

When Technology Fails the People It Is Meant to Serve

Structural Barriers to Interdisciplinarity & User Involvement

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Core Problem

Many technologies designed for populations in need never reach widespread adoption.

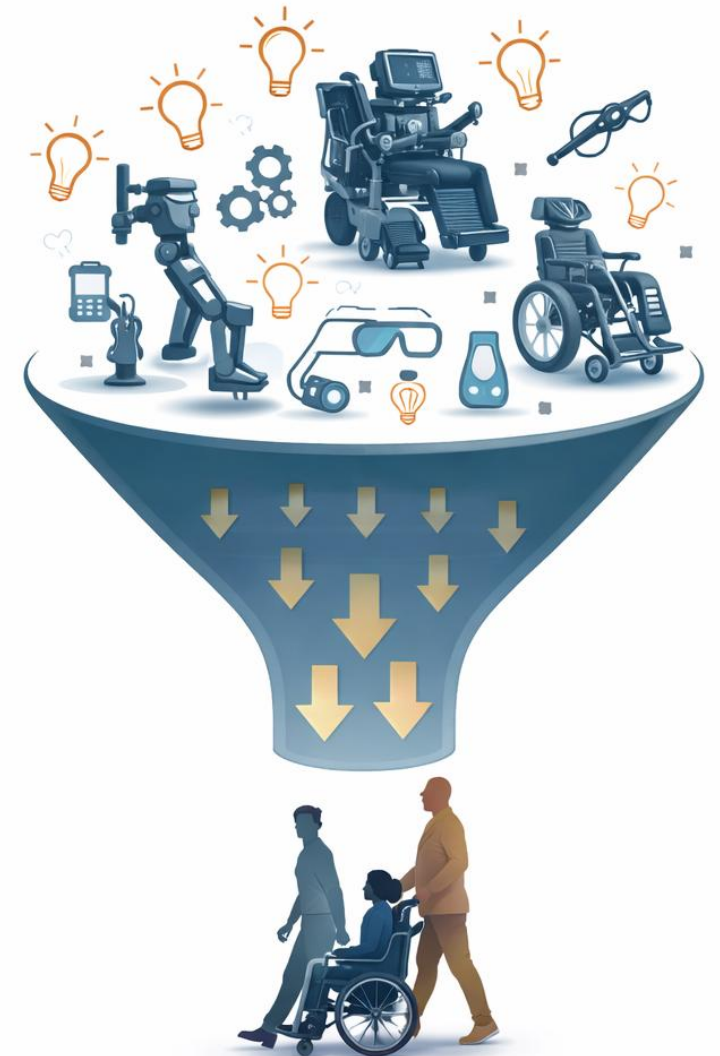
Huge R&D effort, public investment, etc.



Many innovative technologies

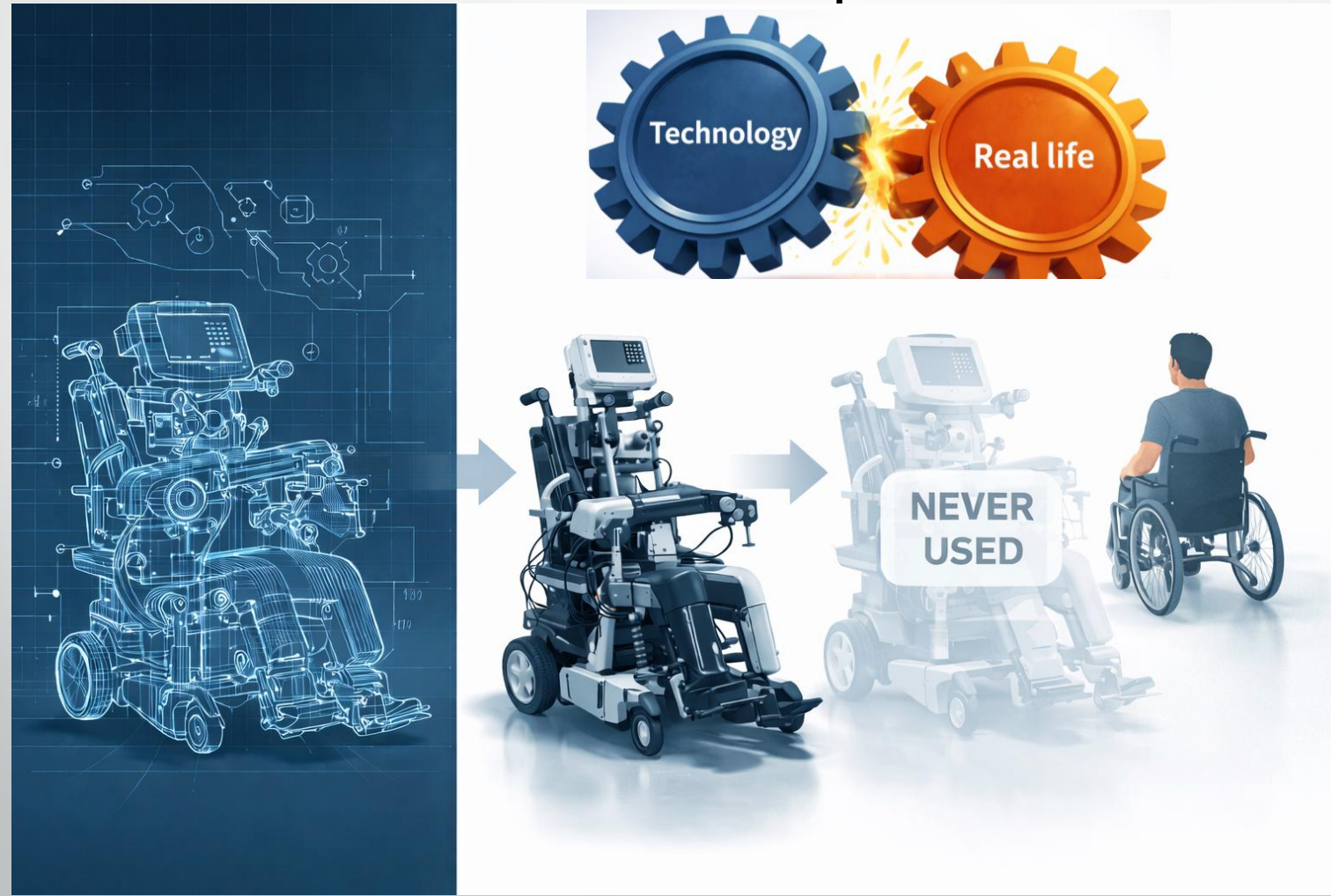


little adoption



But why does this happen?

Structural misalignments between AT development and real user needs and expectations.



Where do these barriers begin?

Academia

- Interdisciplinarity is encouraged but rarely rewarded
- Career evaluation prioritizes:
 - High-impact publications
 - Technical novelty & “breakthroughs”
- Real interdisciplinarity takes time
- UCD and Multidisciplinary work are penalized



Result: Elegant, publishable technologies
→ **Disconnected from real user needs**

Interdisciplinary Teams

When Collaboration Breaks Down

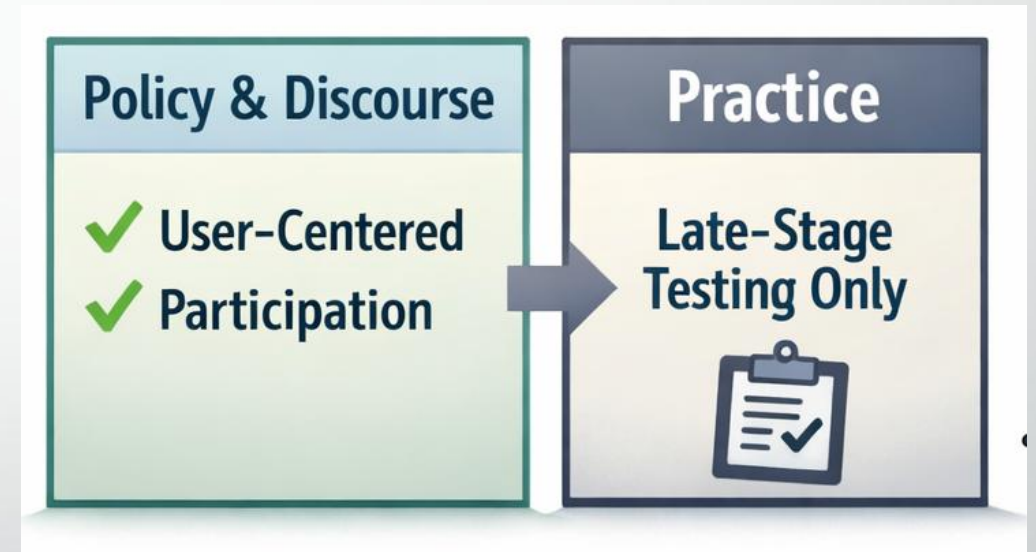
- Different disciplines speak different “languages”
- No shared understanding → teams talk past each other
- Hidden hierarchies shape whose knowledge “counts”



Result: distorted design priorities and potential harm to users

User Involvement: Consensus in Theory, Failure in Practice

- Everyone agrees user involvement is essential
- User-centered design is widely promoted
- Yet meaningful involvement is rare
- The problem is not unwilling engineers
- The problem is how systems are structured



User Involvement - Barrier 1: Ethics Frameworks Built for Linear, not Iterative, Design

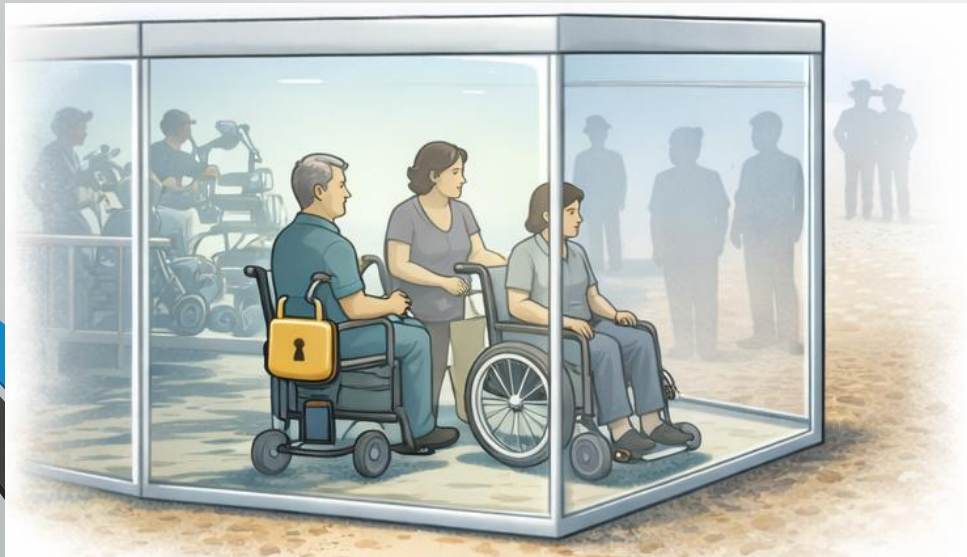
- Meaningful early involvement:
 - flexible conversations,
 - informal testing,
 - mock-ups, and
 - low fidelity prototypes
- Ethics committees require: fully detailed, finalized protocols
- Early-stage prototypes treated like finalized medical devices
- Users pushed to the very end of development



Result: User involvement becomes validation, not co-creation.

User Involvement - Barrier 2: When Protection Becomes Exclusion

- Assistive technology users labelled as “vulnerable populations”
- Leads to:
 - Over-protection
 - Restricted participation



User Involvement - Barrier 3: Ethics Review Fragmentation in Collaborative Research

- Multi-institution projects → multiple ethics approvals
- Different timelines, formats, expectations
- Delays of months — sometimes more than a year
- High cost in time, money, and motivation

Result: Users excluded from shaping tools they depend on

Paths Forward:

From Structural Barriers to Structural Change

Change is possible and already underway

- **Rethinking incentives:** Funding and career criteria that value user engagement and interdisciplinarity
- **Stabilizing collaboration:** Long-term interdisciplinary teams instead of project-by-project assembly
- **Bridging disciplines:** *Boundary-spanning roles* translating between engineering, ethics, and social sciences
- **Evolving ethics framework:** Flexible procedures for early-stage, low-risk user involvement
- **Rights-based grounding:** UN Convention on the Rights of Persons with Disabilities: users as active participants
- **Regulatory experimentation:** Regulatory sandboxes enabling innovation *with* users, not around them

Inclusive design is not a "nice to have", it is a condition for health justice

Health Justice in Assistive Technology: The Call to Action

- Health justice goes beyond access, it requires transforming how technologies are designed and evaluated.
- Disciplinary silos, lack of user involvement, and misaligned incentives ➡ Impressive but failing technologies.
- This is not inefficiency ➡ it is structural injustice.
- A just innovation ecosystem is:
 - Inclusive
 - Interdisciplinary
 - Grounded in lived experience