Developing the Internet eco-system

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Internet is an ecosystem: Progress in one leads to progress in others

Attractive content & apps

Trust

Internet ecosystem

User with skills

Access available & affordable

User-friendly terminal devices
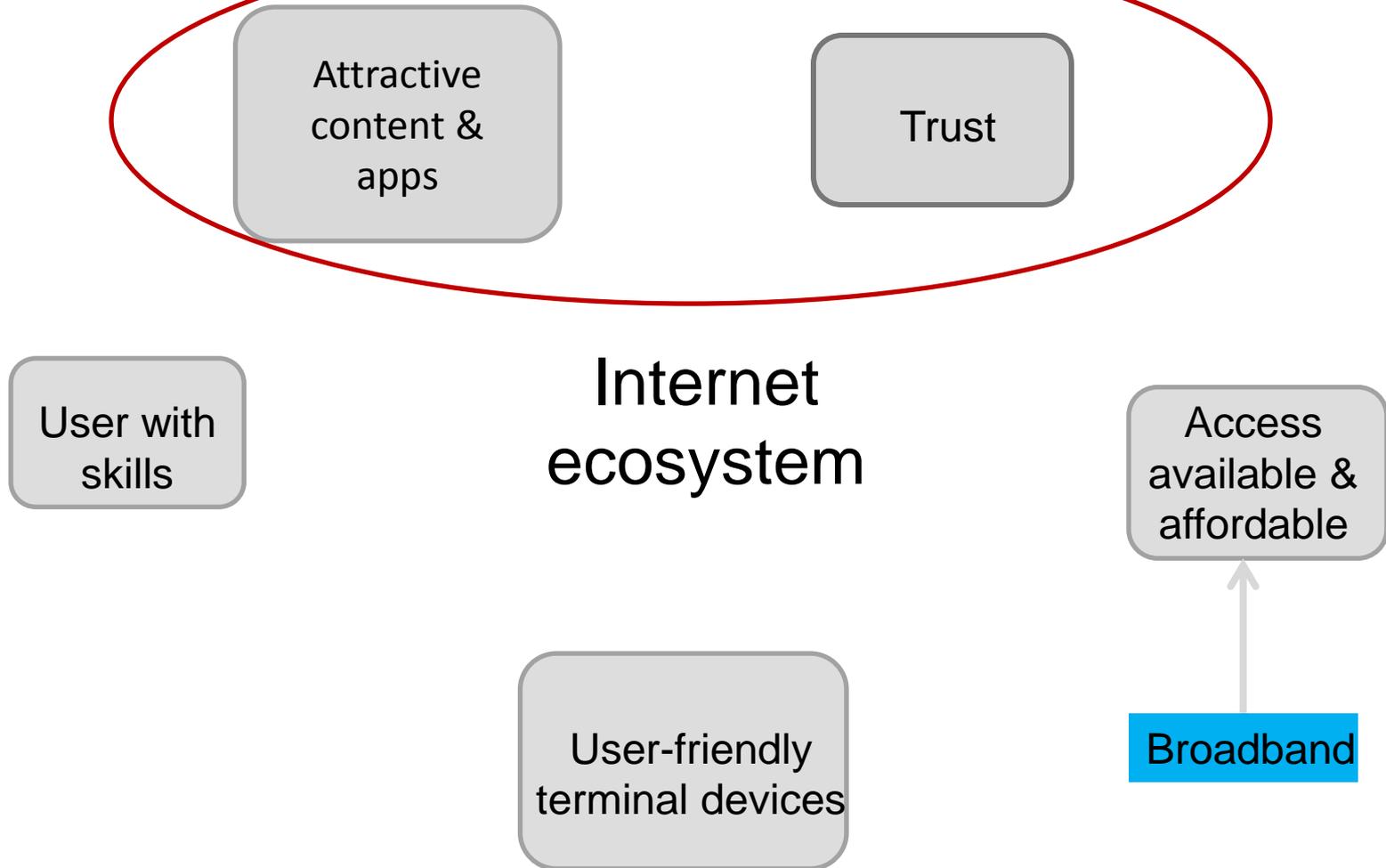
Broadband

Basis of selection

- Access, including broadband requires major investments
  - Key actors are government and major telecom suppliers
- Terminal devices require even more capital
  - Key actors are equipment manufacturers and large buyers
- Users with skills
  - Government, educators, network operators, people themselves
- Selected the two components that are most amenable to action by those in Internet community

ATTRACTIVE CONTENT & APPS

"Do not use Internet, but on Facebook all the time"

- LIRNEasia qualitative research in Java
  - Surprised to hear interviewees who had said they did not use Internet go on to talk about Facebook
- Research ICT Africa quantitative research (12 countries)
  - Found significant numbers of people talking about Mixit and Facebook after having answered Internet questions in the negative

Finding attractive content and apps is a challenge

- Lots of services/apps must be offered; only some will succeed
  - Story of Angry Birds: 52nd game developed by Rovio
- Is centralized supply the best solution?
  - Mobile operators can make the necessary investments, but is their culture the most conducive to innovation?
  - Is it not better to share the risks (taking a percentage of earnings) with independent app developers?

What works and what are the barriers?

- Innovation that occurs mostly outside large organizations
- Barriers to success
  - Capital (not on the scale of infrastructure)
  - Business sense
  - Dependence of key external actors

Entrepreneurship

- What can be done
  - Incubation
  - Startup labs that train innovators on how to do business plans and communicate effectively
  - Linking innovators with angel investors and venture capital
- Who is doing it
  - Donors: World Bank's infoDev in Kenya, S Africa, Vietnam
  - MIT funded by Google in several countries including Sri Lanka, now involving SLASSCOM
  - Governments

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What can telecom policymaker/regulator do?

- Issues of access to capital and business plans are outside regulators' area of competence

- Undue exercise of market power by telecom operators is only area that a regulator may have authority/competence
  - But innovation is a delicate process; crude interventions may cause more harm than good
    - *Primum non nocere* (First, do no harm) is applicable to regulators and policy makers as well

Basis of regulatory action

- Need to differentiate between
  - Type I: Classic OTT applications such as Viber and Facebook that do not require the participation of network operators
    - And which can be blocked only by highly intrusive means that violate the principle of net neutrality
  - Type II: VAS and apps that require participation of operators
    - The software is located on the network, not in customer device
    - Payment mechanism is provided by the operator
- In Type I, question is whether regulation will permit intrusive means
- In Type II, the question is whether there is undue exercise of market power

Type I: Over the Top (OTT)

- Non-discrimination is a general principle of regulation
- Not in operator's long-term interest to stifle the services that attract customers to broadband
- Can a telecom operator conduct Deep Packet Inspections or otherwise discriminate between different kinds of traffic or services?
  - E.g., Saudi Arabia's recent moves to block Viber
  - E.g., All four mobile operators in the Netherlands being recently found to have engaged in undue discrimination
- Key issue is workable approach to net neutrality; cannot be absolutist since traffic has to be managed in conditions of high network utilization

Type I: OTT v operators

- WCIT discussions brought up issue of OTTs contributing to revenue streams of operators
  - Proposals for international-treaty level commitments on sending-party-network-pays principle extended to data traffic did not, correctly, make it into final text
    - Could have led to balkanization of the Internet and exclusion of low-income populations from attractive content
- Two-sided markets are highly problematic: Simplest solution is for operators to collect revenues from data use of their customers
  - As free or for-fee OTT applications grow, data use will grow, leading to increased revenues to operators
    - Suggests that volume-based pricing that is becoming the norm in our countries should not be discouraged

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Recommendations for Type I issues

- Government's objectives and long-term interests of operators are served by more people using the Internet

- Research shows that attractive content and applications drive demand

- Experience shows that decentralized innovation is what will yield attractive content and applications

- While some traffic shaping activities are unavoidable, regulators should actively discourage intrusive measures by operators intended to safeguard existing revenue streams

- Regulators should discourage operators from blocking OTTs as part of their revenue negotiations
  - It is in interest of OTTs to ensure good performance; they are bringing content closer to customers and investing in international backhaul

Type II: VAS and apps that involve operators

- General principle: an entity that has market power in one part of value chain should not be allowed to extend that power to lessen competition in other parts of the value chain (e.g., regulatory treatment of essential facilities)
  - However, an operator must be able to protect itself from ill-effects of actions of others
  - In addition, incentives to invest in services and apps should also be considered

TRUST

How is trust addressed in physical space?

- Not just overt communications, but contextual information: based on millennia of human interactions

In physical space, but with abstract systems

- How is it addressed in modern settings? Think credit cards
- Credit cards are an abstract system of which we have little knowledge
- All we know is what happens at the access points
  - A third party certifies identity (?) and credit-worthiness of payor
    - Difficult-to-replicate design features
    - Signatures
    - Holograms
- But not enough: now online verification; sometimes an additional phone call to confirm

What happens when interaction/transaction is fully in virtual space . . .

- Holograms, signatures no longer of any use
- Only the CVC number and a phone call?
  - "Verified by Visa"
- Yet significant losses
  - Losses occur in all systems, even cash; always balanced with other factors

- What about virtual transactions in general?
  - Is the party at the other end is really who she/he claims to be?
  - Is there anyone listening in the middle?
  - Are the communications being modified?

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Importance of design

- Security must be built into the design of virtual spaces
- Trust is built on perception; so the fact that security has been built into the system must be communicated effectively
  - Not just messages, but through the design itself
- Thin line between security that builds trust and surveillance that scares users