Are multiple video-capable broadband infrastructures sustainable?

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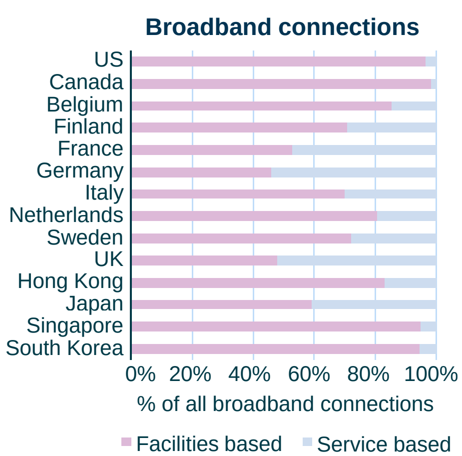
October 19, 2007

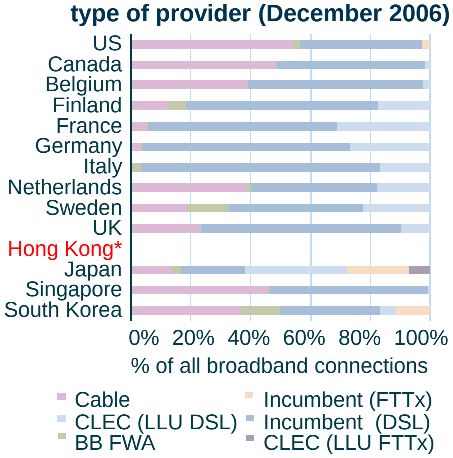
Multiple broadband networks are already prevalent …



- North America and Asia have cable networks leading to facilities-based competition
- Europe has less cable, and thus has relied more heavily on generating service-based competition

… and facilities-based competition spurs further facilities investment

Broadband connections by type of provider (December 2006)



- In Europe, innovation can be driven by alternative providers using LLU:
  - e.g. IPTV
  - open regulatory issues relating to fiber deployment
- Elsewhere, innovation is driven by facilities-based competitors:
  - StarHub in Singapore
  - Japan and Korea
  - AT&T and Verizon

We have not been able to source credible data for LLU numbers in Hong Kong

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In the US, cable has a first-mover advantage in triple play …

- **Video:**
  - cable has captured between 55% and 78% of digital video net additions for the last nine quarters
- **Cable modem:**
  - monthly ARPU for cable broadband is USD10 higher than DSL ARPU
- **Telephony**:
  - cable telephony has recently grown by more than one million subscribers per quarter

Service	*Subscribers (millions)*	*Market share*	*Date*
Video	64	65%	2007E
Cable modem	33	52.5%	Jun-07
Cable telephony	12	6.7%	Jun-07

Source: Bear Stearns - Broadband/Digital Monitor 2Q07 update, Stifel Nicholaus, NCTA statistics

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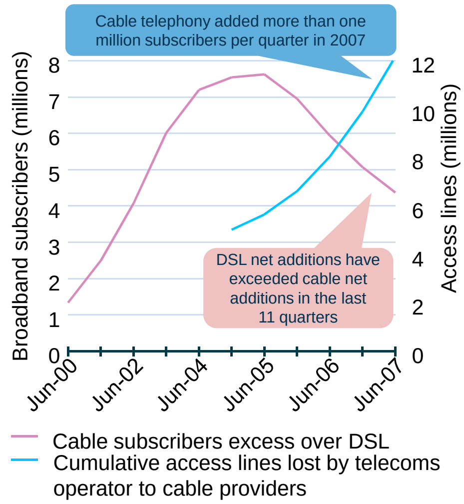
… with Bells catching up in the short-run …

- **Telecoms operators:**
  - are catching up on broadband …
  - … but cable is gaining many access lines



Source: FCC - High-Speed Services for Internet Access 2006, Bear Stearns - Broadband/Digital Monitor 2Q07 update

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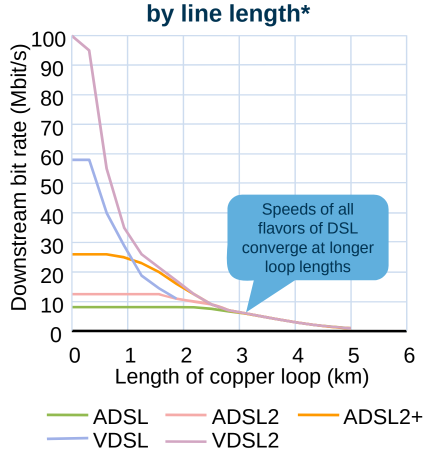
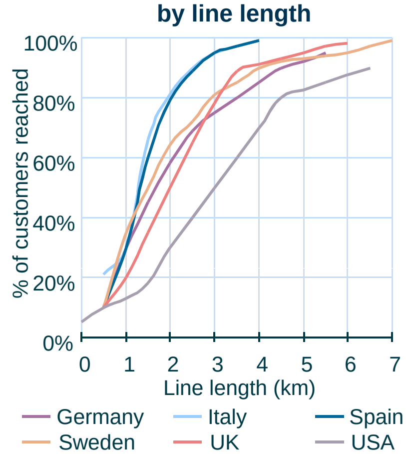
… but DSL is not able to offer video as easily as in Europe…

DSL speed variation by line length*



Cumulative market coverage by line length



Source: Analysys Research

Source: IEEE, Telefonica (2002/3)

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… leading to FTTx deployments

Verizon and FiOS		AT&T and U-verse	
verizon FiOS Internet FiOS TV	• FTTH (except for last feet in coaxial cable) • Speed available varies between 50 and 400 Mbit/s • FiOS IPTV service was launched in late 2005	at&t U-verse	• FTTN in most of the network; FTTH in new residential construction areas • Speed available varies between 24 and 58 Mbit/s • U-verse IPTV service was launched in June 2006
Deployment	*Investment* : estimated at USD23 billion *Houses passed:* target is 18 million by 2010; actual number is around 5 million	Deployment	*Investment:* USD6.5 billion (as of May 2007) *Houses passed:* target is 18 million by 2008
Outside plant cost / home	*Actuals:* USD1032 in 2005, USD850 in 2007 *Target:*: USD700 in 2010	Outside plant cost / home	*Target:* USD242 *Actual:* USD330 in 2007
FiOS video subs	515,000 as of June 2007, adding 2600 per day 13,2% penetration rate as of June 2007	IPTV penetration	51,000 as of June 2007, adding 600 per day 10% penetration rate during trial
FiOS data subs	1,07 million as of June 2007 22% of FiOS data subs. migrated from DSL	Triple-play package price	From USD99.98 per month
Triple-play package price	From USD94.99 per month	Revenues	65% of U-verse subscribers sign up for the 6Mbit/s broadband connection
Revenues	FiOS penetration has led to 20% ARPU increase in some markets 60% of FiOS IPTV subscribers sign up for FiOS Internet package		

Source: Robert W. Baird & Co. Verizon Communications, Inc. July 31, 2007, RBC Capital Markets, Video 2.0 - A Tidal Wave of High Definition, Sep 10 2007

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Although the costs for FTTx are high, the demand is different than for DSL …

- Triple play has lower churn levels …

	Average monthly customer churn
Video only	3.0%
Video + HSI	2.3%
HIS + phone	1.9%
Video + phone	2.2%
Video + HIS + phone	1.4%

Source: Credit Suisse (Based on Cox Communications, 2007)

- … and higher (ARPU)

	2006	*2007E*
	(USD)	
Video	57.28	61.41
Data	42.97	40.99
Voice	44.44	42.54
Total*	144.69	144.94

Source: Comcast Model Update, Deutsche Bank (August 24, 2007)

**Triple play customers typically receive a bundled discount*

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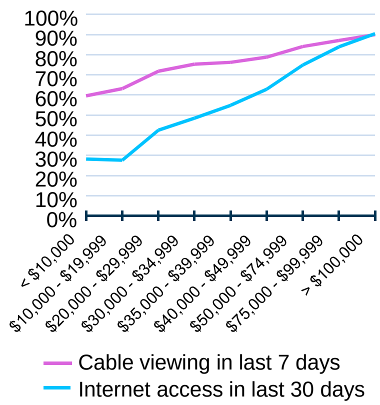
… and could lead to increased penetration and adoption

- Pay TV has higher penetration than broadband …

	Household penetration	*Addressable market*
Pay TV	88%	99.4% (TV)
Broadband	55%	70.9% (PC)
Voice	93%	approx 100%

- … and less income sensitivity



Source: Stifel Nicholaus 2007,
Statistical Abstract of the United States, 2006-2007

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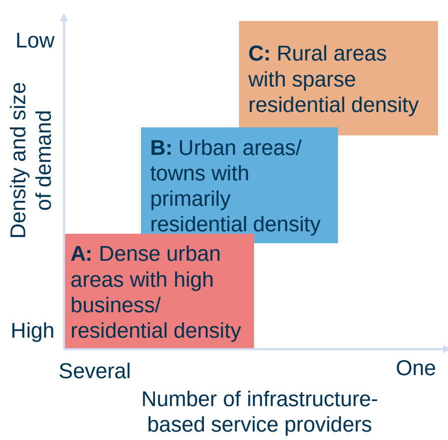
There may be significant variations in geographical competitiveness

Principles of geographical separation



Main drivers:

- demand for services:
  - based on demand for components of triple play
- cost of deployment:
  - a good proxy for this is population density

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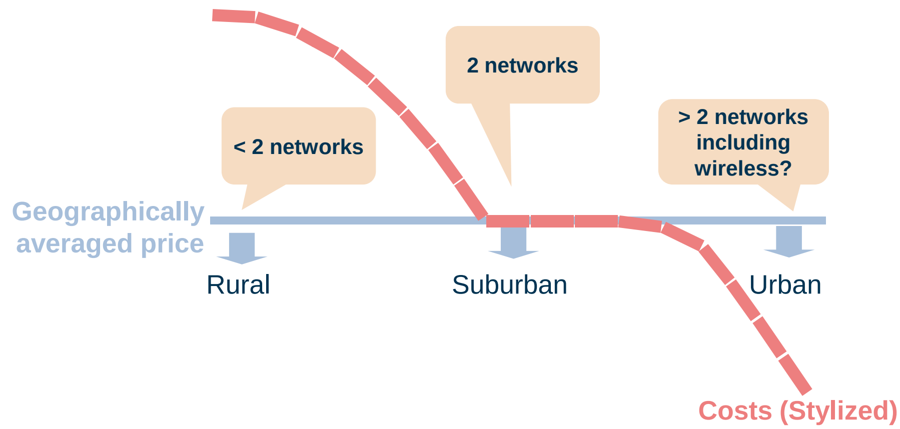
The number of video-enabled networks will vary according to region and pricing



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