

This response is part of an interview conducted by **Jana Ai**, News Reporter at *Blue Tech Wave*, for the series titled “**The History of the Internet**”, based at Devonshire House, One Mayfair Place, London, UK.

List of Questions:

[Please introduce yourself, and explain how you were involved in the beginnings of the internet.](#)

[From your perspective, what were the most important turning points in the early Internet history?](#)

[You later moved from academic and experimental Internet work toward promoting community and rural networks such as RT/RW-Net. What led you to make that shift from “the laboratory” to “the community”?](#)

[You have highlighted language and localization as barriers to Internet adoption in Indonesia. Looking back, how important were local language content and digital literacy in shaping the history of Internet use in your country?](#)

[You pioneered many low-cost, do-it-yourself solutions—such as the famous “wokbolic” antennas—to make connectivity accessible. In your view, how significant were grassroots and low-cost innovations to the early spread of the Internet in developing regions?](#)

[How did government policy, telecom regulations, and the role of commercial operators affect the growth of the Internet in Indonesia? Were there particular policies that helped—or hindered—the process?](#)

[In your experience, how do infrastructure deployment and user capacity \(digital skills, education, demand for content\) interact? Historically, did one side lag behind the other, and how can both be advanced together?](#)

[You have long advocated for open source, copyleft, and community participation. What role did these principles play in Indonesia’s Internet history, and how do you see them fitting into today’s global Internet governance debates?](#)

[Lessons for Future Generations: Reflecting on your career, what lessons from the early days of the Internet would you share with those aiming to document or shape the Internet's future?](#)

Please introduce yourself, and explain how you were involved in the beginnings of the internet.

Onno Widodo Purbo (b. 17 August 1962, Bandung) is one of Indonesia's most influential information technology figures. He is known as a **technologist, educator, author, and open-source activist**, advocating for affordable Internet access for ordinary Indonesians.

- **Education:**
  - Best graduate in Electrical Engineering, ITB (1987).
  - Master's in semiconductor lasers at McMaster University, Canada (1989).
  - Ph.D. in Electrical Engineering, University of Waterloo, Canada (1994).
- **Key Innovations & Advocacy:**
  - Promoted open-source and *copy/left* principles.
  - Created **Wajanbolic antenna** (WiFi with a cooking wok) and **RT/RW-Net** (community neighborhood networks).
  - Championed **VoIP Rakyat**, community cellular systems (OpenBTS), and ICT inclusion in schools.
- **Recognition:**
  - Awarded the **ASEAN Outstanding Engineering Achievement Award (1997)**, **Eisenhower Fellow (2002)**, **Ashoka Senior Fellow (2005)**, and **Jonathan B. Postel Service Award (2020)** for outstanding contributions to Internet development.

Onno W. Purbo and the Beginnings of the Internet in Indonesia

- **Early Internet Networking (1993–1996):**

At ITB, Onno and his students built one of Indonesia's first community-based educational networks using **AX.25 packet radio** on 1200bps walkie-talkies. This setup connected campuses and laid the foundation for academic networking.
- **International Link via Japan (1996):**

With support from Japanese Internet pioneers **Suguru Yamaguchi and Jun Murai**, Onno's team secured a **1.5 Mbps satellite link via JCSat to Japan**. This became the **first major Internet backbone for Indonesian education**, connecting multiple universities and serving as a model for national Internet expansion.
- **Spreading Internet Access:**
  - Popularized **cyber cafés (WARNETs)** as affordable public Internet access points. At its peak (2000–2002), ~100,000 WARNETs introduced millions of Indonesians to the Internet.
  - Advocated for **WiFi deregulation**, leading to the 2005 legalization of the 2.4 GHz band, enabling grassroots Internet via cheap antennas and RT/RW-Net.

- **Community Empowerment:**

His vision emphasized **bottom-up, community-driven infrastructure** instead of relying solely on government or large telecoms. Initiatives like RT/RW-Net and VoIP Rakyat gave villages, neighborhoods, and schools affordable connectivity long before mass mobile Internet adoption.

## Legacy

Onno W. Purbo is often called **Indonesia's Internet Liberator**. His work not only introduced Indonesia to the Internet but also ensured that access was **inclusive, low-cost, and community-based**, influencing policies, inspiring generations of ICT activists, and shaping the digital landscape of Indonesia.

From your perspective, what were the most important turning points in the early Internet history?

### 1. The Rise of Academic Internet (1990–1994)

- According to Onno, the Indonesian Internet began in academic circles — ITB, UI, UGM, and IPB.
- Early access relied on academic initiatives such as UUCP and later international dial-up lines.
- What mattered most here was the *self-help, community-driven* spirit: the Internet was not built by the government, but by researchers and students linking themselves together.

### 2. Birth of Indosat & Commercial ISPs (1994–1996)

- In 1994, commercial Internet appeared with Indonet (built by Adisoemarta and others). This marked the shift from *academic internet* to *commercial internet*.
- Onno saw this as a critical step because access spread beyond campuses to the wider public.
- This was also the era of the *Internet cafés (Warnet)* — which Onno later documented in his book *Teknologi Warung Internet* (2000).

### 3. Grassroots Infrastructure & Low-Cost Access (1997–2003)

- Onno pioneered **RT/RW-Net**, a neighborhood-based community network model that enabled cheap Internet at the grassroots level.
- He also popularized **Wajanbolic**, a DIY parabolic dish WiFi antenna for affordable wireless Internet.
- For Onno, this was a turning point because it brought Internet access directly to villages and households without relying solely on commercial ISPs.

### 4. Open Source, Linux, and Democratizing Technology (1998–2008)

- Onno actively promoted Linux and *open source*, in line with his *copyleft* philosophy.
- His many publications on TCP/IP, Linux, VoIP, and low-cost server helped schools and small businesses adopt Internet technology.
- For him, this was the moment when the Internet shifted from being a corporate privilege to something ordinary people could *copy, adapt, and build themselves*.

### 5. International Recognition & Copyleft Philosophy (2000–2020)

- Onno received numerous awards, culminating in the **Postel Service Award 2020 from the Internet Society**, given only to a handful of global Internet pioneers.
- To him, this was recognition that Indonesia's grassroots Internet struggle — building affordable, open, community-based networks — was also part of the global Internet story.

### 6. Legacy of Philosophy: Internet for All

- Onno emphasized that the greatest turning point was not purely technological, but philosophical: the Internet should not be limited to elites or governments but must belong to villages, schools, neighborhoods, and youth in Internet cafés.
- This idea is reflected in many of his books (*Buku Pegangan Internet untuk Desa, Perjuangan Menyebarkan Internet Mempersempit Digital Divide*), which capture his lifelong advocacy.

**Conclusion:**

From Onno W. Purbo's perspective, the real turning points in Indonesia's Internet history were not just about technology (academic links, ISP launches, international backbones), but about **grassroots movements, affordable access, and the open philosophy** that turned the Internet into a public right rather than a mere commodity.

You later moved from academic and experimental Internet work toward promoting community and rural networks such as RT/RW-Net. What led you to make that shift from “the laboratory” to “the community”?

### 1. Philosophical Roots: *Copyleft* and *Access for All*

- Onno embraced the *copyleft* and *open source* ethos early on.
- He believed that knowledge — especially Internet know-how — should not be hoarded in academia or corporations but freely shared.
- This philosophy naturally pushed him out of the ivory tower into the neighborhoods, where he could empower ordinary citizens to build their own networks.

### 2. The Social Context: Indonesia in the Late 1990s

- The Asian Financial Crisis (1997–1998) created economic hardship. Commercial Internet access was expensive and inaccessible to most Indonesians.
- Onno saw that if Internet remained a costly, elite service, it would deepen the **digital divide**.
- His answer was **low-cost, do-it-yourself solutions** like RT/RW-Net and Wajanbolic, which made connectivity possible with minimal resources.

### 3. From Academia to Advocacy

- After leaving his lecturer position at ITB in 2000, Onno was no longer confined to formal academic structures.
- This gave him freedom to publish practical guides, run workshops, and engage directly with schools, youth groups, and rural communities.
- For him, real impact was not publishing in journals but enabling villages to get online.

### 4. Technology as Community Empowerment

- Onno reframed technology as a **tool for empowerment, not just experimentation**.
- With projects like RT/RW-Net, he showed that communities could control their own information infrastructure instead of waiting for telcos or the government.
- This bottom-up model matched Indonesian traditions of *gotong royong* (mutual help), making it both culturally resonant and technically feasible.

### 5. Recognition & Validation

- His grassroots orientation was later validated by both local and international recognition (e.g., KADIN Telematika Award in 2000, Postel Service Award in 2020).
- These awards reflected that the Internet was not just a research experiment — it had become a community tool, and Onno’s approach was central to that transformation.

**In short:**

Onno W. Purbo moved from lab-based experiments to community networking because he believed the Internet should not remain an academic curiosity or commercial luxury. His philosophy of openness, the economic reality of Indonesia, and his personal desire to empower ordinary citizens all led him to focus on grassroots, rural, and low-cost community networks — turning the Internet into a people's movement rather than just a research project.

You have highlighted language and localization as barriers to Internet adoption in Indonesia. Looking back, how important were local language content and digital literacy in shaping the history of Internet use in your country?

This is a really central theme in Onno W. Purbo's writings and advocacy. Looking back, **local language content and digital literacy** were not side issues — they were *structural turning points* in how Indonesians could adopt and shape the Internet.

### 1. Local Language as the “Doorway” to Internet Use

- In the 1990s, most online content was in English. For a country where English literacy was limited, this was a barrier.
- Onno argued that unless the Internet “spoke Indonesian,” it would remain a tool for elites — academics, professionals, or those educated abroad.
- Localized content (in Bahasa Indonesia and local dialects) made the Internet culturally accessible and socially relevant. For example, mailing lists, forums, and early Indonesian websites began to appear in Bahasa Indonesia, helping the Internet spread among everyday users.

### 2. Digital Literacy as a Foundational Skill

- Onno didn't just push for access — he pushed for **how to use it**.
- He published dozens of freely downloadable books on topics like TCP/IP, Linux, VoIP, and practical Internet guides.
- These materials functioned as *do-it-yourself curricula* for schools, small businesses, and community organizers. They bridged the gap between simply having connectivity and actually *using* the Internet productively.

### 3. Community Learning and “Gotong Royong”

- Onno linked digital literacy to Indonesian social culture — *gotong royong* (mutual help).
- Initiatives like **RT/RW-Net** were not just about wiring houses together; they were also about collective learning. Communities taught each other how to set up servers, share connections, and maintain systems.
- This peer-to-peer model created a uniquely Indonesian path toward digital literacy, one not dependent on formal schooling or state programs.

### 4. Expanding Internet from Elites to Villages

- Without local language and literacy efforts, the Internet would have remained concentrated among urban, English-speaking elites.

- By the early 2000s, with the rise of Bahasa Indonesia content, open-source guides, and cheap community networks, the Internet became something rural schools and small towns could realistically adopt.
- This democratization of access and knowledge is why Onno often described his work as “narrowing the digital divide” rather than just “spreading technology.”

## 5. Historical Impact

- In retrospect, local language content and digital literacy were as critical as physical infrastructure.
- Fiber optics, satellites, and ISPs could provide *pipes*, but it was language and literacy that determined whether ordinary Indonesians could meaningfully use the Internet.
- This is why Onno consistently treated language, content, and literacy as part of *infrastructure* — just as vital as routers and cables.

### Conclusion:

From Onno W. Purbo’s perspective, the history of Internet use in Indonesia cannot be told without language and digital literacy. They transformed the Internet from an English-speaking, urban, elite phenomenon into a grassroots, national, and eventually rural movement. In other words: **no localization, no mass adoption.**

You pioneered many low-cost, do-it-yourself solutions—such as the famous “wokbolic” antennas—to make connectivity accessible. In your view, how significant were grassroots and low-cost innovations to the early spread of the Internet in developing regions?

From Onno W. Purbo’s perspective, **grassroots and low-cost innovations were not just useful add-ons — they were essential catalysts** for spreading the Internet in Indonesia and other developing regions. His writings, workshops, and projects show a consistent emphasis on this idea:

### 1. Technology Without Affordability Is Irrelevant

- Onno believed that if the Internet remained tied to expensive equipment and corporate ISPs, it would never reach ordinary Indonesians.
- Innovations like **RT/RW-Net** (community-built neighborhood networks) and **Wokbolic antennas** (a parabolic WiFi dish made from everyday kitchenware) proved that **connectivity could be built from household budgets, not corporate investments**.
- For him, affordability was the *precondition* for adoption.

### 2. Grassroots Solutions as Multipliers

- These DIY solutions did more than save money: they multiplied the number of entry points to the Internet.
- Every RT/RW-Net node, every Wokbolic dish, every Linux-based school server created by communities added **new users outside the reach of telcos or government projects**.
- Onno often described this as “Internet gotong-royong” — a people’s Internet, built collectively.

### 3. Local Ingenuity, Global Impact

- While the designs were local and improvised, their impact was global.
- Onno shared these models internationally (e.g., through Wireless Networking for the Developing World, FOSS conferences, and ICT workshops in Asia and Africa).
- This showed that what worked in Indonesian kampungs could also work in Bangladeshi villages, African townships, or Latin American barrios.

### 4. Empowerment Beyond Access

- Grassroots innovations weren’t just about connecting cables or boosting signals.
- They created **local ownership**: communities understood, maintained, and extended their own networks without waiting for big providers.

- In Onno's philosophy, this was a *political act as much as a technical one* — reducing dependency and giving communities real control over their information infrastructure.

## 5. Historical Significance

- Looking back, these low-cost, DIY approaches were as historically significant as government policies or ISP launches.
- They turned Internet access from a **top-down, elite-driven service** into a **bottom-up, community-driven movement**.
- Onno saw them as the practical bridge across the *digital divide*, especially in rural and developing regions where mainstream infrastructure was unlikely to arrive quickly.

### Conclusion:

For Onno W. Purbo, grassroots and low-cost innovations were **the backbone of Internet diffusion in the developing world**. They transformed connectivity from an imported, expensive, corporate commodity into a local, affordable, and community-owned resource. Without these bottom-up hacks, the Internet in Indonesia (and much of the Global South) would have remained the privilege of a few rather than the right of the many.

How did government policy, telecom regulations, and the role of commercial operators affect the growth of the Internet in Indonesia? Were there particular policies that helped—or hindered—the process?

Excellent question. From both Onno W. Purbo's writings and the wider history of Internet Indonesia, the growth of the network was shaped not only by grassroots ingenuity but also by **government policy, telecom regulations, and commercial operators** — sometimes as enablers, often as barriers.

### 1. Early Monopolies and Barriers (1980s–1990s)

- In the early years, telecommunications were tightly controlled by **state-owned monopolies** like Indosat and Telkom.
- Regulations meant that only licensed operators could legally provide Internet connectivity. This **slowed down innovation** because community-driven networks were technically “illegal” or operated in grey zones.
- Onno often criticized this, noting that it forced pioneers to “hack around the system” rather than openly innovate.

### 2. Emergence of Commercial ISPs (1994 onward)

- The establishment of **Indonet in 1994** marked the start of commercial Internet service in Indonesia.
- This was a breakthrough, but access remained **expensive** and concentrated in urban centers.
- While ISPs like Indonet, Radnet, and others expanded connectivity, the **lack of competitive regulation** kept prices high and penetration limited.

### 3. Policies That Helped

- By the late 1990s and early 2000s, the government began to cautiously **liberalize ISP licensing**, allowing more players into the market. This helped expand the Internet beyond a handful of providers.
- The **IGOS (Indonesia Goes Open Source) initiative** in the mid-2000s, which Onno supported, reflected a policy shift toward embracing open technologies — indirectly encouraging more affordable Internet adoption.
- Educational policies encouraging ICT literacy in schools also created more demand for Internet services.

### 4. Policies and Practices That Hindered

- High license fees and regulatory hurdles made it **difficult for small ISPs or community networks** to operate legally.
- Spectrum allocation policies often favored large telcos, making grassroots wireless projects like RT/RW-Net technically “outside the law.”

- Filtering and censorship regulations (e.g., *Internet sehat* guidelines from the government, distinct from the civil-society InternetSehat movement) sometimes framed the Internet more as a *threat* than an opportunity, chilling community experimentation.
- Onno repeatedly highlighted how **bureaucratic rigidity** slowed down the organic growth that grassroots communities could otherwise have achieved.

## 5. Commercial Operators' Role

- Telcos and ISPs were double-edged:
  - On one hand, they provided backbone infrastructure, international bandwidth, and mainstreamed Internet access.
  - On the other, their pricing models and control over last-mile connectivity created **bottlenecks**.
- This is why Onno emphasized alternatives like RT/RW-Net: communities could “grow their own Internet” rather than depend entirely on operators.

## 6. Historical Turning Points

- **1994–1996:** Legal recognition of ISPs → Internet expands beyond academia.
- **Late 1990s:** Reformasi period → space for civil society to push community networks, though often in legal grey zones.
- **2000s:** ISP liberalization and falling equipment costs → more access points emerge, but regulation still favors large players.
- **Post-2010:** Broadband policies (Palapa Ring, etc.) bring more infrastructure, though affordability and last-mile access remain challenges.

## Conclusion:

Government policy and telecom regulations in Indonesia shaped Internet growth in contradictory ways. **Monopolies and rigid licensing slowed early adoption**, while later liberalization, open-source policies, and educational ICT programs helped expand access. Commercial operators provided infrastructure but often kept costs high, creating space for grassroots innovators like Onno W. Purbo to step in. In his view, the Internet grew fastest when **policy opened space for community participation**, and it slowed when **policy centralized control in the hands of a few large players**.

In your experience, how do infrastructure deployment and user capacity (digital skills, education, demand for content) interact? Historically, did one side lag behind the other, and how can both be advanced together?

This question really cuts into the “chicken-and-egg” dilemma that Onno W. Purbo has described many times: **infrastructure vs. user capacity**. From his experience, the two are inseparable — and the history of the Internet in Indonesia shows how imbalance between them shaped the trajectory.

### 1. Infrastructure Without Skills = Wasted Potential

- In the 1990s, early Internet links and ISP services appeared in Jakarta and a few cities, but **ordinary users lacked digital skills** and most content was in English.
- Onno argued that this created a “pipe without water”: the cables existed, but most Indonesians could not benefit.
- He stepped in by writing free books, teaching TCP/IP, Linux, and practical Internet use in Bahasa Indonesia, filling the gap in digital literacy.

### 2. Skills Without Infrastructure = Frustration

- On the other side, by the early 2000s, many students and small businesses wanted to use the Internet but **connectivity was scarce and expensive**.
- This mismatch inspired Onno’s grassroots solutions (RT/RW-Net, Wokbolic WiFi antennas, community servers) to extend the reach of infrastructure.
- In his view, **user demand and skills often came first**, and infrastructure deployment lagged behind. Communities had to improvise to fill the gap left by operators and government.

### 3. The Interaction Over Time

- **1990s:** Infrastructure began (academic and early ISP links), but skills and local content lagged.
- **2000s:** Skills and demand grew faster (helped by Onno’s guides, Internet cafés, and ICTWATCH/InternetSehat campaigns), but infrastructure was uneven — concentrated in cities.
- **2010s:** Broadband projects (e.g., Palapa Ring) expanded infrastructure, while digital literacy campaigns caught up, though rural areas still faced gaps.
- **2020s:** With smartphones and social media, user demand exploded, sometimes *outpacing the capacity for safe, productive use* (e.g., misinformation challenges).

### 4. Advancing Both Together

Onno consistently argued that **infrastructure and capacity must co-develop**. His recommendations included:

- **Community infrastructure + community training:** Don't just build networks; empower locals to run them. RT/RW-Net was always both a *technical project* and a *learning process*.
- **Open content in local languages:** Infrastructure creates demand only if content is relevant. Onno's decision to publish in Bahasa Indonesia was a deliberate move to align both sides.
- **Policy support for grassroots initiatives:** Instead of licensing hurdles, enable small ISPs and community networks that combine deployment with literacy.
- **Digital literacy as infrastructure:** For Onno, teaching Internet use was as important as laying cables. Education was "soft infrastructure" that unlocked the value of physical networks.

## 5. Historical Lesson

Looking back, **skills and demand often outpaced infrastructure** in Indonesia. Young people, schools, and small entrepreneurs wanted the Internet earlier than telcos or government were ready to provide it. Grassroots innovation filled this gap.

- When infrastructure ran ahead (urban broadband), **digital literacy lag** led to misuse or underuse.
- When skills ran ahead (students, communities), **infrastructure lag** led to DIY solutions.

### Conclusion:

In Onno W. Purbo's experience, **neither infrastructure nor user capacity alone is enough**. The Indonesian story shows that they interacted in cycles of mismatch, where one side lagged the other. His core insight is that both can be advanced together by **integrating training, local content, and community ownership into infrastructure deployment** — so the Internet grows not only as a network of cables but as a network of people.

You have long advocated for open source, copyleft, and community participation. What role did these principles play in Indonesia's Internet history, and how do you see them fitting into today's global Internet governance debates?

Great framing. Onno W. Purbo's long advocacy for **open source, copyleft, and community participation** sits at the very heart of both Indonesia's Internet history and today's global governance debates. Here's how it looks through his lens:

## 1. Role in Indonesia's Internet History

### a. Copyleft as a Knowledge Equalizer

- In the 1990s and 2000s, imported IT knowledge was scarce, expensive, and often in English.
- By publishing his books, tutorials, and lecture notes **freely online in Bahasa Indonesia**, Onno democratized technical knowledge.
- This made the Internet accessible not just for academics or corporations, but for **teachers, students, small entrepreneurs, and rural communities**.

### b. Open Source as an Infrastructure Strategy

- Proprietary software licenses were unaffordable for schools and small ISPs.
- Onno's promotion of Linux, Apache, LTSP, and open-source networking tools gave Indonesians the ability to **build Internet infrastructure at low cost**.
- This aligned with grassroots projects like **RT/RW-Net**, which depended on communities being able to replicate and adapt technology freely.

### c. Community Participation as the Engine of Spread

- Indonesia's Internet did not grow mainly through government planning or corporate investment.
- It spread through **bottom-up networks of students, hobbyists, and neighborhood groups** who shared skills and hardware.
- Onno consistently framed this as an extension of *gotong royong* (mutual help) into the digital realm.

## 2. Lessons for Global Internet Governance Today

### a. Internet as a Commons, Not Just a Market

- Onno's philosophy resonates with global debates on whether the Internet should be governed as a **global commons** or as a set of **corporate fiefdoms**.
- His work shows that treating connectivity as a *public good* rather than a commodity unlocks much wider adoption.

## b. Open Standards and Open Source as Sovereignty

- For developing nations, reliance on proprietary systems can create **digital dependency**.
- Onno argued early that **open standards and open source** are paths to *digital sovereignty* — the ability of communities and countries to build, maintain, and control their own networks.
- This idea echoes in today's debates around **AI governance, cloud monopolies, and data localization**.

## c. Participation as Legitimacy

- In global forums (ICANN, WSIS, IGF), legitimacy increasingly depends on **multi-stakeholder participation**.
- Onno's Indonesian experience shows that when communities are excluded, the Internet grows slowly or unevenly; when they are included, adoption accelerates.
- His grassroots Internet philosophy foreshadows the **multi-stakeholder Internet governance model** that is now the global norm.

## 3. Continuity Between Past and Present

- In the 1990s, copyleft and open source allowed Indonesians to build a people's Internet.
- In the 2020s, these same principles — openness, transparency, participation — are central to debates over **AI, digital platforms, cybersecurity, and Internet fragmentation**.
- Onno's perspective implies: if governance drifts toward centralization and enclosure, we risk repeating the barriers he fought against in Indonesia.

### Conclusion:

Open source, copyleft, and community participation were **the DNA of Indonesia's Internet history** — they turned scarcity into opportunity and exclusion into empowerment. Globally, those same principles remain critical in Internet governance: ensuring that the Internet evolves as an **open, participatory commons** rather than a closed, corporate-controlled system.

Lessons for Future Generations: Reflecting on your career, what lessons from the early days of the Internet would you share with those aiming to document or shape the Internet's future?

Here's a reflection styled in the spirit of **Onno W. Purbo**, distilling lessons from his career that future generations can carry forward when documenting or shaping the Internet's future:

### 1. The Internet is Built by Communities, Not Just Corporations

- In Indonesia, the Internet spread because of *students, hobbyists, and neighborhood networks* — not because big companies or government planned it.
- Lesson: **never underestimate grassroots innovation**. Future Internet history should document not only the infrastructure and policies, but also the *ordinary people* who built and shared it.

### 2. Openness Multiplies Impact

- Copyleft, open source, and freely shared knowledge made it possible for villages, schools, and small businesses to come online with limited budgets.
- Lesson: In shaping the Internet's future, **open standards and open knowledge** are what allow the next billion users to innovate. What you give away freely today can seed entire ecosystems tomorrow.

### 3. Localization Matters as Much as Technology

- Without Bahasa Indonesia content and digital literacy, the early Internet would have stayed an elite, English-only tool.
- Lesson: Always ask “**in whose language, in whose context, for whose benefit?**” The Internet only becomes real when people see themselves in it.

### 4. DIY Innovation Can Narrow the Divide

- Low-cost hacks like RT/RW-Net and the Wokbolic antenna showed that communities can solve connectivity problems themselves.
- Lesson: **don't wait for perfect infrastructure**. In the future, encourage experiments, frugal innovation, and “good enough” solutions that bring access to those left behind.

### 5. Policy Can Empower or Restrain

- In Indonesia, monopolies and restrictive licensing slowed adoption, while liberalization and open-source policies accelerated it.
- Lesson: Future Internet governance should be judged not by the technology it regulates, but by **whether it empowers people to participate**. Document where policies enabled communities — and where they shut them down.

## 6. The Internet is a Social Space, Not Just a Network

- For Onno, teaching was as important as building. Internet cafés, neighborhood workshops, and InternetSehat campaigns were as critical as cables and routers.
- Lesson: Document and design the Internet as a **human ecosystem** — one of trust, safety, learning, and cooperation — not just a technical system.

## 7. Preserve the Stories, Not Just the Specs

- Much of Indonesia's early Internet history is oral — told in mailing lists, workshops, or small communities.
- Lesson: Future historians should capture **personal voices, grassroots struggles, and cultural practices**, not just the milestones of technology and policy. These human stories carry the real meaning of the Internet's growth.

### Closing Reflection:

If Onno were speaking directly: *"The Internet is not about technology alone. It is about people helping each other, sharing freely, and building together. If you want to shape its future, document not just the machines, but the spirit of gotong royong that made it possible. That is the lesson I leave to you."*