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Comparison of Mobile TV in Singaporeand Taiwan: A Social-technical System Approach

Trisha, Tsui-Chuan Lin

Assistant Professor,

Wee Kim Wee School of Communication

Nanyang Technological University, Singapore

Liu, Yu-Li

Professor, Department of Radio and Television

National Chengchi University, Taiwan

Mobile TV trends

- ABI Research: in 2010, 250 million mobile TV users Worldwide (Oh & Jablon, 2008).
- Informa Telecoms & Media (2007):

  - mobile TV and video will generate US$8 billion by 2012

  - Asia-Pacific region will lead the development of mobile TV

    - high penetration in cell phones
    - Asians’ commuting lifestyles
    - advanced broadcasting mobile TV technology

  - Asia Market trials:

    China, India, China Taipei, Indonesia,

    Malaysia, Australia, and Singapore

Singapore & Taiwan… emerging mobile TV

- 2007 ITU's DOI: Singapore 5th vs. Taiwan 7th
- Mobile phone penetration:

  - Singapore: 131.3% mobile phone penetration & 2.5 million 3G subscribers (iDA Singapore, January 2009)

  - Taiwan's is 110.3% with 11.29 million 3G subscribers (FIND, 2009)

- 2005 both launched 3G video services
- Free-trade countries with 'pro-market' Little Asia Tigers
- Different government-market relationships:

  Singapore (government involvement) vs.

  Taiwan (minimal government intervention)

What is mobile TV?

- Mobile TV: transmission of TV programs or videos for various wireless devices (Kumar, 2007, p.5).

- Two kinds of mobile TV (Kumar, 2007)
  - mobile broadcasting TV
  - unicasting mobile videos

Mobile TV Technology

- 3G: bandwidth limitation caused unsatisfied viewing experiences
- Broadcasting mobile TV(Choi, et al., 2008; Gill, 2008; Kumar, 2007).

- Europe's DVB-H
- South Korea's DMB
- Japan's ISDB-T
- United States' (Qualcomm) MediaFLO

Advantages: 1) transmit content to large areas simultaneously with high quality pictures and little additional cost; 2) allow many players to join in; 3) transmit broadcast-based content without any telco infrastructure or spectrum availability

Mobile TV Business Model

- Two dominant business models(Gill, 2008; Kumar; 2007):

  - Subscription model: the mobile operator-led model

  - FTA model: led by broadcasters or a consortium

- Subscription model: suitable in the Asia-Pacific region (Oh & Jablon, 2008)

  - gain revenue in return immediately (incentives)

  - create diverse content and services for Asia's heterogeneous peoples/cultures

Mobile TV Policy

- The majority of global regulatory authorities apply fixed TV broadcast rules on mobile TV content (MDA, 2007)

  ex: KBC (South Korea): requires DMB carriers to follow broadcasting content codes & universal services

- FCC (USA) & Ofcom (UK):

  - treating MTVS as information services
  - broadcasters kept the control of broadcast channels
  - mobile operators control the great majority of uplink capacity

- Current provisional regulations fail to fully address the complex issues of mobile TV

Mobile TV content

- News, drama, sports as the most popular genres for mobile TV customers (Carlsson & Walden, 2007; Gill, 2008; Shin, 2007; Wei & Huang, 2008)
- Asian consumers prefer local content (Gill, 2008)
- Attention-expensive medium (short, quick interaction)

Mobile TV content

- 'Surrogate TV effect' (a new distribution platform)
- A secondary channel to add interactivity, mobility, and personalization into traditional TV (Andersson et al, 2006)
- Design: make mobile TV a ubiquitous feature on a handset & create a seamless user experience

Amazing Race Asia

ESPN Star Sports

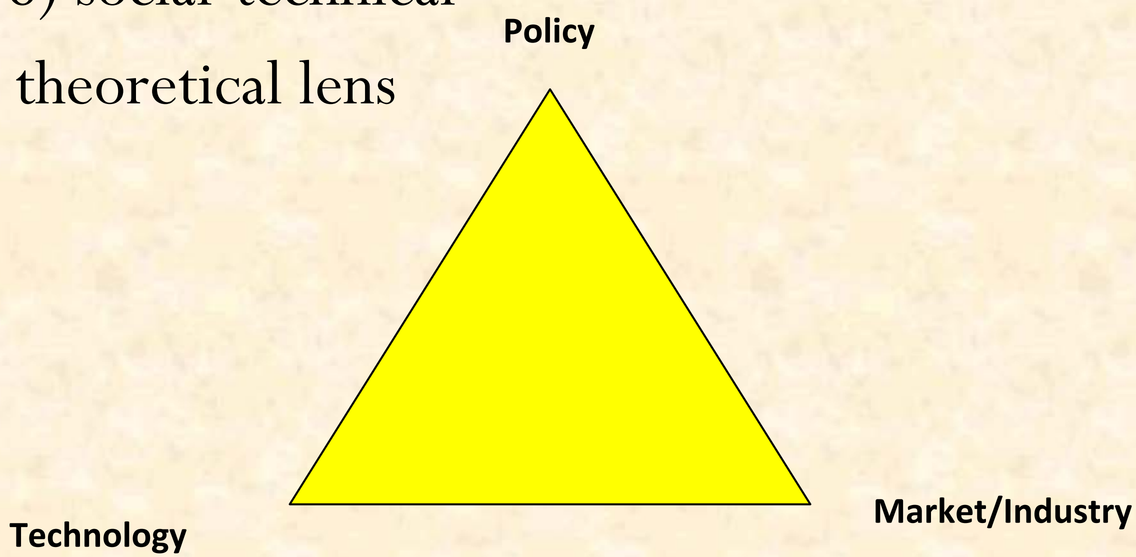
Social-technical Perspectives of Technologies

- Sawyer et al. (2003): emerging broadband and mobile opportunities with a socio-technical perspective
- Bauer (2004): viewed technology, industry/market & policy as a coevolving ensemble to forecast future mobile environment
- Dong (2006) & Shin (2007): a social-technical perspective to analyze Korean's DMB

  - a technology push to market rather than market pull
  - divergent views between different industrial players (broadcaster vs. telcos)

Research framework & methods

- Interesting to contrast Singapore's and Taiwan's responses to deal with similar techno-economic-regulatory challenges brought by mobile TV
- Socio-technical approach as a good framework to investigate interrelationships of technical and social processes
- Uses Dong's (2006) social-technical framework as the theoretical lens



Research Questions

- Aim to elaborate & compare key issues of mobile TV ecology in two national contexts:

  - how do the stakeholders (various industrial players, policy makers) in Singapore and Taiwan respond to the hype of mobile TV?

  - what are the similarities and differences between the two countries regarding mobile TV technology, markets/business models, and policy planning?

- Qualitative data collection (November 2008 ~ March 2009):

  - in-depth interviews with major stakeholders, like industrial players (telcos, broadcasters, content/services aggregators) and regulators in Singapore and Taiwan

  - second-hand documents

- Data analysis: Miles and Huberman's (1994) thematic data analysis

ANALYSIS

Background of Mobile TV Industries in Singapore & Taiwan

Development of Mobile TV in Singapore

Time period	Event(s)
April, 2001	3G licenses awarded to MobileOne, SingTel and StarHub
December, 2004	StarHub launched 3G network
February, 2005	M1 started commercialized 3G video services
November 18, 2005	StarHub launched i-mode
January, 2007	M1 launched MeTV
June, 2007	PGK Media launched TV2GO Trial
November, 2007~ January, 2008	MDA sought public feedback on its proposed regulatory framework for mobile TV services in Singapore
May, 2008	SingTel had mio TV on Mobile
June, 2008	Joint venture between PGK Media and Broadcast Australia to set up Singapore Digital
August, 2008~ November, 2008	Joint DVB-H mobile TV consumer trial by SingTel, StarHub, M1, and Mediacorp

Development of Mobile TV in Taiwan

Time period	Event(s)
August 1, 2006	NCC passed the hand-held TV trial plans
August 4, 2006	NCC asked interested teams to apply for mobile TV trials
October 13, 2006	NCC announced four teams qualified for the project
November 30, 2006	In the secondary selection, NCC selected PTS team for the trial
January 1, 2007	PTS team started to launch the trial
June to October 2007	Other four teams launched mobile TV trials
December 2007- June 2008	Trials completed (Dawn TV team, FTV team, and CTV team had 6 month delay)
December 2007	NCC held internal meetings to review the results of the trials and to discuss the possible licensing scheme
January 31, 2008	NCC passed the drafted plan for soliciting public consultation for mobile TV licensing scheme
March 11, 2009	MOTC suggested discuss the mobile TV issues with the DTV issues about frequency allocation

ANALYSIS

Mobile TV Technology in Singapore & Taiwan

S'pore mobile TV technology

- MDA: no mandating a single standard, suggested DVB-H, MediaFLO, and UHS three technologies
- Singapore's mobile TV trials: Singapore's mobile TV industrial players tend to select DVB-H

  - no limits of users; good quality & speed; 20 channels; no extra data charges; 3G for interactive services only

- Expensive infrastructure investment on DVB-H

  extend DVB-T towers

  - HDB signal coverage

  - solve indoor & tunnel transmission bottlenecks

Taiwan mobile TV technology

- NCC: MTVS standard as technological neutral & allocated three channels for the mobile TV trials
- Taiwan's mobile TV trials: 3 DVB-H & 1MediaFLO
- MTVS operators have to guarantee there is no interoperability problem between different systems

ANALYSIS

Mobile TV Industry/Market in Singapore & Taiwan

Key Players in Singapore's Mobile TV Market

- August 2008, local joint DVB-H trial

 - Singtel: leading communications group

 (mio TV on cell phone; i-phone)

 -Starhub: 2nd largest mobile operator and the sole cable television operator in Singapore (i-mode)

 - M1: 3rd largest mobile operator

 (MeTV; launch Asia's first 3G mandarin mobi-drama & programs 2008)

 - MediaCorp: leading media company and content provider

 (first DVB outdoor worldwide)

Key Players in Singapore's Mobile TV Market

- Singapore Digital

  - Founded in 2001, PGK Media

  - June 2007 Singapore Digital, a joint venture between PGK Media and Broadcast Australia, commenced

  - TV2GO DVB-H trial extended to November 2008.

Broadcasting Mobile TV Trials in Singapore

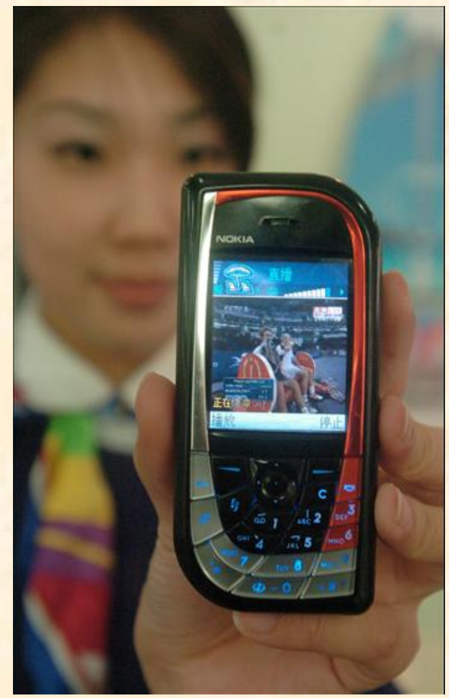
	Joint DVB-H Mobile TV trial	TV2GO
Trial partners	M1, StarHub, SingTel, MediaCorp Alcatel-Lucent and Gemalto (Technology partners)	PGK Media, Broadcast Australia Zenteck Technology, NCS Communications Engineering, CNBC Asia Pacific, ESPN STAR Sports, Kamera
Trial Time	August 2008- November 2008	June 2007-November 2008
Technology	DVB-H	DVB-H
Content	15 channels (English and Chinese) News (Channel NewsAsia, CNBC, Cti, TVBS News); Sports (tvmobile's Olympics 2008, Football Channel); Entertainment (UKTV, Channel 8, Channel U, ETTV Asia); Kids & LifeStyle (MTV, Kids Central, Nickelodeon, World Fashion, The History Channel)	10 foreign channels CNBC, ESPN, WOW!TV, ESPN, Bloomberg, Disney Channel and TV2GO's own channels
Interactive services	None	EPG, Interactive radio shows, digital text applications, interactive ads, voting on programs, content purchase, and access to micro-sites, weather applications
Cell Phones	Samsung P-960	Nokia N77, N92, Samsung SGH-P930
Usability of Interface/ Artifact	Version 1.1 handset: simple navigation and channel switch functions, minimalistic design	User friendly, easy to navigate, long wait for channel switch

Singapore's mobile TV content

- Live Olympics games attracted many trialists' attention; however, after that, it fell back to incidental viewing
- Sports, news, and local content are expected to be the top genres for MTVS
- initial commercialized mobile TV content in Singapore concentrates on how to arrange a compelling lineup of content, rather than prioritizing interactivity
- user-generated content: Mediacorp (careful & selective) vs. TV2GO (enthusiastic)

Singapore's mobile TV consumer

- MDA (2007): only 11% Singaporeans would be willing to pay between S$5 and S$15 per month for MTVS
- Mobile TV is a just "nice to have" service (affordable price)
- Singaporeans consume a lot of content out of home
- a media saturated society have many portable entertaining substitutes
- mistake MTVS for TVMobile



Singapore's mobile TV business model

- Prefer subscription models initially

  -TV2GO:monthly flat rate for viewing 8-10 broadcasting mobile TV channels

  - When the MTVS switches to mass market, the advertising-supported FTA model is useful. (MediaCorp's Business Development Director: tricking timing)

- Singapore will have a collaborative consortium market structure

  - MediaCorp's primary role is to create and aggregate content for telcos that sell MTVS to end users directly

  – future bundled commercial launch with major handset manufacturers

Key Players in Taiwan's Mobile TV Market

- 3G operators: CHT provides 18 channels (US$5.1/month); Taiwan Mobile provides 1,000 minutes program (US$6/ month)
- 3G/2.5G Networks: CHT & Taiwan Mobile joined two teams (PTS & CTV); Far Eastone joined four teams
- Five mobile broadcasting TV trial alliances trials (January 2007 to October 2007)

  - Taiwan's broadcasters: PTS & CTV (DVB-H)

  - State-owned ISP, Chung-Hwa Wideband Best Network (DVB-H)

  -Dawn TV, a subsidiary of CMC Magnetic Corporation (DVB-H)

  - Qualcomm alliance: MediaFLO standard

Broadcasting Mobile TV Trials in Taiwan

Team	PTS team	CTV team	Qualcomm	CHWBN	Dawn TV
Trial time	Jan 2007-Jan 2008	June 2007-June 2008	Oct 2007-Feb 2008	Aug 2007-March 2008	Sept 2007-March 2008
Technology	DVB-H	DVB-H	Media FLO	DVB-H	DVB-H
Trial Region	North	North	North	South	South
Trial Content	CNBC, ESPN, PTS, TVBS-N SET (Metro) Phone TV Short films Data services	CTV News CTV Variety, Cti News, DaAi TV, iNTv, Momo, Star TV, Music Radio	5 channels	ETTV News, ETTV Vareity, ETTV Shopping, FTV News, FTV, Traffic TV, Movie Channel, Video Content	CTS, CTS Leisure ETTV News, ETTV Shopping, CMC Mobile Entertainment Beautiful Life TV, Skyhigh Entertainment
Trial Alliance	PTS, Chunghwa Telecom, Taiwan Mobile, Far Eastone, BenQ, Motorola, Cyberlink	CTV, Chunghwa Telecom, Taiwan Mobile, Far Eastone, CTV Infortech, Motorola, DaAi TV, Cti TV, Cyberlink	Qualcomm, Asia Pacific Broadband Wireless, China Network Systems, TTV	Chung-Hwa Wideband Best Network, Far Eastone, Eastern TV, Formosa TV, DaAi TV, Innoxious	Dawn TV, CTS, Nokia, Eastern TV, Vibo Telecom, Cyberlink, Far Eastone

Taiwan's mobile TV content & consumer

- PTS-- 45% test users willing to subscribe; 51% willing to use paid interactive service
- CTV test users more willing to pay after usage; 37% wanted interactivity

  - test users use the MTVS 2-3times a day & spend about 10 minutes each time;

  - used when waiting or on the way

  - asked varieties in content, characteristics, & phone interface
- News, sports, drama:

  mostly watched and favored programs

Taiwan's mobile TV business model

- The trial teams proposed the hybrid model--an advertisement-sponsored FTA model and a subscription model
- Monthly flat fee:

  - CTV & PTS teams' test results US$9/month for 10-20 channels

  - Other three teams: 66 % prefer to pay monthly fee, US$3.5~9 for 20 channels
- Yang (2007):

  - MTVS operators can provide 1/4 free content +3/4 paid content.

  - The pricing strategy should be US$ 1.6 per month for the transmission fee/ free content+ US$3-5/ month for subscription fee

ANALYSIS

Mobile TV Policy
in Singapore & Taiwan

Singapore’s mobile TV policy

- MDA defined MTVS as “personalized viewing TV, often with a choice of 10 to 15 channels on an anywhere anytime’ basis,” and unlike cellular mobile TV, the service is not charged by the length of viewing time
- November, 2007: MDA’s market-driven and pro-enterprise regulatory framework

  - MDA issue the MTVS licenses: 4 multiplex -2UHF & 2 VHF channels

  - two-tier framework

  - follow Broadcasting TV Program Codes

Singapore's mobile TV policy

- The mobile TV policy framework hasn't finalized

  - MDA would not force MTVS to be commercialized when it was premature of industry's viable business plans and consumers' demand

  - the government actively discusses with the industry

  -whether the government should establish the infrastructure to kick off MTVS?

- MDA now takes a consultative and collaborative approach for licensing, instead of a traditional tender process.

Taiwan’s mobile TV policy

- NCC’s annual plans for 2006-2008: promoting MTVS
- Disagreements to open up or not
- February 2008, NCC sought for written public consultation
- NCC: 1) "technology-neutral" approach; 2) issue 3 MTVS licenses (6MHz for 8 channels); mobile TV licenses: CH35, CH36,CH49
- Nationwide mobile TV service
- NCC proposed to regulate the MTVS license based on the Telecommunications Act; MTVS content will be subject to the Broadcasting Act

Taiwan’s mobile TV policy

- After the public consultation stage, the NCC has not taken any action for its mobile TV regulatory proposal
- After the new Administration, KMT, took the helm in May 2008, the Executive Yuan considered discussing the mobile TV issues with DTV issues together (Deng, 2009; Hong, 2009; Wu, 2009):

  -uncertain that the NCC will open up new MTVS licenses

  -an alternative to let the incumbent telco operators and broadcasters to provide MTVS with their assigned frequencies

Discussion & conclusion

- Singapore 's and Taiwan's national competitive advantages for mobile TV:

  -high mobile penetration, digital savvy customers, pro-innovation government, sophisticated media companies, well-established telecommunication infrastructure

- Both have potential to blossom if… settle technology, policy making, content innovation, and customer awareness
- Singapore's mobile TV players tend to select DVB-H vs. Taiwan (DVB-H + MediaFLO)

Discussion & conclusion

- Singapore MTVS players tend to adopt a telco-led consortium market structure vs. Taiwan’s broadcast-led consortium
- Compared with Taiwan, Singapore’s commercial mobile TV market is more collaborative and less competitive.
- Taiwan’s 3G TV is a competitive substitute that attracts a certain amount of users and has more shaping power than Singapore’s 3G video services.
- Taiwan’s broadcasting mobile TV trials has more advanced and interactive content than Singapore’s.

Discussion & conclusion

- Singapore's subscription business model vs. Taiwan's hybrid model & Singapore: tiered MTVS fee vs. Taiwan users: flat monthly MTVS fee
- Concerning about commercial viability, the MDA now take a more consultative, collaborative, and market-driven approach for licensing and will open four MTVS multiplexes
- Taiwan's NCC is less enthusiastic about MTVS and still indecisive to either open three new MTVS license for tender or auction, or let incumbent telcos or broadcasting to provide such services.

Discussion & conclusion

- With respect of the content, Singapore's MTVS is subject to the Broadcasting Act, while Taiwan's MTVS will have more flexibility in their content
- Mobile TV: a disruptive technology and a social-technical artifact.
- Adopting Dong (2006)'s model, this research has found the socio-technical theoretical approach is useful to investigate the technology subsystem, market/industry subsystem, and policy subsystem of the emerging and evolving new technology, MTVS, and even do a cross-country comparison.

Discussion & conclusion

- Not technology push, not policy push, not market push
- Industrial players shape the trajectories of the two countries' broadcasting mobile TV more than policy and technology.
- The new entrant triggered Singapore's market trials vs. Taiwan's incumbent and new players are keen to seek for new business opportunities of wireless video services
- The policy makers both take market-driven and technology neutral approaches.

Contributions

- Illustrate the status quo of Singapore's and Taiwan's mobile TV industry & identifies the key stakeholders & cross country comparisons
- Shed light for the future development of mobile TV in other countries in Asia Pacific
- Show the social-technical framework is useful to examine the complex interplay of technology, market, and policy

  of emerging new technologies

  in different national contexts

Feedback welcome!

Trisha, Tsui-Chuan Lin

Assistant Professor,

Wee Kim Wee School of Communication

Nanyang Technological University, Singapore

trishalin@ntu.edu.sg

Liu, Yu-Li

Professor, Department of Radio and Television

National Chengchi University, Taiwan

yuliliu@nccu.edu.tw