

Telecommunications

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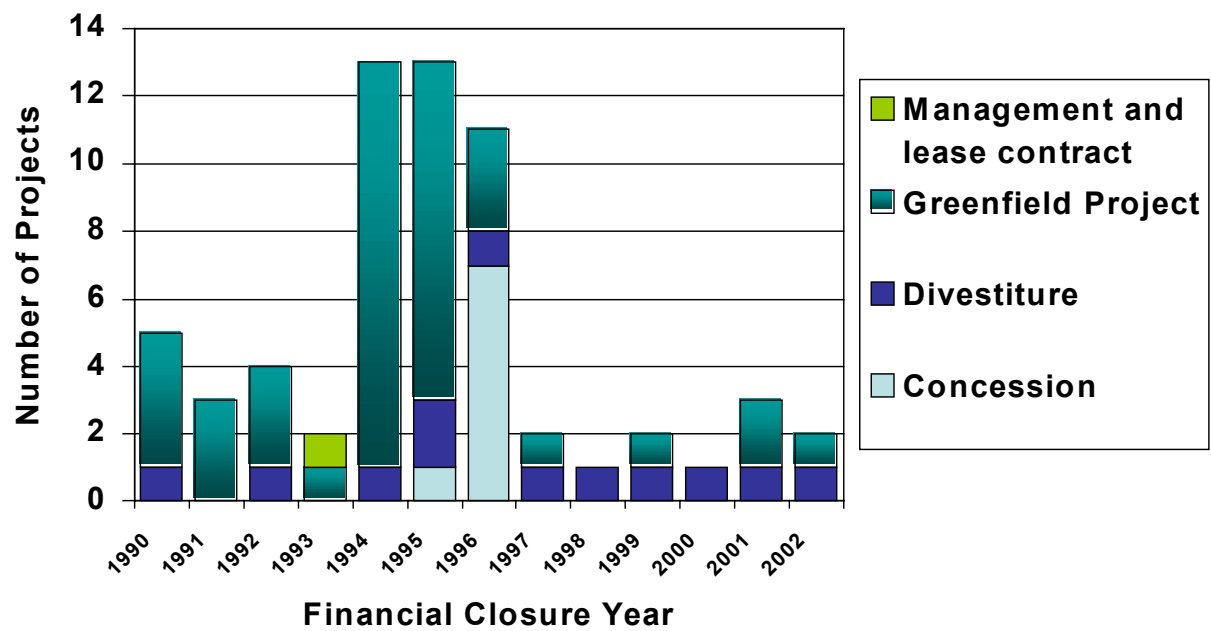
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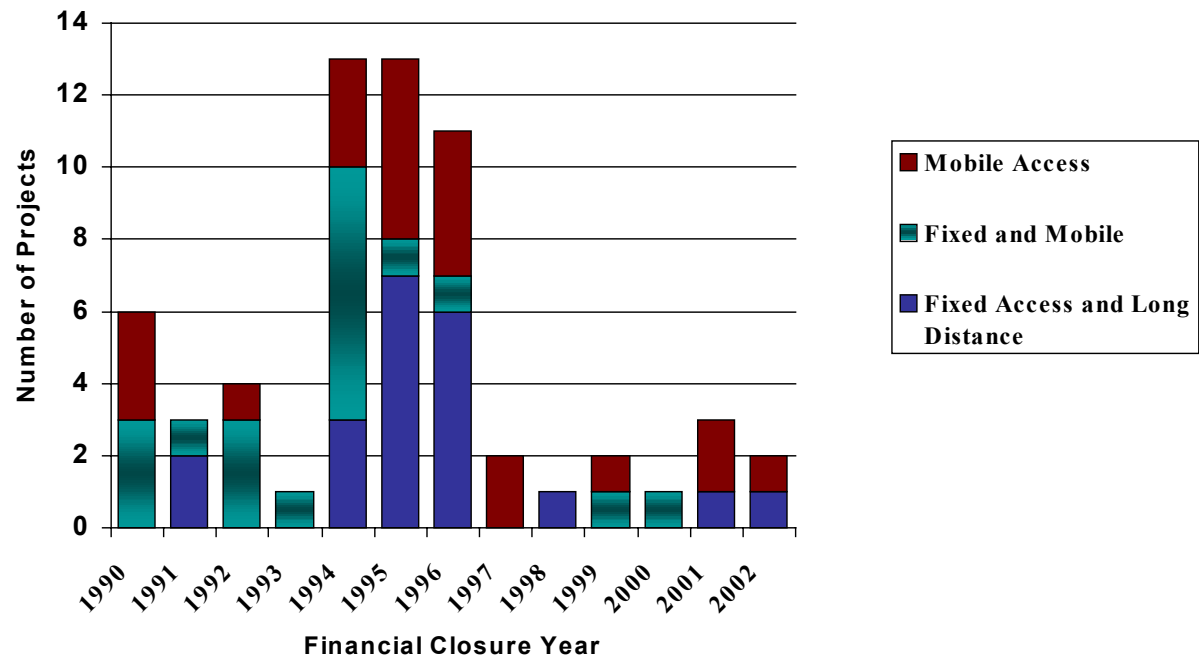
Issues Addressed

- Investment in telecommunications
- Telecom as a utility with a difference
- What has been driving telecommunications, and what are the To be completed

Telecom Investment in EAP

- Telecom accounted for 44% of investment going into infrastructure projects in developing countries, 1990-2001
 - Around 80% of this was FDI?
 - EAP accounts for around 20% or US\$65 billion
 - 40% goes into divestiture
 - over 50% investment goes into Greenfield projects, mostly mobile cellular or a mix of mobile and fixed;
 - 8% investment went into Concessions (BTOs/BOTs)
- Post-1997 collapse, but divestments kept steady





Costs - Is Telecom a Utility?

- Essential producer service as well as consumer service
- Falling absolute costs of entry - but economies of scale remain paramount
- New entry and standalone projects can succeed
 - beware dot.bombs! Successful dot.coms mostly associated with incumbent carriers
- Convergence - telecom (regulated standards) with IT (market-driven standards)

Technology

Countervailing tendencies

Economics

Moore's Law

Economies of Scale



Falling cost of electronic components

vs Growing scale of network



Next Generation Networks

Economies of scope



IP-structured architecture with routers

vs Diverse software-driven services



Standalone Networks

Network Economics



Contestable markets

vs Externalities (duplex)



Switching and Transmission Costs Compared

Cost Estimates of Network Elements in Philippines

Network Elements	Average Costs (ballpark figures)
Mobile Cellular	US\$50 per subscriber
Landline switching and equipment costs	US\$600 per direct exchange line
Landline transmission and connection costs	US\$400 per direct exchange line
Landline NGN routing and equipment costs	US\$200-300 per direct exchange line

Looking Forward

- Wireless Local Loop
 - 2002 - Telkom estimated building new fixed line local loops had fallen from \$1,000 to \$530 per line
 - 2004 - Telkom \$368 per line ; Ratelindo \$240 per line
- Vendor competition
 - Chinese manufactures cutting switching costs by up to 60%?

Fixed and Mobile Cost and Revenue Characteristics

Costs

Fixed

75C:25V - 40% sunk

High and falling

Mobile

70C:30V - 40% sunk

Half* and falling

Tariffs

Regulated

Rebalancing

Competitive

Unbalancing

Revenues

Steady  Falling

Rising  Steady

* Note: Thailand, TA's fixed network (mid-90s) cost Baht 80 billion - capacity 2.6 million;
TA's Orange mobile network cost Baht 40 billion - capacity 3 million

Telecom Cycles and Trends

- Technologies, regulation and markets interact
 - 1990s - virtuous cycle
 - 2000s - over-capacity, industry consolidation, exit
- Technologies - Moore's Law and new technologies drive regulatory change and markets
- Regulation - enabling market adoption and diffusion of technologies
- Markets - elastic responses
- Environment - telecom becomes part of everyday life
 - unlicensed spectrum and private participation
 - universal access and the involvement of civil society
 - ICT diffusion and the digital divide

Critical Success Factors Form a Virtuous Loop

Technology

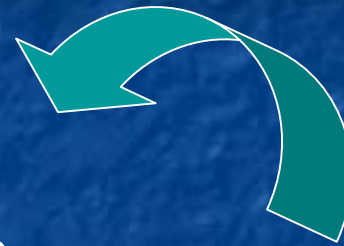
Innovation allowed to influence regulation

Markets

Opportunities enabled by regulation, encouraged technological innovation

Regulation

Prepared to abandon PTT model



Disruptive New Technologies

VoIP

Mobile Cellular



Undermine Fixed IDD and NLD revenues, and substitution of mobile cellular for fixed



Reduce Fixed IDD and NLD cross-subsidy to local loop



"Rebalance" local loop tariff and accelerate mobile:fixed substitution



Note: IDD and NLD price elasticity uncertain. Indosat's IDD revenue contribution fell from 73% to 27% 2000-1/4 2004; mobile revenue (Satelindo) rose to 55%

Technology Effects

Markets

- Mobile cellular (including pre-paid electronic transfers)
- Internet Protocol-enabled networks (including broadband)
- Wireless access (WiFi, WiMax, etc)

Costs

- Switching costs down
- Transmission costs down
- CPE (Handsets, PBX, etc)



Policy & Regulation

- Deregulation of CPE and VAS
- Competitive and convergence licensing
- Cost-based pricing

Investment

- Greater network technology and service options
- Lower cost barriers to entry
- Firm-specific and first-mover advantages versus commodity markets

Policy and Regulatory Effects

Markets

- Mobile cellular users overtake fixed users
- Diffusion of ICT usage (traffic)
- Convergence (networks such as cable TV-telephony, and fixed-wireless)

Costs

- Cost-based interconnect
- Tariff rebalancing
- Competitive pricing



Technology

- Type approval procedures
- Spectrum management
- Deregulation of procurement

Investment

- Opportunity through licensing
- Policies encourage market growth
- Free to choose technologies and market segments

Market Effects

Policy and Regulation

- Pro-consumer, pro-competitive policies
- Telecoms seen a trade and investment issue
- Universal access and ICT promotion-specific policies

Costs

- By-pass and arbitrage of traditional tariff structures
- Flat-rate, Ramsey and other pricing models
- Elasticity and investment



Technology

- New technology diffusion tested and accelerated
- IP-based and e-technologies
- Technology convergence

Investment

- High returns on investment
- Exit strategies if market is buoyant
- Eases access to finance

Combined Effects

Access

- Faster growth of the private sector increases attraction of commercially incremental service areas (eg, pre-paid mobile cellular services; WLL)
- Releases and adds to public sector resources for devoting to access
- Public policy can focus on ICT diffusion

Costs

- Incrementally efficient
- Transparent or revealed through incentive mechanisms
- Wholesale/retail competition regulation watchdog required



Revenues

- Revenue models uncertain
- Commodity level prices will drive convergence to gain traffic
- Product and service substitution is likely to grow

Investment

- Incumbent fixed line carriers either (a) as low-cost competitive oligopolies rather than inefficient monopolies, or (b) broadband innovators
- Mobile cellular operators likely to consolidate, maybe convergence with fixed, with higher returns for scale and scope (eg. 3G applications)
- Investors looking for regional/global synergies and require ownership

Models of Ownership

Ownership	Market	Private Participation	Growth
SOTE	Closed	Concessions (BT, BTO, BOT)	High
Partial Privatization	Partially Open	Public-Private JVs	Medium
Fully Privatized	Fully Open	Fully owned and operated	Low

Across EAP variations on all these are to be found - for example, China is high growth SOTE open to VAS; Vietnam is medium growth SOTE offering BCCs; Myanmar is low growth SOTE mostly closed

From SOTE to POTE



Initial Investment

Privatization

IPOs, Auctions, JVs

Concessions

BTs, BTOs, BOTs

New Licences

Greenfield projects, JVs

Expansion

Equity, Debt, Retained Earnings



Pull Factors

Emerging markets, Growth markets; Global synergies;
Servicing MNCs; Experimental

Push Factors

Saturation in home markets; Supporting domestic stock
price; Strategic expansion.

Levels of Interest by Investors

Privatization

High → Medium

Concessions

Medium → Low

New Licences

High → Low

Issues of Concern to Investors

Tariff policy
USO
Unbundling

Exclusivity
Duration
Transfer

'New' new entry
Interconnection
> 50% Control

From Entry to Exit



Pull Factors

3G debt; Dot.bomb; Threats and opportunities in home markets, especially broadband; International alliance fails

Push Factors

1997; Regulatory failure*; No chance of 50% ownership;

- Exit by strategic investors based in larger, especially non-Asian economies
- Exit by fund investors from smaller Asian economies
- but some are stranded
- Staying - strategic investors from small developed Asian and Scandinavian economies

* For example, Indonesia replaced 15 year KSO exclusivity with competition between IndoSat vs Telkom and failed to rebalance tariffs.

What Drives Government's to Liberalize Telecom?

- National Information Infrastructure planning
- Reallocation of scarce (State) resources
 - Relieves State deficits and adds to tax revenues
 - Frees resources for universal access and ICT diffusion
 - Puts radio spectrum to revenue-generating and more efficient use
 - State-sponsored projects
 - Local state - fibre optic rings around cities and communities
 - National state - backbone projects, eg. GMS (Greater Mekong Sub-region)

Future Role of the State in Telecom

- As Regulator - industry specific or general? M&A regulations most important to investors?
 - Telecom cycles require M&A provisions?
 - Unified or specialized regulatory framework?
 - Similar utility economics vs different technological/market dynamics
 - Convergence regulation and licensing - reduces costs of business
- As Sponsor - economic investment vs. market failures
 - Broadband initiatives? (Japan, Korea, Singapore vs Hong Kong?)
 - Universal access and digital divide
 - Building capacity of local capital markets

Lessons for Other Utilities?

- Regulation - limited by INFORMATION GAP which is COSTLY to overcome
 - Incentive regulation reveals costs without knowing them (price caps, auctioning USO, etc)
- Licensing - REDUCE COSTS OF LICENSING
 - Class licensing reduces business costs
 - Raise general licensing conditions to level of Laws
- Interconnection - commercial negotiations only truly succeed when networks are closer to equality
 - Facilities competition or sharing? Issue of resources?
- Competition - reduces costs but regulation of quality and hazard safeguards is IMPORTANT even for investors
- Can the USO/USF principle be more widely applied to other sectors?