

Challenges of wireless

Rohan Samarajiva, drawing from LIRNEasia 2005 research

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LIRNEasia

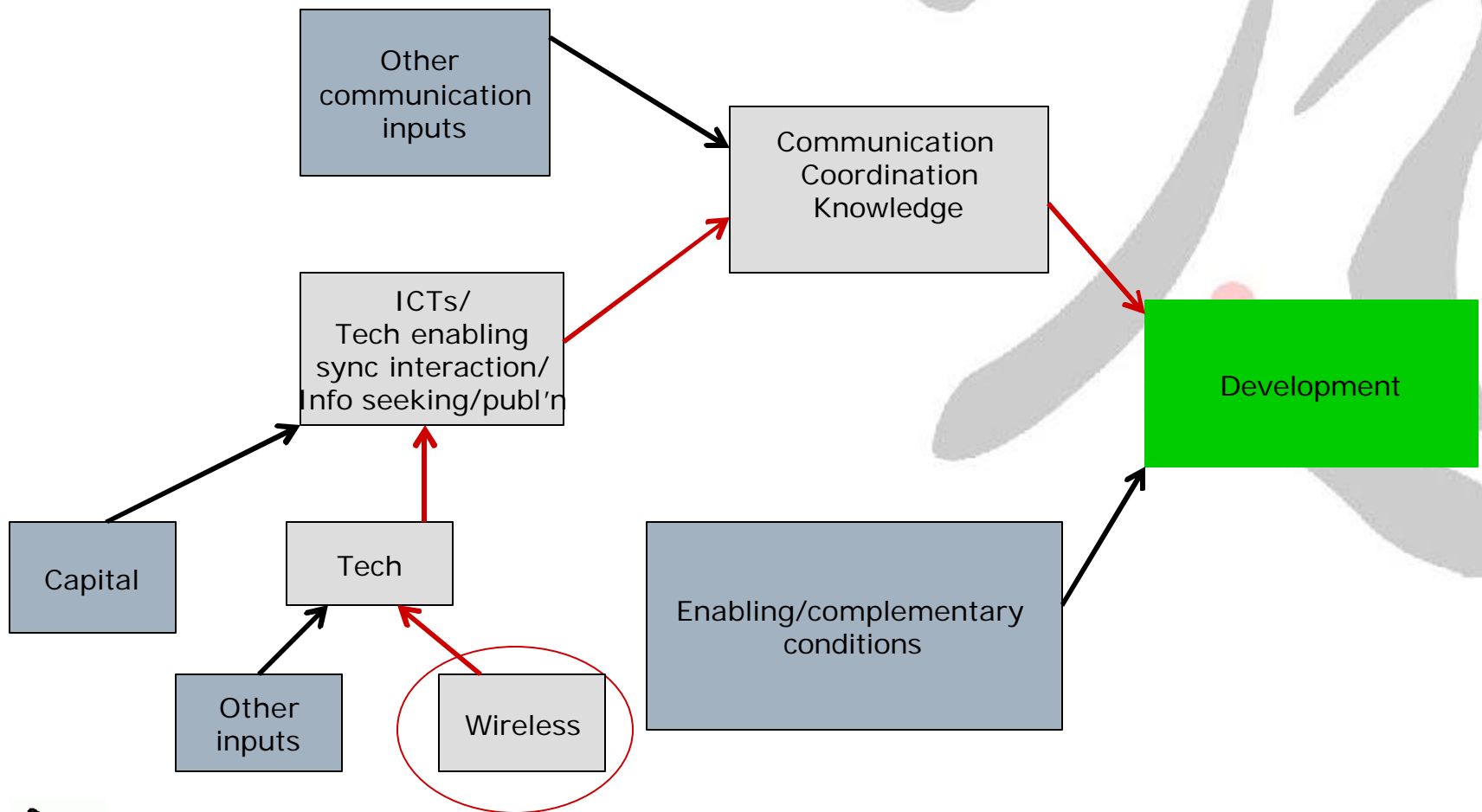
Learning Initiatives on Reforms for Network Economies

Agenda

- Wireless and development
- Wireless in the network
 - Backbone
 - Mobile & “fixed”
 - Mobile data
 - WiFi type
 - The strange case of Indonesia
- Regulatory environment
 - Spectrum management incl. refarming
- Importance of investment



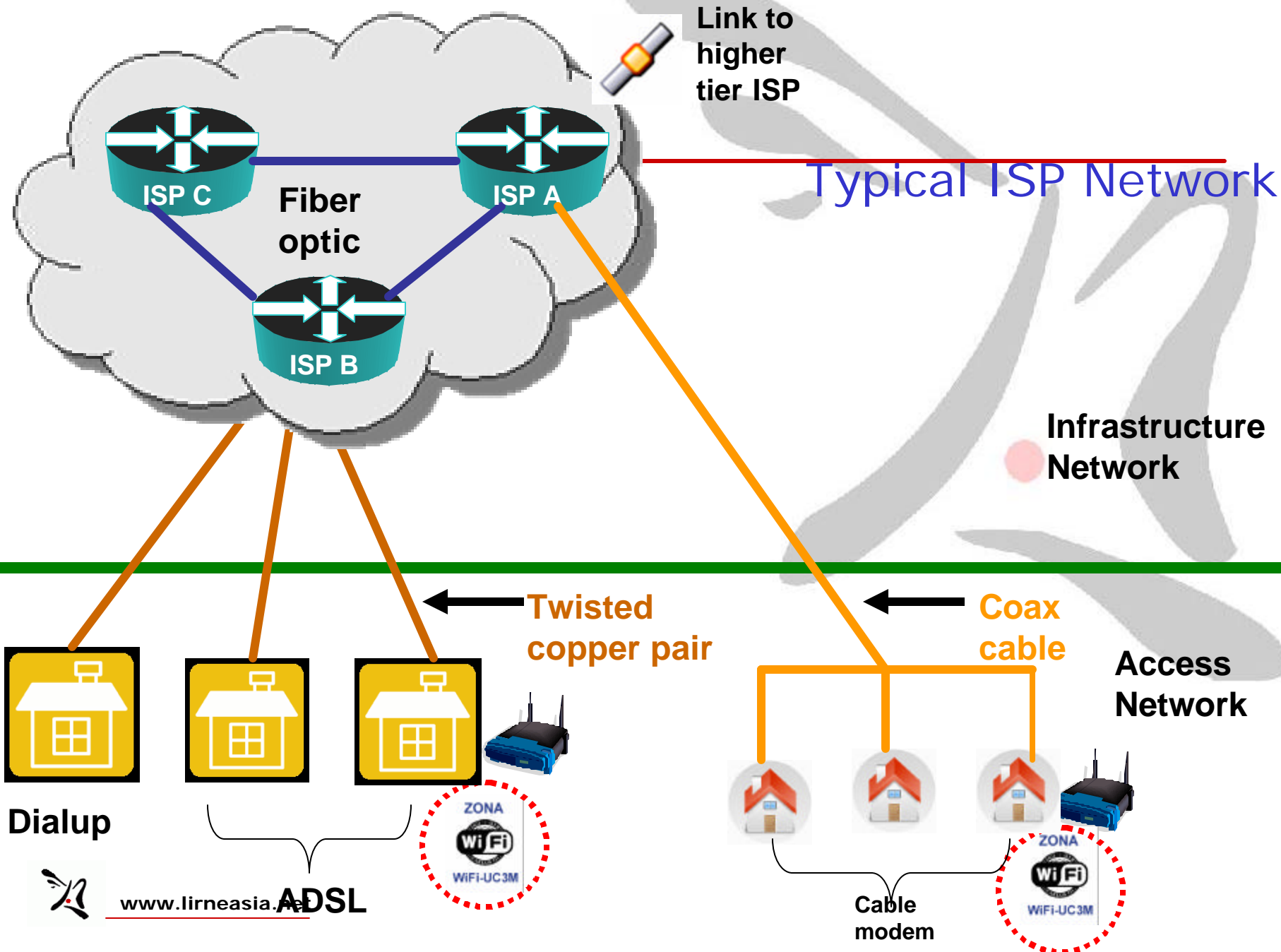
Development: Not by communication (wireless) alone



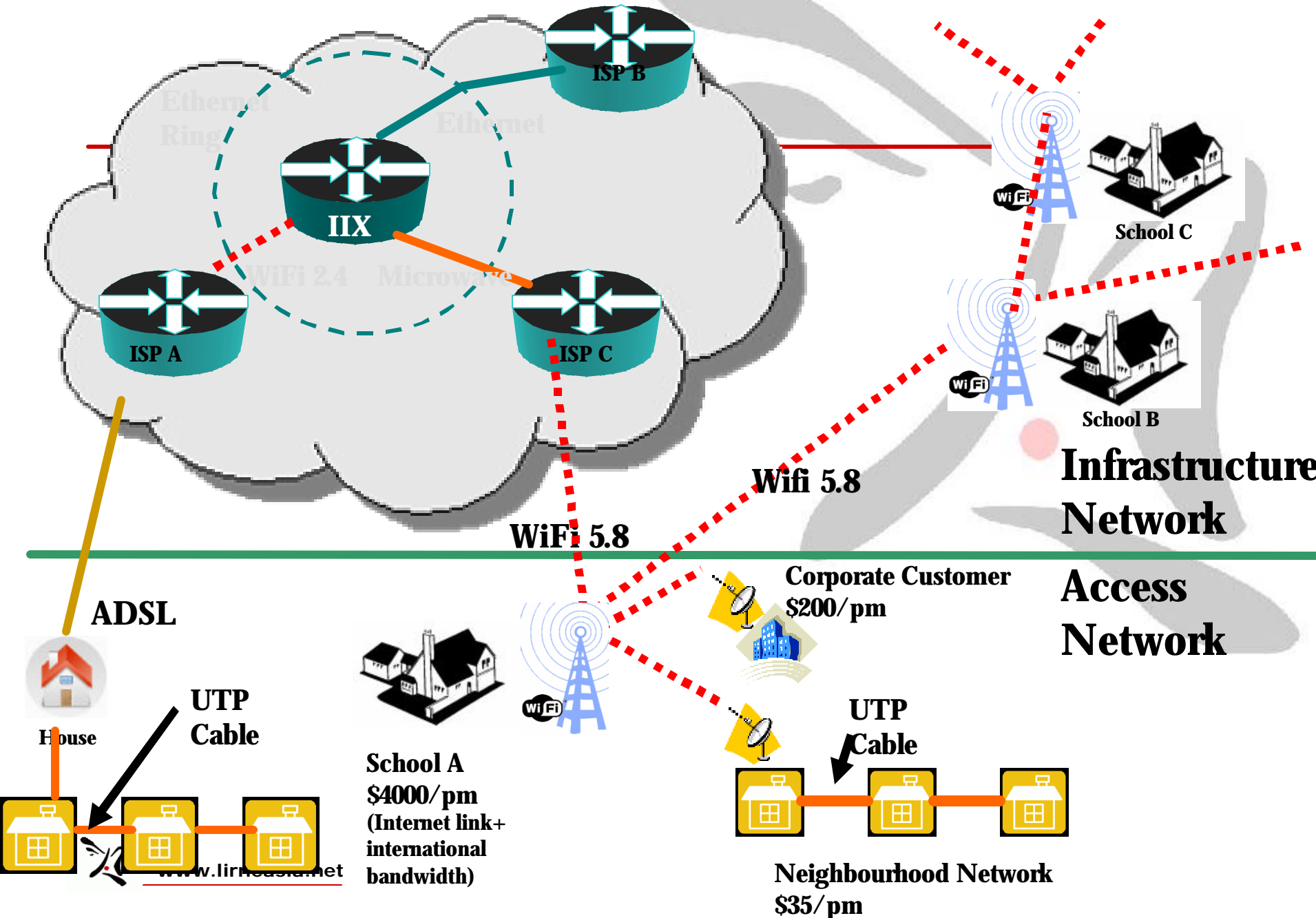
Wireless in the network

- ❑ Wireless in the backbone (digital microwave & satellites)
- ❑ Mobile telephony is most visible manifestation in the access network
- ❑ Much of current “fixed” growth in China, India, etc. driven by wireless
 - CDMA 800/1900 for voice
 - CDMA 450 & other standards for data overlay networks
- ❑ Mobile data increasing
- ❑ WiFi hotspots increasing
 - Nokia developing WiFi handsets
- ❑ WiMAX, WiBRO, etc. etc.



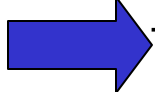


Network Reality-Indonesia



Strange case of Indonesian WiFi

□ WiFi deployment

- Not inside home; not available for free
- Blurring of access and infrastructure network; used as backbone; up to the curb WiFi, last mile aerial cable
- Many tiered retailing of Internet service....
- WHY?  To recover high input costs
 - In addition to “last mile,” need to recover domestic & int’l leased line and interconnection costs



What gave rise to strange network configuration in Indonesia?

Regulatory environment

- Non-independent regulator
 - Two regulatory bodies: DG POSTEL & BRTI
 - DG POSTEL is unit of Ministry of Communication & IT
 - BRTI under-staffed, powers under transition, chairman is DG of DG POSTEL
- Exclusivity clauses extending historical monopolies
 - Indonesian govt owns 51% share in PT Telkom & 15% in Indosat plus "golden share"
- Licenses prevent ISPs from deploying infrastructure
- No local loop unbundling
 - Exclusivity until 2015
- No regulation of leased lines
 - Few suppliers, refusal to deal, high prices, quality



Market environment

 No competition

 Limited competition

 Competitive

- Lack of competition in infrastructure sector
- Resulting in high leased line prices
- High international backbone prices
- Proliferation of unlicensed "reseller-ISP's"

Telecom services	Telecom operations
Fixed wireline local	Exclusive right 1996-2010 PT Telkom
Fixed domestic LD	Exclusive right 1996-2005 PT Telkom
Fixed wireless local	Limited competition (Satelindo)
Fixed international	Duopoly 1995-2004 (Indosat, Satelindo)
Mobile	Competitive (Satelindo, Excelkomindo, Telkomsel etc.)
Internet service provision	Competitive Currently 124 ISPs official, 54 unlicensed



Annual leased line prices: 2Mbps link

2Mbps link	2km	200km
Indonesia	US\$ 18,000 Ratios India 1: 47.9 EU 1: 3.8	US\$ 45,000 Ratios India 1: 5.9 EU 1: 4.9
India	US\$ 376	US\$ 7,603
EU Benchmark (Denmark)	US\$ 4,802	US\$ 9,219

Data compiled from Lokanathan, lirneasia.net, EU 10th report, interview with Indonesian ISP & Network Service Provider



Institutional aspects of wireless

- **Current quasi-property rights regime**
 - Bundle of rights, less right to alienate
 - Except by selling the licensee firm
 - Use highly constrained (e.g., specific standards, power, polarity)
 - Therefore, significant role for effective spectrum management by government
- **Government responsible for refarming of frequencies**
 - Quasi-property rights require consent of/compensation for displaced users
 - Cost for 3 x (7.5 x 2) MHz in 1800 Band in Sri Lanka in 2003 was estimated to be USD 3 m.



Hypothetical refarming process

Step	Main policy actions	Parallel policy actions
1	Government sets overall policy and authorizes negotiations with seven operators ($O_1 - O_7$)	
2	System and frequency license modifications negotiated (Modifications include removal of technology restrictions from O_1 , O_2 , etc.; and may include extending license term of O_4 (which will gain no benefits but has to yield frequencies	
3 & 3A	O_4 and O_5 release GSM 900 frequencies; O_1 , O_2 , and O_3 will also be requested to agree to phased release of frequencies to enable overall ordering of the bands	1800 MHz Tender Board releases funds for band clearing (some 1800 MHz frequencies have been auctioned to GSM operators)
4 & 4A	O_6 assigned GSM 900 frequencies & releases CDMA 800 frequencies	1800 GSM and 1900 CDMA bands fully cleared
5 & 5A	O_1 , O_2 , and O_3 assigned CDMA 800 frequencies	Auction frequency slots that may be used for CDMA 1900 or GSM 1800 to current operators but possibly also to newcomers



Difficulties with refarming for unlicensing

- In many countries, 2.4 GHz and 5 GHz bands have occupants who require coordination/relocation
 - In India, EESS (active) and SRS (active) services in 5250–5570 MHz band
 - In Sri Lanka, high-powered MMDS broadcasts on either side of 2.4GHz band which is also used by data licensees for 10+ years
- How to find the money to pay off users who are to be moved?
 - Beneficiaries of unlicensing cannot be asked to pay



Spectrum management is not enough . . .

- For WiFi to be effective in the access network, backbone must exist & be offered on non-discriminatory basis at reasonable prices
- Data or voice communication is a chain
 - Speed = speed of the weakest link; if link is broken, no communication
 - In these markets, sustainable prices determined by input costs
- ISPs require access to backbone
 - In some countries only access regime needs improving
 - In others, need to create incentives for building as well



Spectrum management is not enough . . .

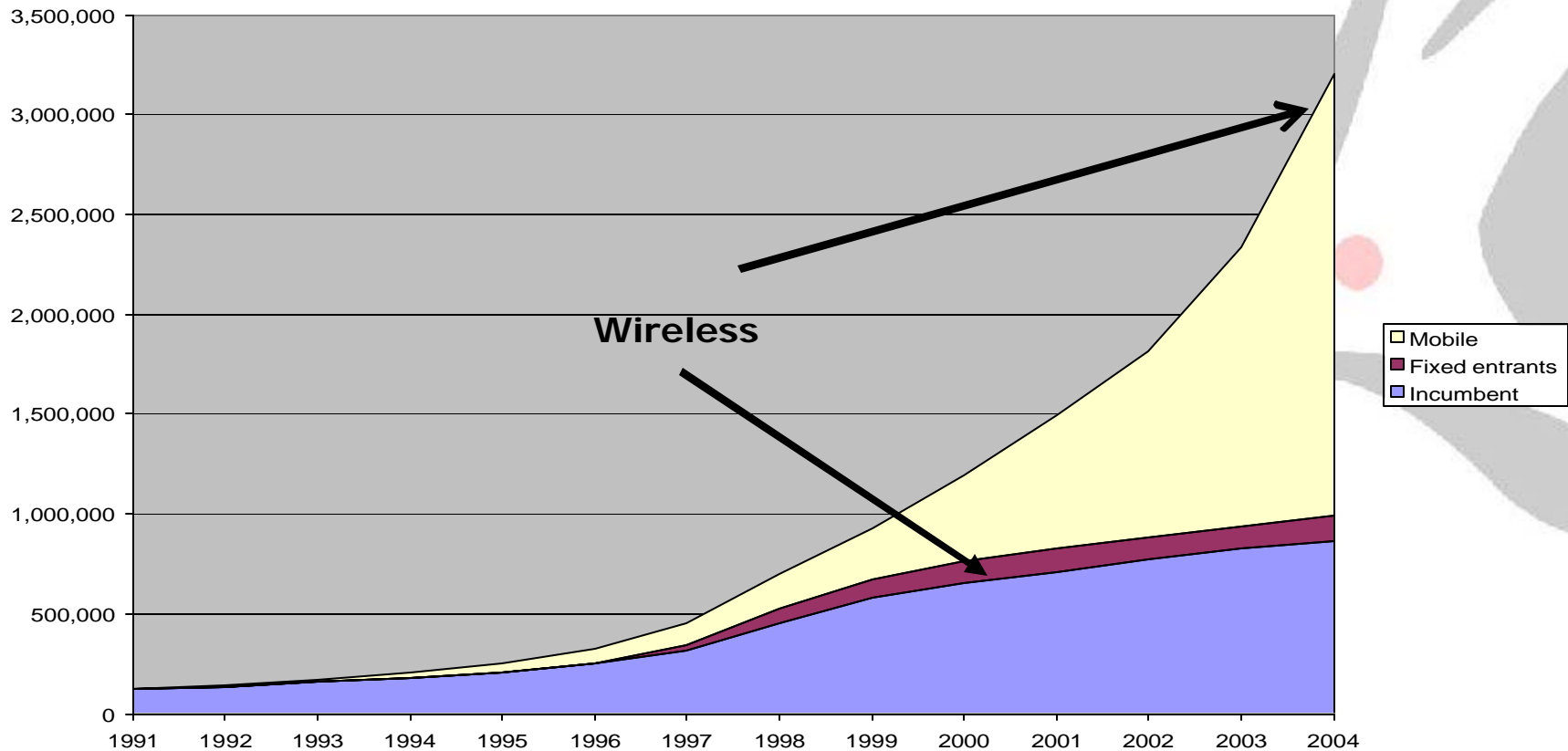
- In addition
 - Market entry
 - Interconnection and access
 - Effective regulation of competition

- Investment is what connects people

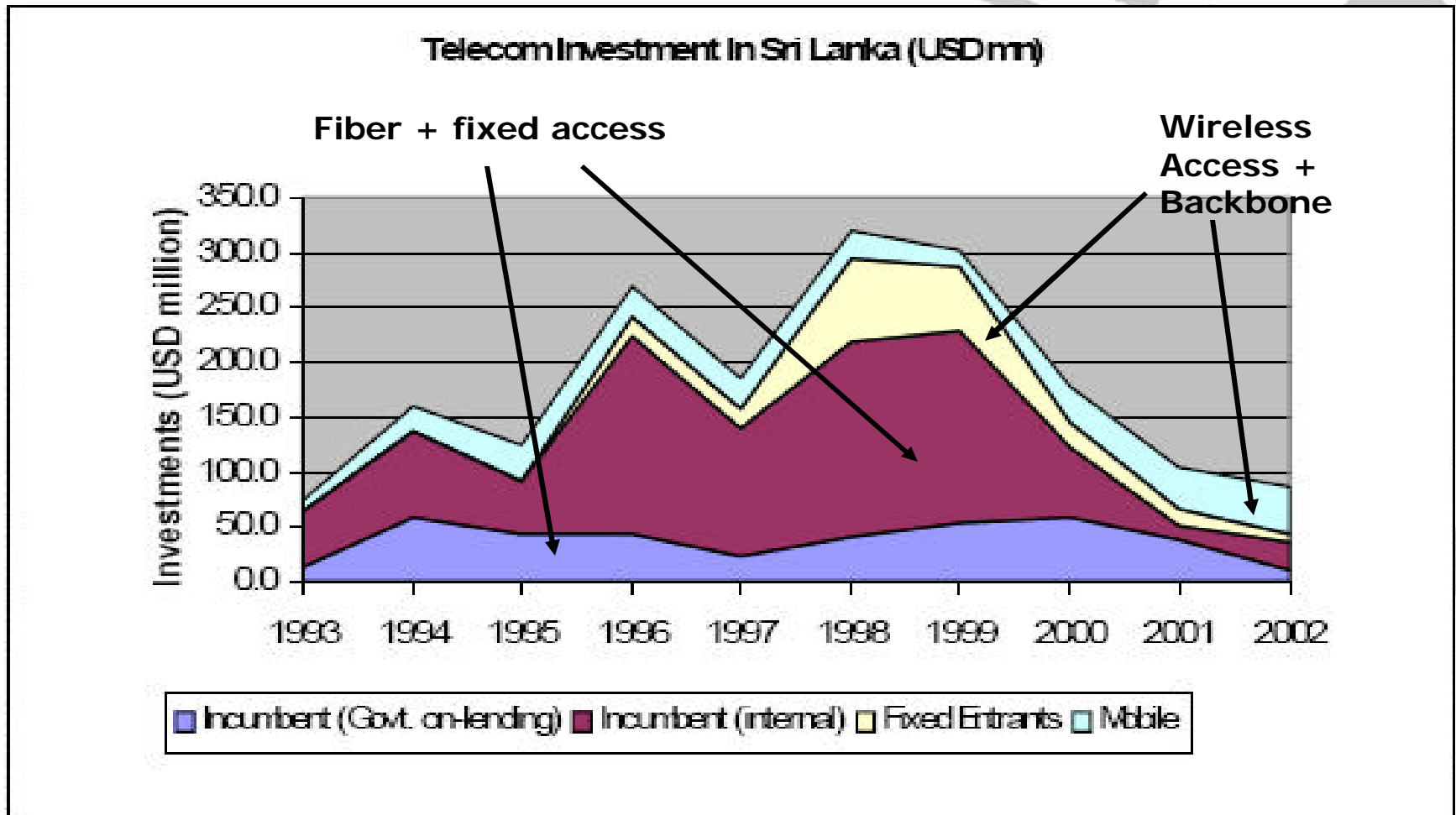


Investment is necessary condition for improved access

Figure 3: Sri Lanka telecom growth 1991-2004

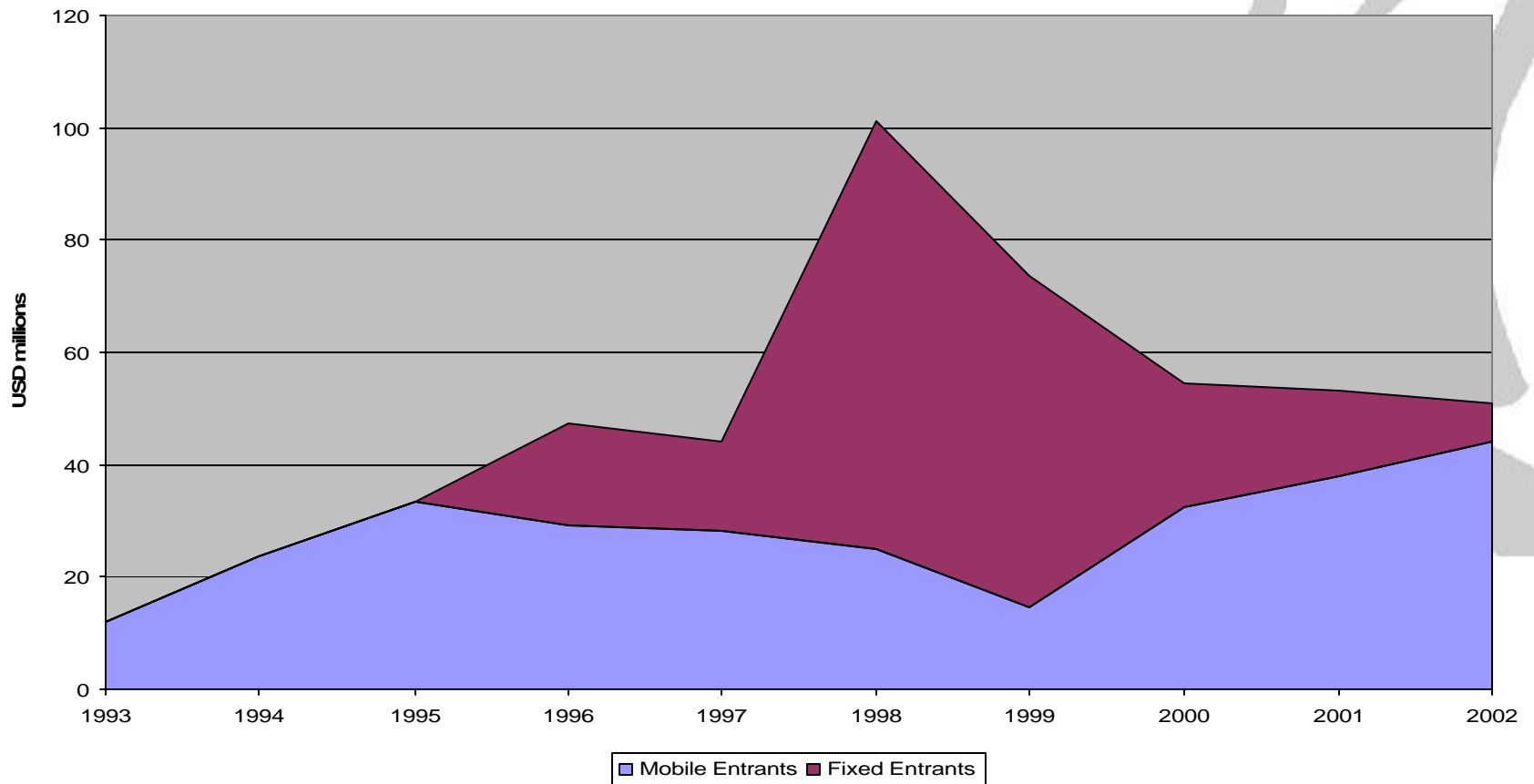


Investment is necessary condition for improved access



Wireless investment

Wireless-based investment in Sri Lanka, 1993-2002



What is needed . . .

- ❑ Market entry permitted/liberalized
 - Case of Bhutan
- ❑ Environment for investment created
 - Regulatory risk reduced
- ❑ Participation by multiple suppliers enabled
 - Level playing field



In sum . . .

- ❑ Wireless vision of developed countries is possible only because of fully developed backbone and access network
 - Enabled by environment conducive to investment, including effective regulation
- ❑ Without institutional conditions, little/no WiFi type applications outside developed enclaves
- ❑ Technology matters; but not without appropriate institutional conditions



More info:

www.lirneasia.net (search wireless)

E.g., <http://www.lirneasia.net/2006/05/wi-fi-%e2%80%9cinnovation%e2%80%9d-in-indonesia-working-around-hostile-market-and-regulatory-conditions/>

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