Technology and Innovation in the Diffusion Process of 3G Mobile Phones in Japan

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Objective & Research Questions

The objective of the paper:

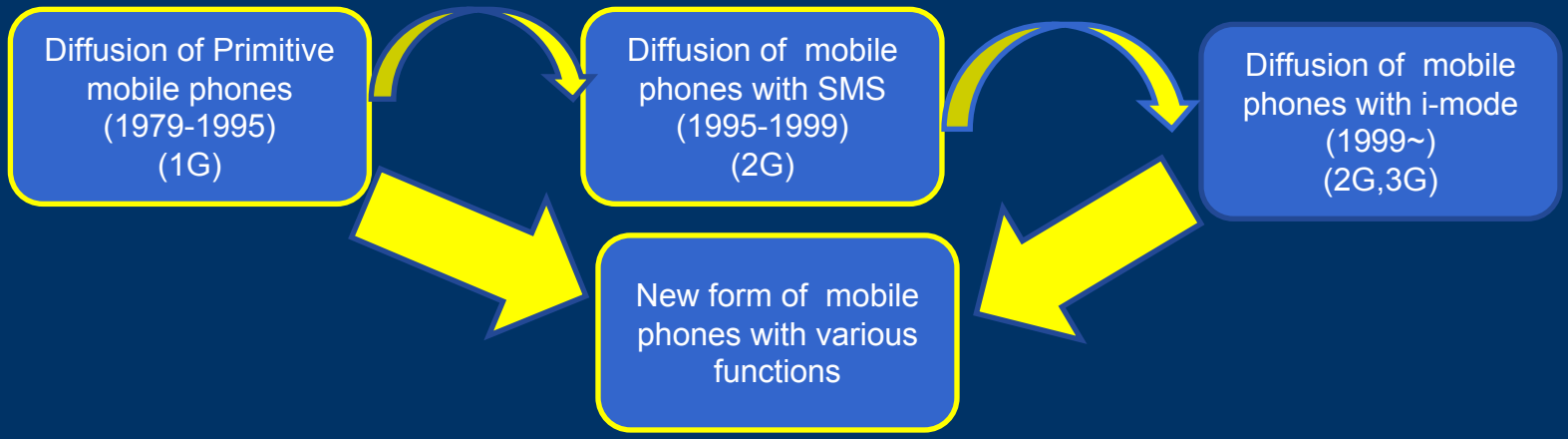
- Discuss effect of technological innovations and policies for the diffusion of 3G mobile phones in Japan

Research questions:

- What are the specific technologies and innovations that influence Japanese 3G subscribers?
- Was there any policy that affect 3G?
- Is there any new technology to shift 3G to 3.9G/4G in Japan?
- Is there any possibility to measure Next Generation Mobile Network (NGMN) for the future of mobile phones business of Japan?
- Is there any empirical rather than theoretical analysis can solve the recent debate exist inside the Japanese market?

Brief history of Japanese mobile phones

1979 NTTPC offers the world's first automobile phone service (Launch of 1G)
1985-1988 New carriers enter the market
1993 DOCOMO starts PDC (launch of 2G)
1994 New entry continues (Sale of terminal equipments starts)
1998 DDIcellular (au KDDI) introduces the first CDMA technology
1999 DOCOMO introduces i-Mode (2.5G)
(Transition from voice to data communications)
2000 Analogue transmission for mobile phone is terminated
2001 DOCOMO launches FOMA on W-CDMA (launch of 3G)
2002 CDMA2000 (au KDDI) competes with W-CDMA (3G competition starts)
2003 New innovations and technologies for 3G continues



Technology, innovation and policy

Types of 3G technology

- W-CDMA (DOCOMO, SoftBank)
- CDMA 2001 x (au)
- EV-DO, HSDPA (all for high speed)

Types of innovations

- Entertainment (Video, music, mobile TV)
- e-Payment (Edy, Suica, nanaco)
- High speed (HSPA, High bands)
- Network other than mobile phones (IP phone, IP network)
- Other (2in1)

Policy (MNP)

Pricing strategy (White Plan)

Methodology

- Panel Data Analysis of Japan's mobile phone market

The simple equation of panel analysis:

$$Y_{it} = \beta_0 + \beta_{it} X_{it} + \varepsilon_{it}$$

Dependent variable: no. of subscribers to 3G mobile phones

No. of carriers: 3 major mobile phone operators of Japan namely, DOCOMO, au,SoftBank

Time period: monthly data from October 2001 to December 2008

Independent variables: Economic, Technological innovations, and Govt. policy

Importance

- Selected *Price* and *GDP* to satisfy general equation of Economics and technology, innovation, policy dummies to find significant result

- Compare whole market and each individual carrier with estimated results

Findings

- **Findings for whole market**

1% significance level:
d5*suica* (e-payment)
d7*HSDPA* (high speed)
d8*highbands* (high speed)
d132*in1* (other)
10% significance level
d3*oneseg* (entertainment)

- **Findings for DOCOMO**

1% significance level
d3*oneseg* (entertainment)
d5*suica* (e-payment)
5% significance level
d6*nanaco* (e-payment)
d7*HSDPA* (high speed)
d8*highbands* (high speed)
10% significance level
d12*MNP* (policy)

- **Findings for au**

1% significance level
d2*fullmusic* (entertainment)
d6*nanaco* (e-payment)
d10*IPphone* (network)
d11*IPnetwork* (network)
5% significance level
d7*HSDPA* (high speed)

- **Findings for Softbank**

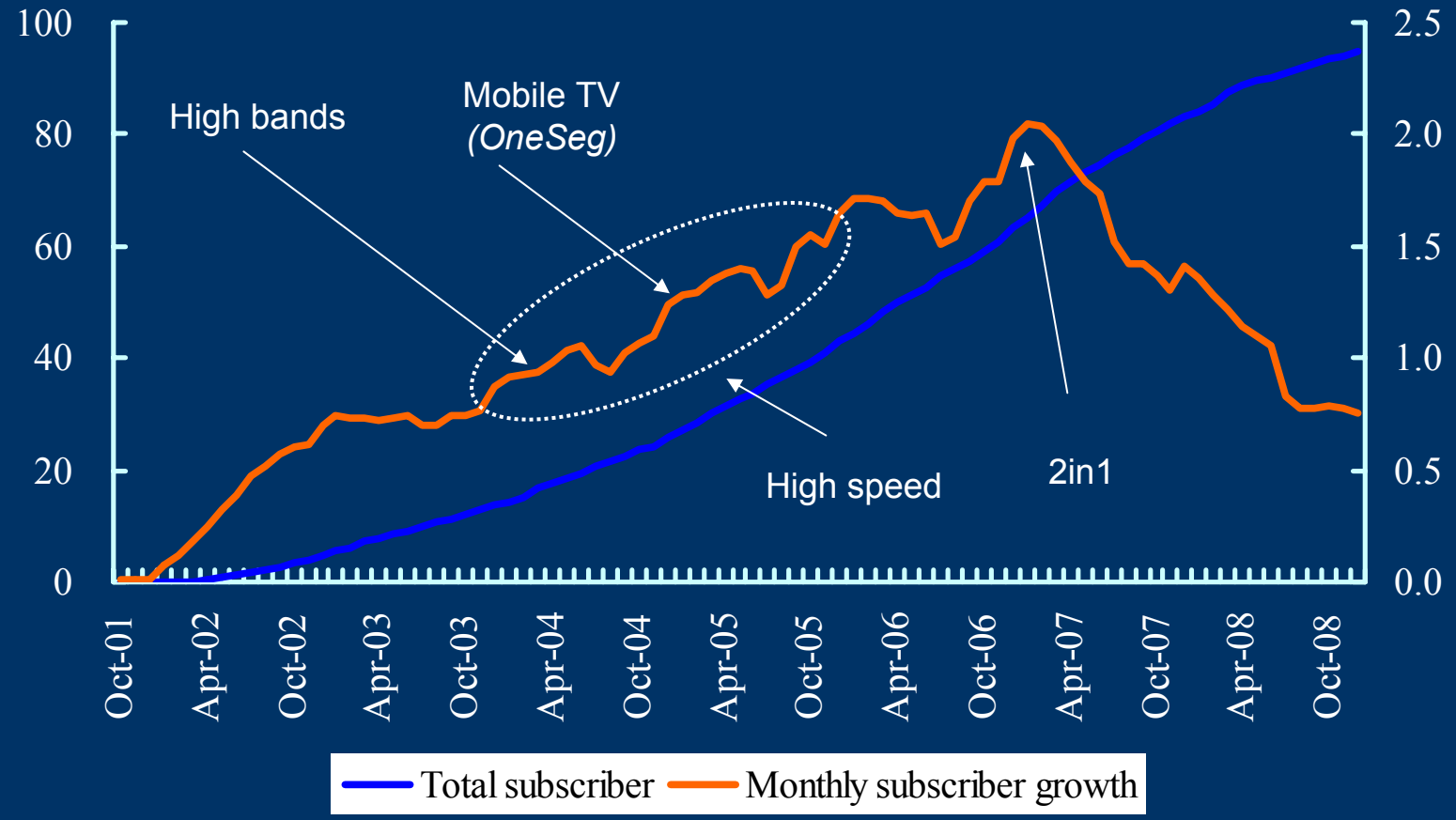
1% significance level
d4*edy* (e-payment)
d6*nanaco* (e-payment)
d9*discount* (pricing strategy)
d132*in1* (other)
5% significance level
d3*oneseg* (entertainment)
d7*HSDPA* (high speed)

Summary result

		Carrier		
Innovations	Whole market	DOCOMO	au	SoftBank
Entertainment	(+)	(+)	(+)	(+)
e-payment	(+)	(+)	(+)	(+)
High speed	(+)	(+)	(+)	(+)
Pricing strategies	(-)	N/A	N/A	(+)
Network	N/A	(-)	(+)	N/A
Policies	N/A	(+)	(*)	N/A
Other	(+)	(*)	N/A*	(+)

(+)= Significance at the 1%, 5%, and 10%, respectively
(-)= Not significant
N/A= Excluded from the analysis
(*)= Positive “t” statistics with high coefficient
N/A*= Service is not available

Graph-the real scenario



Discussion- Technological innovations

- Entertainment: The specific innovations for future mobile phone market
  - new strategy for providing better services to music, Chaku-uta to Chaku-uta full
  - development of mobile TV, *OneSeg*
- e-Payment: The solution for so called traditional payment
  - convergence of card payment/cash payment to digital payment
  - positive trend of mobile payment ensures new opportunity to make money
- High speed: The more the speed the more the services/contents can be provided to subscriber
  - up to 14.4 Mbps
  - application to behavior assistance
  - Is it substitute/complement for FTTH?

  (yes/no- need more empirical analysis)

Discussion- *Continued*

- Pricing strategy: Lower price does not affect much to 3G subscribers

  Who win? Small firm/large firm!

  Are loyal customers switch?

  Was it too late to create price battle for 3G markets?

- Policy: The competition policy did not work equally for whole market and each carrier.

  why MNP did not work?

  - contents
  - handsets quality
  - network speed
  - frequencies
  - customer loyalty
  - address portability

Conclusion

Issues and future scope

- Technological innovations may play important role to attract next generation subscribers
- Fierce competition will arise in future among carriers for contents development
- Win-Win relations should exist among carriers

Conclusion

My conclusion is that:

- Policy variables are less important for 3G mobile phones, so operators should emphasize on technological innovations for 4G mobile phones

- New market model for Next Generation Network (NGN) for mobile phones should develop to shift toward 4G development

- New market entry (i.e., MVNO) can play to remove the so called obstacles still exist inside the Japanese mobile phone market

Recommendations based on previous talk:

Harsha de Silva (Yesterday night talk)

Developed Vs. Developing countries

- Public consciousness/technology love
- South Korea/Japan's i-Phone experience