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Making Human-Centered AI Operational

*Accessibility and Digital Inclusion in AI-enabled Smart Sustainable Cities
and Communities*

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AI Accessibility in Practice

- I asked an AI platform to translate the following **Korean** sentence into **English** and **International Sign**, respectively.

Korean: 안녕하세요. 제 이름은 이용직입니다. 오늘 같은 좋은 날, 의미 있는 발표 자리에서 여러분을 만나서 정말 반갑고 감사합니다.



ENGLISH

"Hello, my name is Yong-Jick.
I'm truly grateful to meet you
all on this wonderful day and at
such a meaningful
presentation."



INTERNATIONAL SIGN

To create an accurate International Sign video, the signs, movements, and facial expressions would need to be carefully defined. I can't reliably produce a finished signing video — an AI-generated video can distort hand shapes and movements, changing the intended meaning. However, I can provide a script for an experienced International Sign interpreter to use. Here is a sample script:

HELLO. ME NAME YONG-JICK. TODAY IS A WONDERFUL DAY. I AM GRATEFUL TO MEET YOU. IT IS A MEANINGFUL PRESENTATION. THANK-YOU.

For recording:
Fingerspell Y-O-N-G-J-I-K.
Use a warm, welcoming facial expression and look across the audience.



"I can't reliably produce a finished signing video here"

...experienced in international sign or a qualified interpreter.

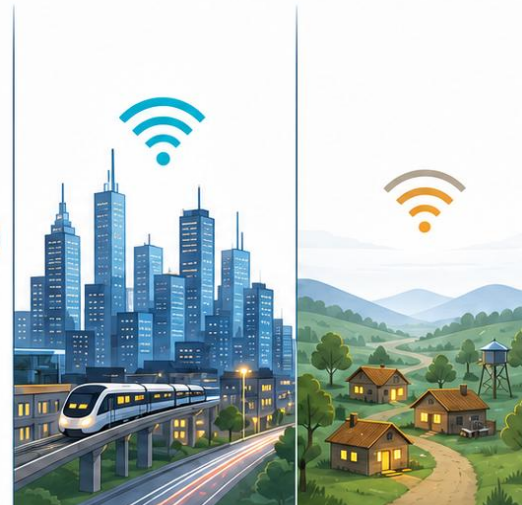
AI Enters an Already Unequal World.

- Let's face the fact – world is unequal.



2.2 BILLION

people remained offline in 2025



85% / 58%

URBAN

RURAL

Internet use worldwide in 2025



1.3 BILLION – 1 IN 6

people experience significant disability



Distinct, overlapping dimensions of exclusion – not additive

Diversity of User Needs in Digital Environments

- **Inclusion** means addressing the needs of all users, especially those at risk of exclusion.

WHO NEEDS INCLUSION?

- ◆ Persons with disabilities
- ◆ Older adults
- ◆ Persons with low digital literacy
- ◆ Linguistic & cultural minorities
- ◆ Low-connectivity & low-resource regions
- ◆ Neurodivergent users

These barriers often compound
(e.g. an older adult in a rural area with low literacy)

AI AS AN ENABLER

- Automatic captioning
- Text-to-speech
- Easy language generation
- Personalization

AI AS A BARRIER

- Voice-only interfaces
- Complex language
- High digital literacy required
- Bias in system outputs

AI can either reduce or reinforce exclusion
depending on how it is designed and governed.

Accessibility and Digital Inclusion in Emerging Technology

Strategic Planning Phase



Is accessibility and digital inclusion
merely a nice decoration
for emerging technologies?

Implementation Phase



Do they get forgotten
as technology evolves?



Accessibility and digital inclusion should be treated as
essential elements, like everything else.

Digital Inclusion in AI: Why It Matters

- AI systems and datasets are not yet equally representative across regions, languages, and cultural contexts, creating a “**global-data gap.**”

KEY ISSUES

Linguistic Diversity

- Over 7,000 languages worldwide, but only around 1,000 are represented online
- Most are under-represented in AI data
- Low-resource languages are often ignored

Cultural Diversity

- Values, gestures and expressions differ across cultures
- Western-centric AI may misinterpret local contexts

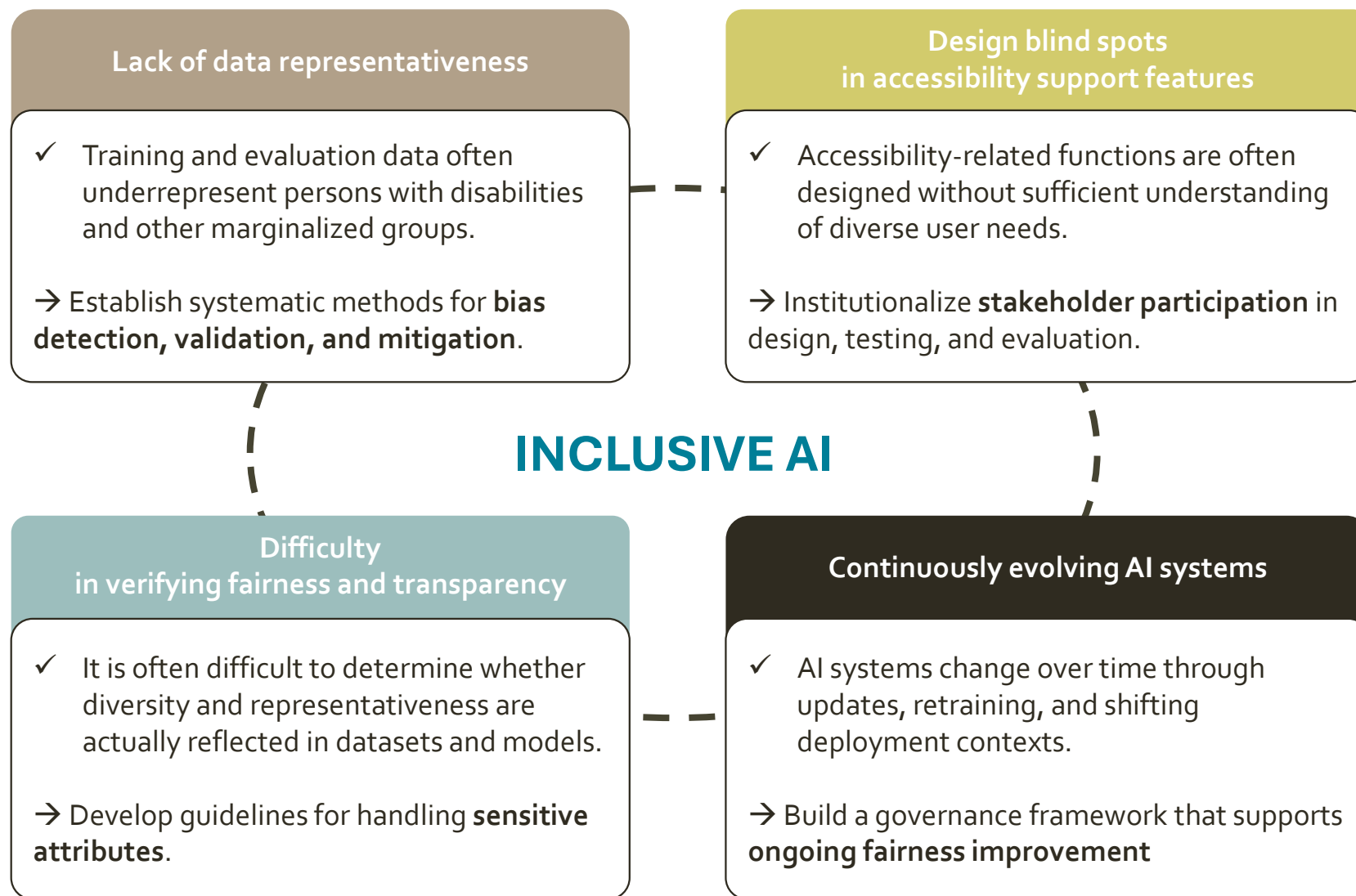
Socio-Economic Diversity

- Wide disparities in connectivity, device access and digital literacy.
- Rural and remote communities' risk being left behind

Without regional inclusiveness, AI may:

Misunderstand local language and dialects,
Produce culturally inappropriate outputs,
Reinforce global digital inequality

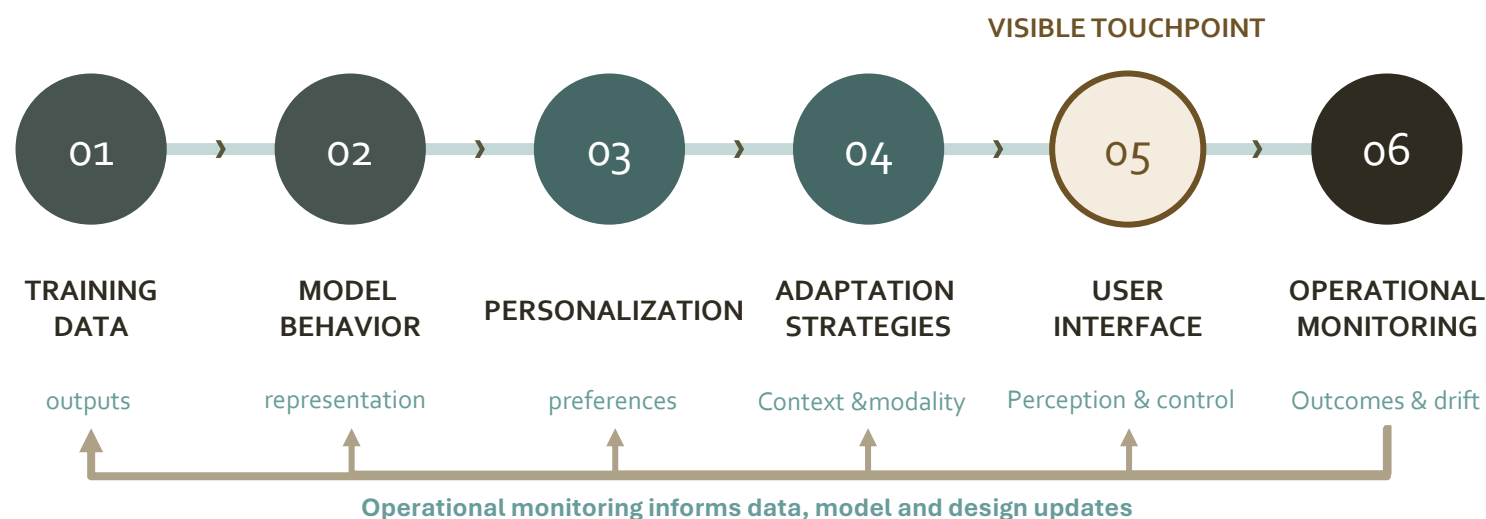
Governance Priorities for Inclusive AI



AI Accessibility Must Cover More Than the Interface

- In AI, accessibility is an end-to-end system property.

The interface is only the visible touchpoint; accessible outcomes are shaped across the full-service lifecycle.



Accessibility must be designed, tested and monitored at every stage.

Human-Centered Design (HCD) for AI Ecosystems

- Bridging readiness gaps requires not only capacity, but also human-centered governance and design.

“HCD is a design approach that focuses on users, their needs, and their contexts – applying human factors and usability knowledge to make systems usable and useful.” [ISO 9241-210]



KEY PRINCIPLES OF HCD

- ✓ Design based on understanding users, tasks, and environments
- ✓ Users involved throughout the process
- ✓ Iterative design and evaluation
- ✓ Address the full user experience
- ✓ Multidisciplinary collaboration

In AI ecosystems, design decisions are governance decisions

Because how we design systems directly determines who is included — and who is excluded.

The Toolbox is Rich — and Layered.

PRINCIPLES

WHY

STANDARDS

WHAT

DELIVERY

HOW IN PRACTICE

**RIGHTS & GLOBAL
NORMS**

UN CRPD · OECD AI Principles ·
UNESCO AI Ethics
Recommendation

Protect rights, participation and fairness
- What must be protected.

**AI GOVERNANCE &
LIFECYCLE**

ISO/IEC 42001 · 5338 · 42005

Govern, assess and improve
- How AI is governed, assessed and
improved.

ICT ACCESSIBILITY

WCAG 2.2 · EN 301 549 · ISO/IEC
30071-1

Specify and embed accessible ICT
- What accessible ICT should do and how to
embed it.

IoT & SSC&C

ITU-T Y.4204 · Y.4211 · Y.4219 ·
Y.4245 ·
YSTR.ACC-SCC

Apply accessibility to urban services
- How accessibility applies to connected
urban services.

The core principles, including universal design, have been established—but they need implementation.

WHO · WHEN · EVIDENCE · PARTICIPATION · IMPROVEMENT

Accessibility and Digital Inclusion in ITU-T SG20 Q8

- ITU-T Q8/20 – “Human-centric digital services enabled by IoT and SSC &C related to digital health, accessibility and inclusion”

BASELINE IoT ACCESSIBILITY	Y.4204	Ensuring consistent and interoperable accessibility across IoT systems composed of interconnected sensors and technologies.
USER INTERFACES	Y.4219, Y.4245	Standardizing consistent accessibility across diverse types of user interfaces, together with personalized accessibility design.
SSC&C	Y.4211, YSTR.ACC-SCC	Extends beyond user interfaces: the personalized delivery and presentation of service information constitutes an additional layer of accessibility.
EMERGING TECHNOLOGIES	Y.4246, YSTR.ACC-Tools, Y.dt-PAF	metaverse (Y.4246, YSTR.ACC-Tools), Digital Twins (Y.dt-PAF)
VERTICAL DOMAINS	Y.4211, Y.IoT-PwD-ID, Y.IoT-SAS, Y.meta-Ed, Y.IoTSpEd_req, Y.AAL-ProIoT	Smart public transportation (Y.4211, Y.IoT-PwD-ID), Community services (Y.IoT-SAS), Smart Education (Y.meta-Ed, Y.IoTSpEd_req), Active Assisted Living (Y.AAL-ProIoT).

The Missing Block: a Shared Operational Framework.

- What we need is a shared view of the whole lifecycle.



PARTICIPATION THROUGHOUT THE LIFECYCLE

WHO MAY BE EXCLUDED?

**WHAT REQUIREMENTS
AND EVIDENCE APPLY?**

**WHO OWNS THE
DECISION—
AND WHO PARTICIPATES?**

Existing standards remain the building blocks. The framework connects them.

Such a framework does not replace existing standards. It helps teams know which to use, when to use them, what evidence to retain and where responsibility passes next.

No one should be excluded from the future digital society.

Thank you!