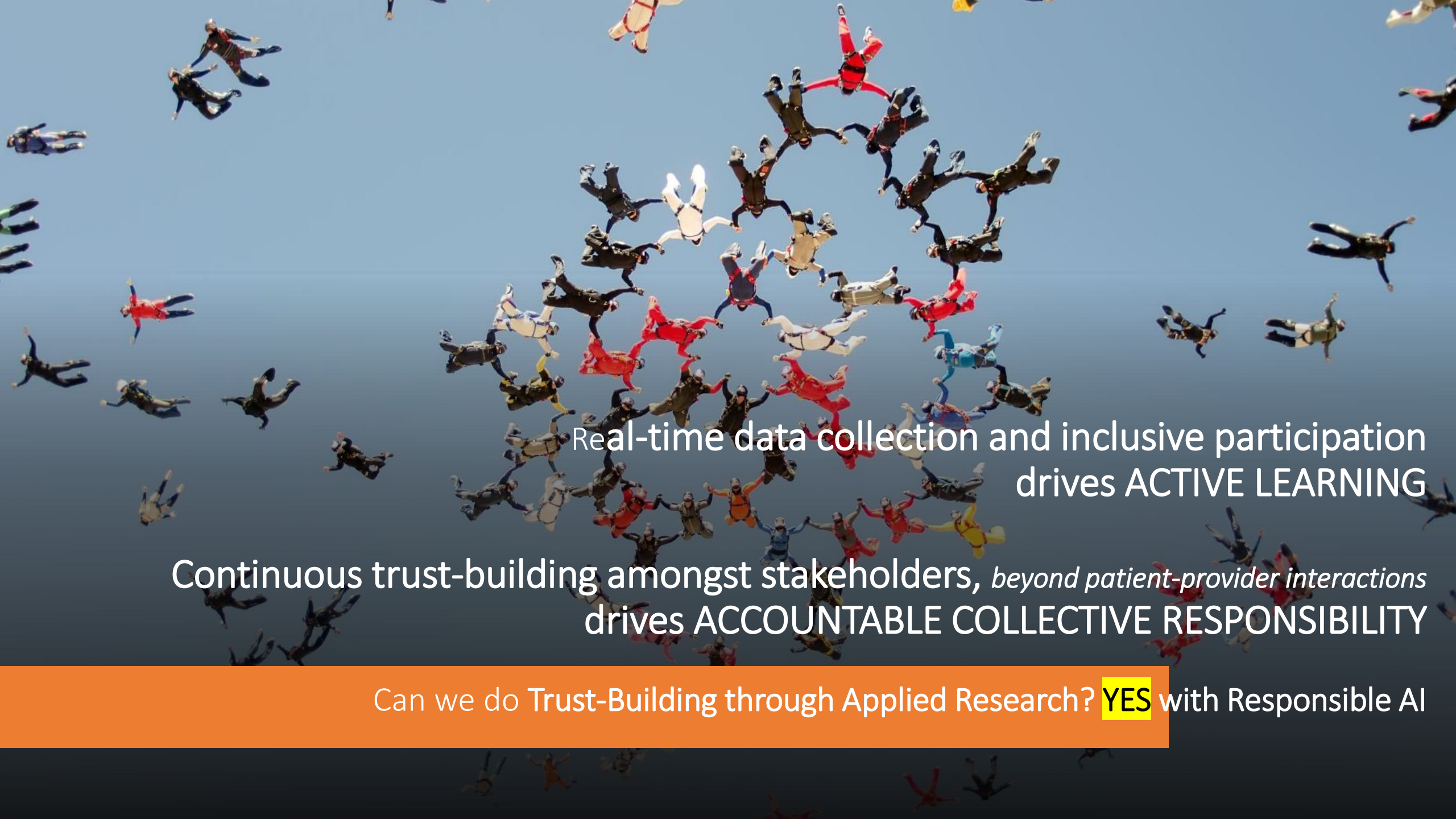
- Enable communities to tackle local challenges through participatory action.
- Promote sustainable living practices tailored to regional needs.

### Regional Collaboration and Networks:

- Strengthen health outcomes by sharing knowledge and resources.
- Facilitate cross-border initiatives for broader impact on well-being.







Real-time data collection and inclusive participation  
drives ACTIVE LEARNING

Continuous trust-building amongst stakeholders, *beyond patient-provider interactions*  
drives ACCOUNTABLE COLLECTIVE RESPONSIBILITY

Can we do Trust-Building through Applied Research? **YES** with Responsible AI



# Sustainable Pathways to Health Equity

**Data Cooperatives:** Establish community-led data cooperatives for collective health improvement paying attention to the social determinants of health

**Local Empowerment:** Empower communities to identify local, national or global assets that can increase the health of people, with special attention to the role of families, elders.

**Enhancing Health and Prosperity:** Support local SME's to meet the needs of community

**Healthcare Research Funding:** Track and direct research funds to ensure they address local health disparities by measuring longitudinal impact in the formal and informal economy

**Community Prosperity:** Integrate health improvement initiatives with local economic development plans.

**Inclusive Policies:** Advocate for inclusive health policies that address the needs of marginalized populations.

**International Collaboration:** Foster global partnerships for knowledge exchange and resource sharing



Diagram from <https://health.gov/our-work/national-health-initiatives/equitable-long-term-recovery-and-resilience>

# Roadmap for People-Centered Scientific and Digital Transformation

**Collective Intelligence:** Merge AI capabilities with human insights to drive innovation and problem-solving.



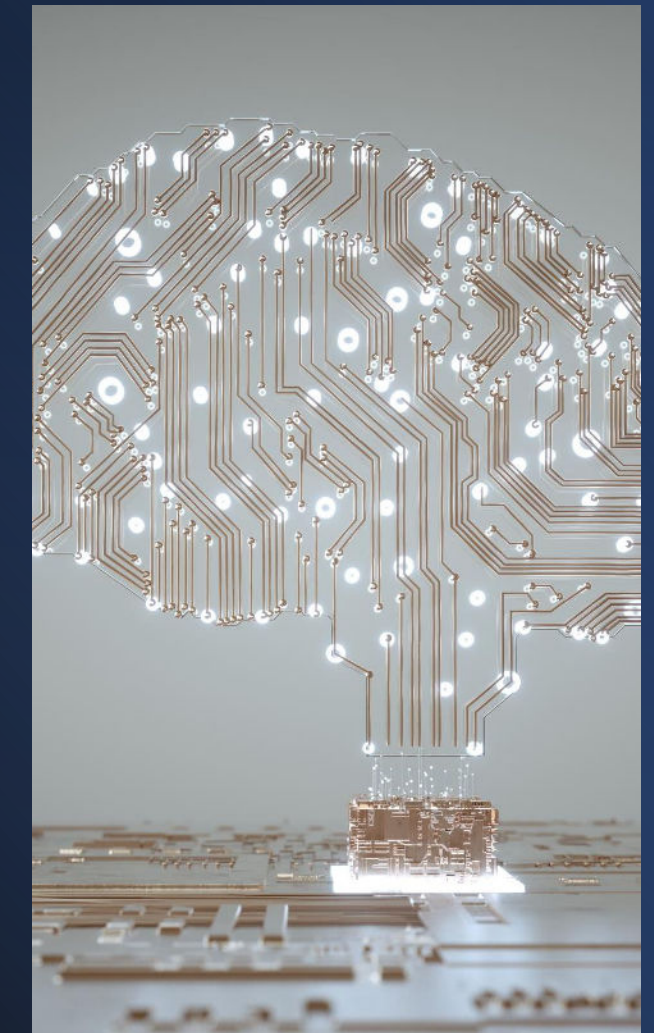
**Continual Improvement and Iterative Learning:** Employ machine learning and data analytics to refine preventive and healthcare strategies continually.



**Feedback Loops:** Establish systems for real-time feedback from healthcare professionals, patients and community to inform AI decision-making.



**Data Cooperatives for Individual and Family Health Data:** Develop community-driven data cooperatives for participation and to share health data securely.



Can we Harness artificial intelligence to analyze data trends, predict health outcomes, and automate processes for efficiency?  
**YES we can !**

Can data cooperatives  
Improve community  
capacity building? **YES**

# Community Capacity Building

- **Collective Data Sharing:** Encourage the sharing of health data across communities to build collective health literacy, develop business opportunities.
- **Community Empowerment:** Enable communities to use shared data for localized health interventions and take responsibility and spread accountability
- **Empowering Transformation:** Empower communities with AI and collective intelligence to create a sustainable health ecosystem.
- **Data-Driven Decisions:** Make informed decisions based on comprehensive data analysis to improve health outcomes individually, in families and communities
- **Societal Health Metrics:** Use big data to assess and respond to population health and public health challenges (like COVID) and societal well-being.





# AI Governance and Community Learning and Living Labs

**Learning and Living Labs in local communities** can utilize AI to enhance community engagement, fostering innovation and collaborative problem-solving.

*2 examples: **AI-based pregnancy monitoring** systems for improved maternal health; poverty mapping tools for targeted aid.*

**Digital Public Infrastructure (DPI) can earn and keep Trust in AI:** Verifying and validating data, encouraging participation and feedback, and acting responsibly on the feedback ensures trustworthy AI applications.

*For example: **Flood Detection with AI** reduced annual flood deaths in Bangladesh from 1000's to under a dozen*

Can We  
Leverage AI  
for the Public  
Good ? **YES**



# Bangladesh AI + DPI Summit highlighted 16 use cases ([Link](#))

Highlighting the importance of AI governance in fostering community participation and the critical role of DPI in establishing trust and efficiency in implemented AI applications



**Preventing Mistakes:** Robust DPI facilitates error detection and correction, enhances efficacy of AI tools.



**Smart Assessment Systems:** Improve educational outcomes by assessing student performance with AI.



**Healthcare Monitoring:** Use AI for early detection in high-risk pregnancies, ensures timely interventions.



**Community Empowerment:** AI governance for data democratization, empowers community solutions.



**Innovation through Collaboration:** Learning and living labs serve as the nexus for public participation, driving societal advancements with AI.

# Kenya AI & Data Cooperative Study

## Atlas AI with Tech Innovators Network Kenya (THiNK)

### For Stanford University CS Dept ([Link](#))

## Built Environment Access for Community Health Resilience

=> Community Health Resilience indicators using proprietary and public access archival data and infrastructure system components

- geospatial catchment area analysis to document “demand” and “supply” of services

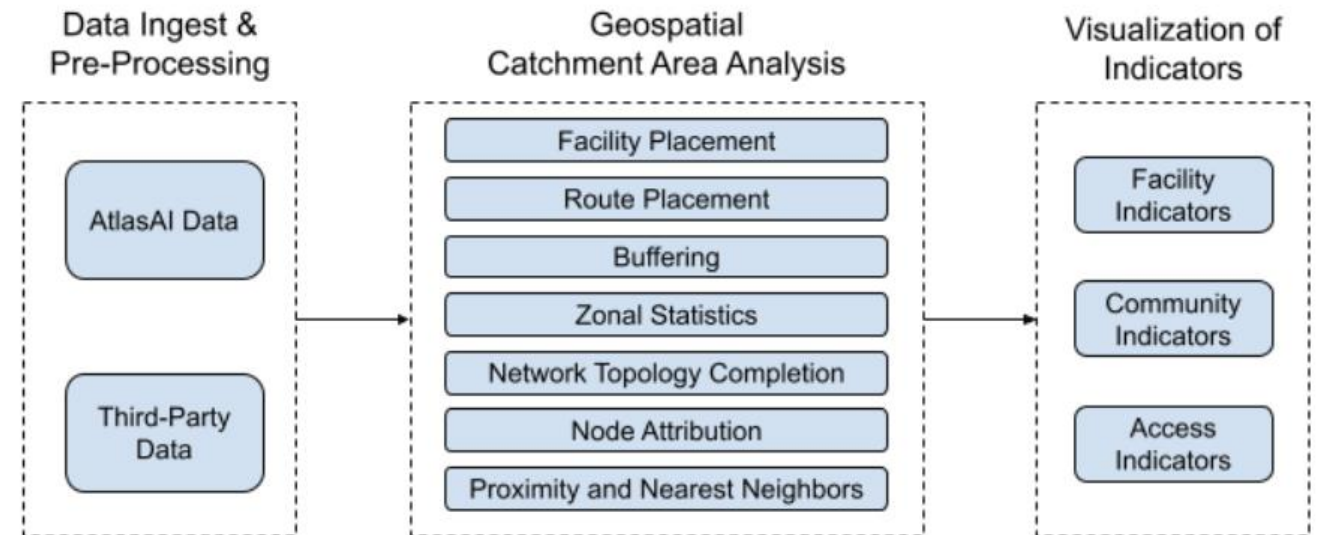
### Urban and Rural Delineations

To the extent useful for delineating types of nodes (facilities) and the type of populations and communities they serve, we will also leverage the Urban R Catchment Area data set for Kenya, see <https://www.pnas.org/content/118/2/e201119>

### Atlas AI Data Sources

Relevant Atlas AI data sources for this analysis include a mix of proprietary and archival data sets: Asset Wealth Index, a measure of economic well-being; Spending, a measure of ability to pay for services; Electrification Access, whether a community is electrified or not; Population and Population Density, high-resolution estimates; Road Networks; Urban and Rural Delineations

*All Atlas AI proprietary data sets provide standardized metadata and complete coverage at 1 km granularity (15 arc-seconds measured at the Equator), and are updated annually.*



**Figure 1. Methods Overview**



# Trustworthy AI developed with and for communities for Affordable, Equitable Health and Sustainable Prosperity

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## Trustworthy AI:

Solutions that are ethical, transparent, and aligned with human values.

Systems are designed with privacy and data protection at their core.

## Community Engagement:

Leverage AI to enhance community health initiatives and personalize care.

Engage with local leaders to identify and address health needs.

## Inclusive, People-Centered:

Integrate diverse perspectives, including indigenous, in health strategies.

Prioritize participatory design and governance of AI solutions.

## Indigenous Wisdom and Participation:

Harness traditional knowledge to complement modern healthcare.

Foster respectful empowering relationships in AI development.

## Organizational Structure for AI4SMEs:

Support small and medium enterprises in adopting AI for health.

Address health challenges with innovative, scalable AI4SME solutions.



## CONCLUSION

Yes we can have

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1. AI that is community-focused, inclusive, trustworthy.
2. Digital Public Infrastructure for equitable health
3. Local SME's supported to prosper with AI to meet community needs and share with the world as needed.

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