25th KISDI 1985-2010

KISDI 25th Anniversary Seminar

정보통신정책연구원 25주년 기념세미나

April 30, 2010 Seoul, Korea

The Future of Convergence

컨버전스의 미래

Program & Proceedings

Korea Information Society Development Institute 25th Anniversary Seminar

정보통신정책연구원 25주년 기념세미나

2010. 4. 30.
Seoul, Korea

GENERAL INFORMATION

Title 행사명	**Korea Information Society Development Institute** **25th Anniversary Seminar** 정보통신정책연구원 25주년 기념세미나
Date 일시	April 30, 2010 2010년 4월 30일(금) 14:00 ~18:00
Venue 행사장	KISDI Conference Room (B1) KISDI 대회의실
Official Language 공식언어	English/Korean 영어/한국어
Theme 주제	**The Future of Convergence** 컨버전스의 미래 :통신·방송 및 IT 융합분야의 미래 시장의 모습과 그에 대비한 정책과 전략은 무엇인가?
Hosted by 주최	**Korea Information Society Development Institute** **정보통신정책연구원 (KISDI)** (427-710) 경기도 과천시 용머리 2길 38 (주암동 1-1) Tel: +82-(0)2-570-4139
Secretariat 준비사무국	**Seong & Min M.I.C.E. Consulting, Ltd. Co.** Tel: +82-(0)70-8250-6846~7 Fax: +82-(0)31-338-0646 E-mail: KISDI@seongandmin.com

PROGRAM

13:30 Registration 등록

14:10 Opening Remarks 개회사 및 인사말 -방석호 정보통신정책연구원 원장
- Suk-Ho Bang (President of KISDI)

14:15 Congratulatory Address 축사 –김세원 경제인문사회연구회 이사장
- Cae-One Kim (Chairman of National Research Council for Economics, Humanities and Social Science

14:25 Keynote Speech 기조 연설. "IT 분야에 관한 한국 정부의 비전 및 정책방향" -곽승준 미래기획위원회 위원장
"Korean government's visions and directives for IT sector"
-Seung-Jun Kwak (Chairman of Presidential Council for Future and Vision)

14:40 Presentation 1. 주제 발표 1. "통신사업자의 미래 시나리오"
"Scenario for the telcos"
- Yves Gassot (CEO of IDATE)

15:00 Presentation 2. 주제 발표 2. "TV 의 미래: 디지털 시대의 생존 전략"
"The Future of TV: Can it survive the digital age?"
- Jan Dawson (Chief Telecoms Analyst of Datamonitor)

15:20 Presentation 3. 주제 발표 3. "브로드밴드 컨버전스의 진화론적 다이내믹스"
"Evolutionary Dynamics of Broadband Convergence: The Case of Korea"
- Suk-Gwon Chang (President of Korea Association of Telecommunications Policies)

15:40 Presentation 4. 주제 발표 4. "디지털 컨버전스를 넘어서"
"Beyond Convergence"
- Ichiya Nakamura (Executive Director of You Go Lab)

16:00 Coffee Break

16:30 Roundtable Discussion 종합토론
- Moderator: Jan Dawson (Chief Telecoms Analyst of Datamonitor)
- Discussants: 발표자 3 인 (Suk-Kwon Chang, Yves Gassot, Ichiya Nakamura)
  Hyeon-Cheol Choi 한국언론학회 회장
  Sang Won Ko, KISDI 미래융합연구실장
  Myeong-Ho Lee, KISDI 통신정책연구실장
  Chu-Hwan Yim 한국디지털케이블연구원 원장

18:00 Wrap up and Closing 요약 및 폐회

Congratulatory Address
축사

By **Cae-One Kim**
Chairman
National Research Council for
Economics, Humanities and Social Science

BIOGRAPHY

Cae-One Kim

As Prof. at School of Economics of Seoul National University(1971-2004) and Dean of College of Social Sciences(1995-96), he taught on *international economics including European integration and trade policy.* He successively served as President of numerous Korean academic associations, especially International Economic Studies(1988-89), Korea Economic Association(2000-01), EU Studies(1994-2004) and EUSA Asia-Pacific(2001-2004).

He was also founding President(1988-91) and Chairman(1993-98) of Korea Information Society Development Institute(KISDI), Korea Monetary Board Member(1991-94) and Commissioner of Financial Supervisory Commission(1998-99) of Korea. He wrote many books and articles on international economics, and Korean economy including *'International Economic Order(1986, Kor.), 'Economic Reforms in the Socialist World(1989, McMillan)', 'Korean Economy at Turning Point(1996, Kor.)', Economics of the EU(2004, Kor.)', 'Conditions for the Successful Establishment of East Asian Economic Integration(2006, Kor).*

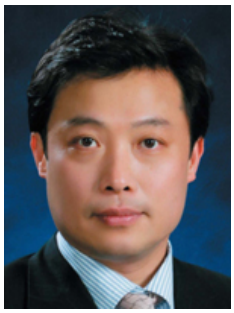
He is currently Chairman/CEO of National Research Council for Economics, Humanities and Social Science.

Keynote Speech
기조 연설

"Korean government's visions and directives for IT sector"

By **Seung-Jun Kwak**
Chairman
Presidential Council for
Future & Vision

BIOGRAPHY



Seung-Jun Kwak

Dr. Kwak Seung-Jun chairs the Presidential Council for Future & Vision. He has an interesting and varied career in both the public and private sector in Korea and abroad. Prior to his current position, he has worked as a Senior Secretary to the President for State Affairs Planning, as a Planning and Coordination Sub-Committee Member for the 17th Presidential Transition Committee, as Chief Editor of the Korea University Newspaper, Director for Policy Planning for Global Strategies Institute and as a Visiting Professor at Vanderbilt University. He received a Bachelor of Economics from Korea University in 1984 then later moved on to achieve both his Masters and Ph.D. in Economics from Vanderbilt University in the United States. In 2003, Dr. Kwak received the Best Paper Award by the Korea Research Institute for Human Settlements. He has published *The North Korean Economy in the Transitional Period* and *Interviews with Distinguished Scholars in the 21th Century*. In addition he co-authored both *The Emissions Trading System* and *Science and Society*.

PRESENTATIONS

Presentation 1
주제 발표 1

"Scenario for the telcos"

By **Yves GASSOT**
CEO
IDATE

BIOGRAPHY

Yves GASSOT

For more than fifteen years, Yves GASSOT has been at the head of IDATE (www.idate.org), an institute that has established itself as one of the leading research centres in Europe concerned with the telecommunications, Internet and media industries. In this position, he has taken part in numerous studies of the various markets and the strategies being pursued in the telecommunications sector. He is on the panel of several expert committees, including the 'Conseil Général de l'Industrie, de l'Energie et des Technologies', ITS and, the advisory committees of the PTC and Iris Capital (VC). He was special adviser of the European Commissioner of the Information Society during the last regulatory framework review (2006-2007). He serves as director of the journal *COMMUNICATIONS & STRATEGIES* and is scientific head of the annual DigiWorld Yearbook and DigiWorld Summit. With a background as architect (DPLG, Paris), he is a graduate of the Institute of Political Studies, Paris (3rd Cycle).

_telecom
_internet
_media

Next generation telcos: navigating the sea change !

April 2010 – KISDI Conference, Seoul

Understanding the Digital World

IDATE
Consulting & Research
www.idate.org

Yves GASSOT
CEO, IDATE
y.gassot@idate.org

Key takeaways

IDATE Consulting & Research www.idate.org

Telecoms in Europe and other advanced markets are facing an unprecedented level of uncertainty weighing on their future outlook:

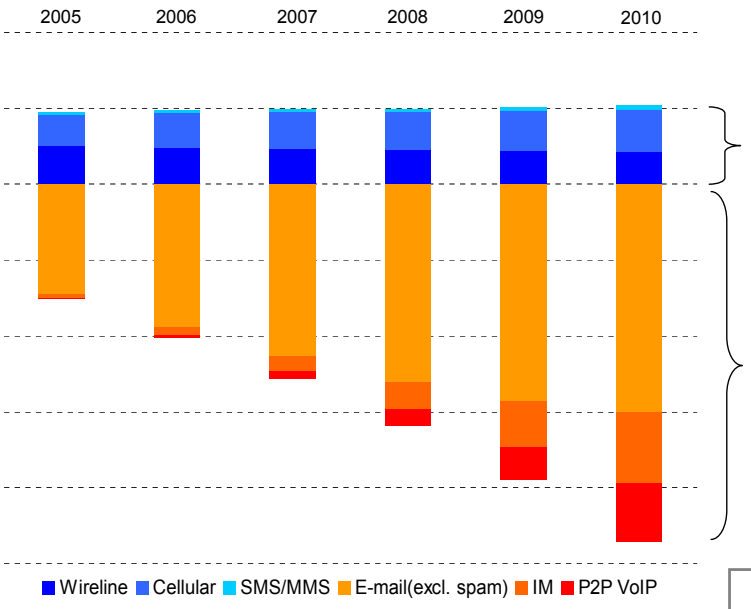
- ✓ Revenues in their domestic markets are decreasing,
- ✓ Market shares on developping markets are expensive, and new giant telcos are emerging in the BRIC markets,
- ✓ Telcos are facing a new investments' cycle (NGN / FTTx – LTE)
- ✓ …and the opportunities related to the « Internet of the Future » are confused by the debate on the Net neutrality.

Carriers will increasingly seek to reinvent the way they address their core business and the adjacent markets through new innovation models ('Open Innovation' and 'Strategies of platforms')

- ✓ Several new carrier models are possible, all relying on increased specialization.

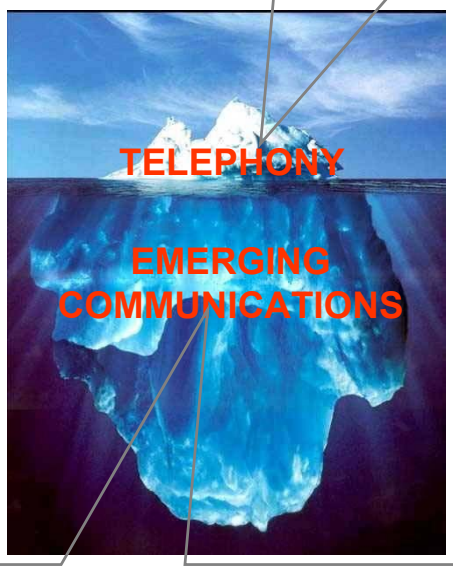
1. Usage challenge: the iceberg effect

FRANCE TOTAL COMMUNICATIONS MARKET
(billions of call minutes and equivalents[1])



Notes: (1) An SMS/MMS or e-mail is considered as a 30 second call.

• Stable usage
• Revenues threatened by multiple alternatives and technology disruptions



• Fast increasing usage
• Not monetizable through traditional pricing models

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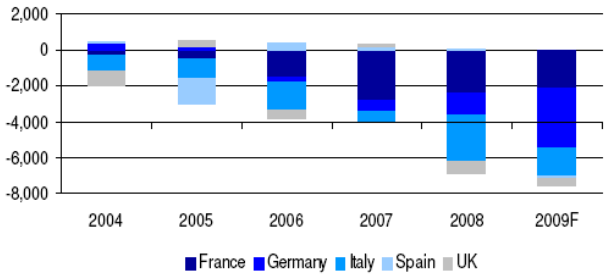
2. The growth challenge (1): wireline market is stagnating …

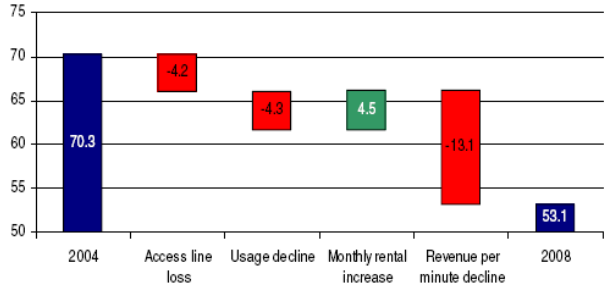
Fixed line loss is generalizing across Western Europe…

EU 5 PSTN/ISDN lines net adds (000s)



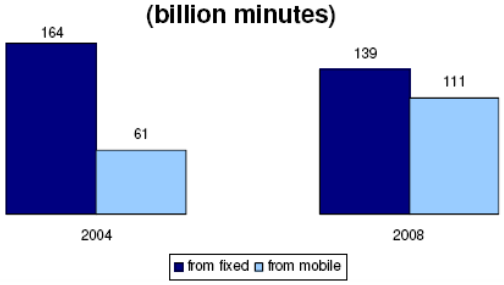
…resulting in high deflationary pressure on wireline voice…

EU 5 fixed voice market '04-08 evolution (€bn)



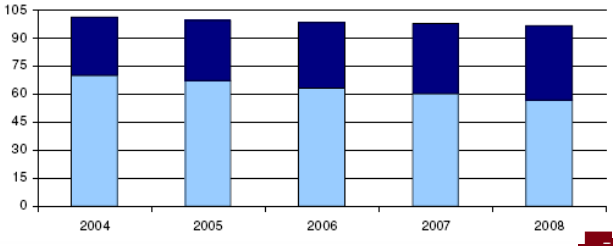
…while usage is declining under fixed mobile substitution

Outgoing call minutes per year in the UK (billion minutes)



…barely compensated by broadband growth

EU 5 fixed services market evolution ($bn)



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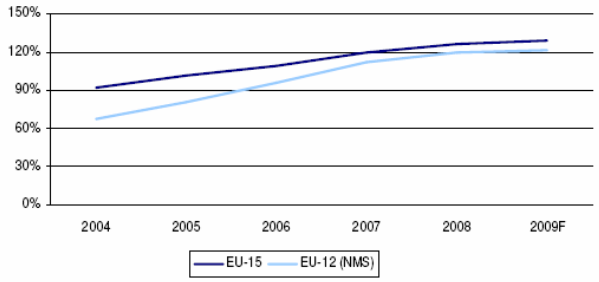
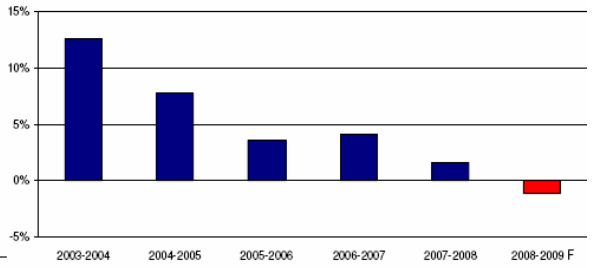
…while the wireless market is loosing steam (2)

Penetration saturation is looming across Europe…

Mobile market penetration (% pop.)

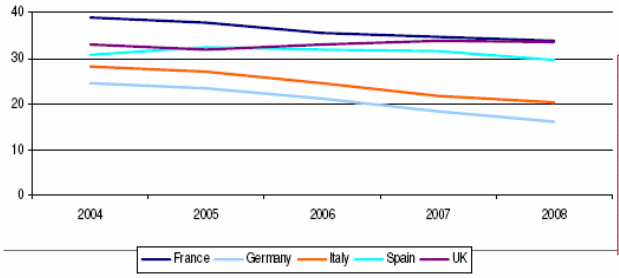


Mobile revenue growth in EU 5



…and ARPU continues to decrease

Mobile ARPU (€/month)



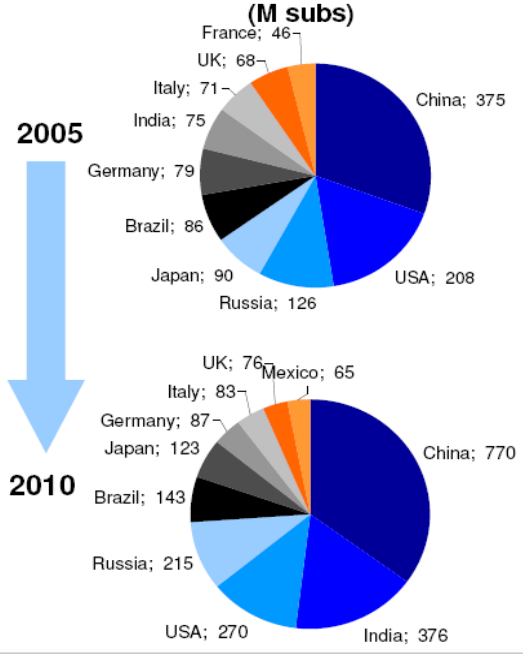
A new paradigm has to be defined with the

Internet Mobile

3. Globalization challenge : where is the growth? (1)

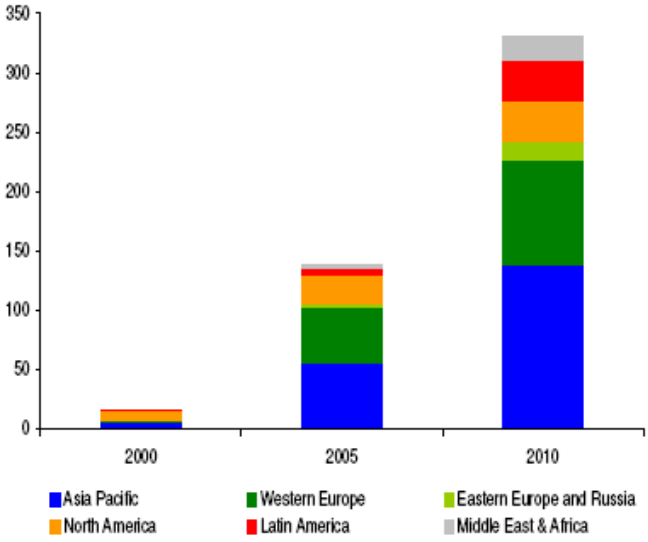
Mobile markets will increasingly be driver by emerging countries

Top 10 mobile markets worldwide (M subs)



…and fixed broadband will see a high dominance of the Asia Pacific region

Fixed broadband regional breakdown (M subs)



3. Globalization challenge (2): toward a new hierarchy?

Rank	Company	Country	2005 revenues (million USD)
1	NTT	Japan	97 452
2	Verizon[1]	USA	75 112
3	Deutsche Telekom	Germany	74 125
4	France Télécom	France	60 985
5	Vodafone[2]	UK	53 364
6	Telefónica[3]	Spain	47 111
7	AT&T Inc.[4]	USA	43 862
8	Telecom Italia	Italy	37 208
9	BT	UK	35 480
10	Sprint Nextel	USA	34 680

1 Excludes MCI, which was consolidated in Q4 2005

2 Excludes Vodafone KK, acquired by Softbank / 3 Does not include O2

4 AT&T Incorporation (SBC before November 2005)

Rank	Company	Country	2008 revenues (millions €)
1	AT&T	USA	84 339
2	NTT (*)	Japan	68 529
3	Verizon	USA	66 201
4	Deutsche Telekom	Germany	61 666
5	Telefónica	Spain	57 946
6	France Télécom	France	53 488
7	Vodafone (*)	UK	51 539
8	China Mobile	China	40 352
9	Telecom Italia	Italy	30 158
10	BT (*)	UK	26 877

(*) Fiscal year ended March 31, 2009

Source: IDATE

- Compared to 2005, China Mobile is now well installed in the Top 10 with a growth of 20.9% in 2008. BRIC + Mexico representing 33% of worldwide telecoms services market to be compared to 20% in 2002
- We can now identified in the ranking, European Telcos now clearly positioned in Emerging countries such as Telefonica (Lat. Am, China), Vodafone (India, Turkey) or France Telecom (Africa) ...but, within Europe, consolidation process is still unclear
- BT is the only Telco not claiming a Fixed Mobile strategy as the right choice. Even Vodafone is today engaged in a Fixed Mobile strategy

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4. Facing new investments cycles: (1) FTTx overview

World's top 10 FTTx operators in terms of subscribers at June 2009

Rank	Operator	Country	Main technology & architecture	FTTx subscribers
1	NTT	Japan	FTTH/B GEPON	11 793 000
2	China Telecom (1)	China	FTTH - FTTx+LAN EPON LAN/DSL	11 160 000
3	KT	South Korea	FTTB EPON/GEPON	3 555 644
4	Verizon	USA	FTTH BPON/GPON	3 100 000
5	SK Broadband	South Korea	FTTB/LAN GEPON	2 733 141
6	AT&T	USA	FTTN VDSL2	1 585 000
7	LG Powercom	South Korea	FTTH/B EPON/GEPON	1 504 090
8	Chunghwa Telecom	Taiwan	FTTB GEPON	1 342 000
9	KDDI	Japan	FTTH/B EPON/GEPON	1 211 000
10	Beeline	Russia	FTTB EP2P	724 000

(1) 560 000 FTTH subscribers and 10.6 millions FTTx/LAN subscribers

Source: IDATE

- In terms of operators, the gap between Asia and the rest of the world is important
- Among the globe's ten largest FTTx operators, seven are Asian, two are North American and one is from Russia. No Western European operators in the Ranking
- NTT is still the largest FTTH/B operator with a base of 11.8 million subscribers but probably no more for a long time
- Indeed China Telecom is now counting 11.2 million FTTx subscribers at June 2009 being mainly FTTx/LAN (EPON LAN/DSL)

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4. Facing new investments cycles : FTTH/B in Europe (2)

► IDATE has identified 233 FTTH/B projects in Europe of which 120 are new initiatives since June 2005

► Some significant FTTH/B European deployments at June 2009

Countries	Players		Home/Building passed (June 2009)
Denmark	DONG Energy	Power utility	150 000
	Energie Midt	Power utility	70 000
	TRE FOR	Power utility	60 000
Finland	TeliaSonera	Incumbent	450 000
France	France Telecom	Incumbent	582 800
	Illiad/free	Alternative	350 000
	SFR	Alternative	350 000
	Numericable	Cable operator	4 100 000
Germany	Wilhelm Tel	Public	100 000
	M-Net	Public	110 000
Italy	Fastweb	Alternative	2 000 000
Netherlands	Reggefiber	Infrastructure operator	400 000
Norway	Lyse	Power utility	210 000
Russia	Beeline (Vimpelcom)	Alternative operator	7 500 000
Slovakia	T-COM	Incumbent	200 000
	Orange Slovensko	Alternative	280 326
Slovenia	T2	Alternative	250 000
Spain	Telefonica	Incumbent	200 000
Sweden	B2	Alternative	400 000

Source: IDATE for FTTH Council Europe

In June 2009, FTTB architecture and Ethernet technology as well as MDUs passed are clearly leading NGA deployments in Europe

The diversity of players involved in FTTH/B in Europe

Total Europe at June 2009

42% of subscribers on FTTH

(from 52.8% in December 2008)

58% of subscribers on FTTB

(from 47.2% in December 2008)

71% of Homes Passed are MDUs

29% of Homes Passed are SDUs

81% of subscribers on Ethernet

(from 80.8% in December 2008)

- 19% of subscribers on PON

(from 19.2% in December 2008)

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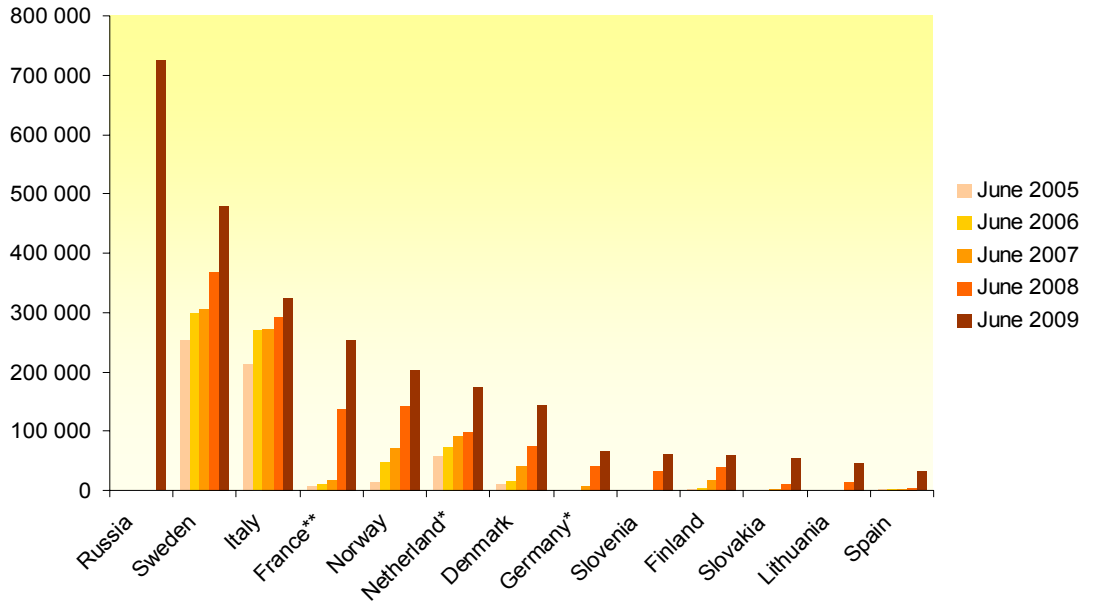
4. NGA challenge: FTTH/B subscribers in Europe by country

Evolution of FTTH/B subscribers in Europe (1)



(1) Here FTTx means Fiber-to-the-Home or Fiber-to-the-Building or Fiber-to-the-Office or Fiber-to-the-Dormitory

* Excluding VDSL / VDSL2, FTTC, FTTN deployments by incumbents

** Including FTTB deployments from Numericable

Source: IDATE for FTTH Council Europe

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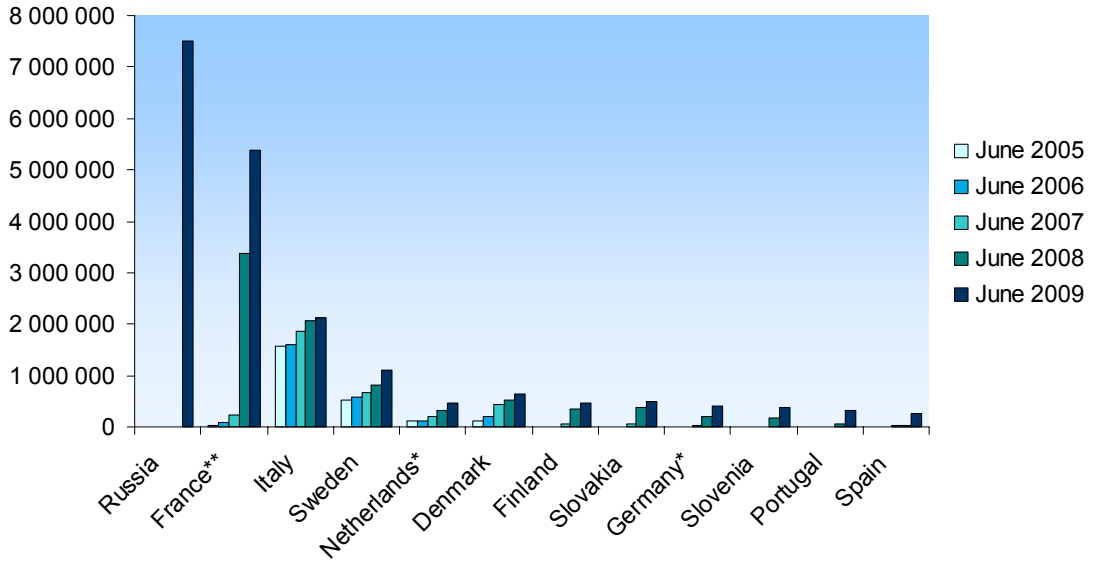
4. NGA challenge: FTTH/B Home Passed in Europe by country

Evolution of FTTH/B Homes Passed in Europe (1)



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** Including FTTB deployments form Numericable

Source: IDATE for FTTH Council Europe

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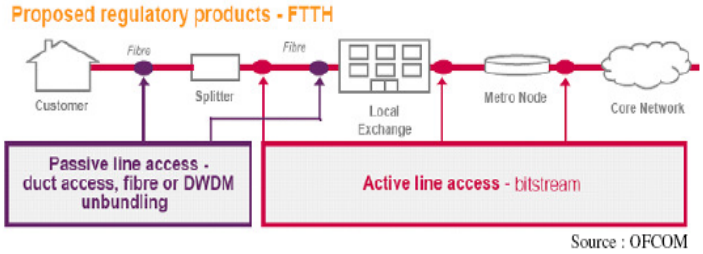
4. Facing new investments cycles: NGA & Regulation

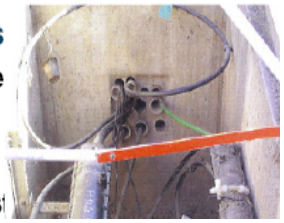
2 main options:

- **Wholesale & Open Model**
  - OFCOM in the UK promoting ALA (Ethernet Wholesale)



  - 2 or 3 Layers Open Model in Sweden, Denmark or the Netherlands

- **Infrastructure competition: Portugal & France s**
  - Incumbent's ducts are an essential infrastructure
  - Access to Incumbent's civil engineering must be guaranteed to allow all operators to inves



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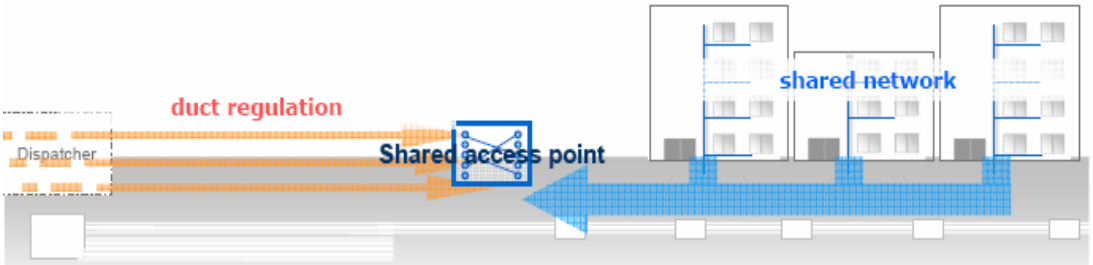
4. Facing new investments cycles: FTTH regulation in France



- Access to existing civil engineering, which is the main cost factor (50% to 80% of the total rollout cost) -> regulation of France Telecom ducts
  - In accordance with the market analysis decision of 2008, July 25th (markets 4 and 5), France Telecom must provide access to its civil engineering under transparent, non-discriminatory and cost-oriented conditions.
- Access/shared investment in the last mile -> sharing the last mile of the fibre network
  - The Law on Modernising the Economy (4 August 2008) sets out specific rules for providing access to the last mile of very high-speed broadband networks.
- Local authority actions in less densely populated areas: incentives to roll out networks opened to all operators,

and a national fund with 2M EU is defined for sparsely populated and rural areas

There is a debate on the interest to set up a complementary plan to upgrade ADSL lines with higher bit rates.

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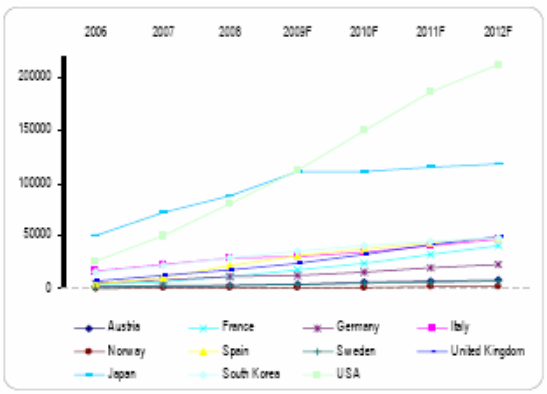
4. Facing new investments cycle: (2) LTE – Mobile Brodaband trends

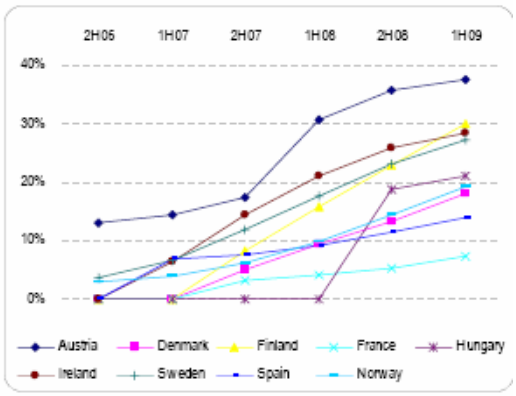
- 3G networks are offering users with a true broadband experience
- Mobile Data packages are attractive
- On latest generation networks, data applications recently started to account for more traffic than voice
- The use of smartphones, phones that incorporate computer and Internet capability and that can run a wide range of data applications, is surging
- Flat rate pricing plans for mobile data ➔ user acceptance of mobile data ➔ increased data consumption
- People are substituting mobile phones for their fixed line phones. Similarly, users are starting to use mobile broadband connections to the Internet as an alternative to wireline connections such as DSL

3G subscribers (thousands) uptake in major mobile markets



Source: IDATE

Mobile vs total broadband ratio (selected European countrie



Source: IDATE

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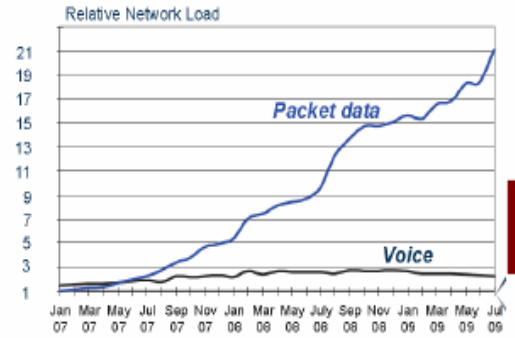
4. Facing new investments cycles: (2) LTE – impacts on the Capex?

HSPA traffic growth – World average



→ *Overall, global mobile traffic has more than doubled in the past year, reaching 33 Petabytes (PB) per month in 2008, and 85 PB per month in 2009*

- Even if some congestion of the network happen in the urban zones in rush hours, 3G networks are still not satured and 3G spectrum has not yet been fully allocated in many countries
- A model for deploying 3G networks developed by IDATE highlighted the limits in terms of available capacity on HSPA networks by 2013. The problems will first appear in densely populated urban areas and, by 2014, in suburban areas.
- Faced with these limits, operators could degrade the quality of their services (restricting available capacity, reducing speeds, etc.) or continue their deployments
- Stronger pressure on the RAN + backhauling network

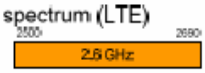
Technical solutions

Increase network capacity

→ move to HSPA+

→ add new cell sites

→ add 2.6 GHz spectrum (LTE)

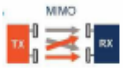


→ buy additional 900, 1800 MHz or 2.1 GHz spectrum

→ use WiFi hot spots

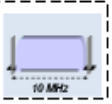
→ add pico/femtocells

→ use multiple antenna systems



→ add 800 MHz spectrum (LTE)

→ use LTE with 10 MHz and 20 MHz channels



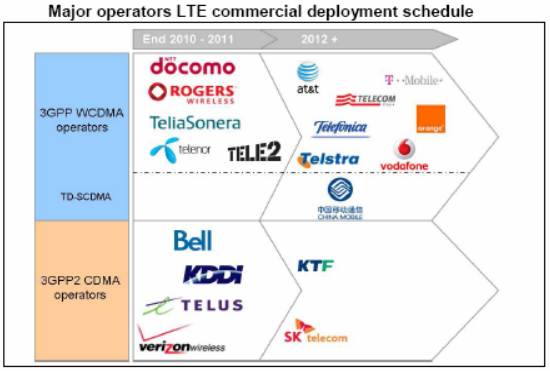
→ use dedicated broadcast networks?

4. Facing new investments cycles: (2) LTE – deployment roadmap

► Earliest LTE deployments announced for end-2010; many more operators are set to follow

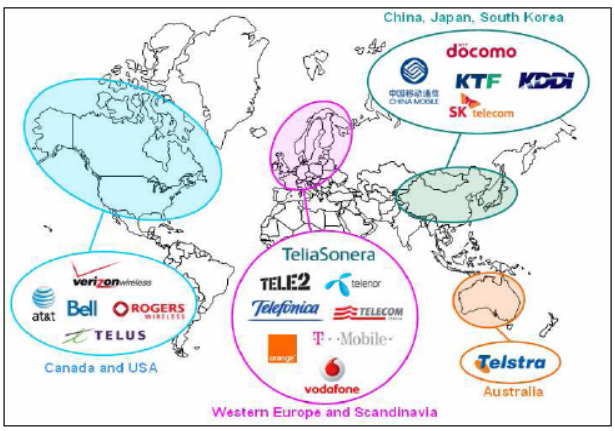
- TeliaSonera announced "commercial launch" in Stockholm in December 2009
- The forerunners of LTE deployment are NTT DoCoMo of Japan and Verizon Wireless of the USA
- A host of other big-name MNOs is committed to deploying the technology from 2011 onwards

Major operators LTE commercial deployment schedule



Source: IDATE

Geographical mapping of early LTE commercial deployment



Source: IDATE, based on operator announcements

5. Facing the « net neutrality » debate: (1) Context

Internet, a growth engine

- Applications and content run across the Internet without the consent of centralized Internet operators
- Gave birth to major successes
  - → The World Wide Web
  - → Applications that run on it such as Google, Yahoo!, social networks, VoIP, video, etc.

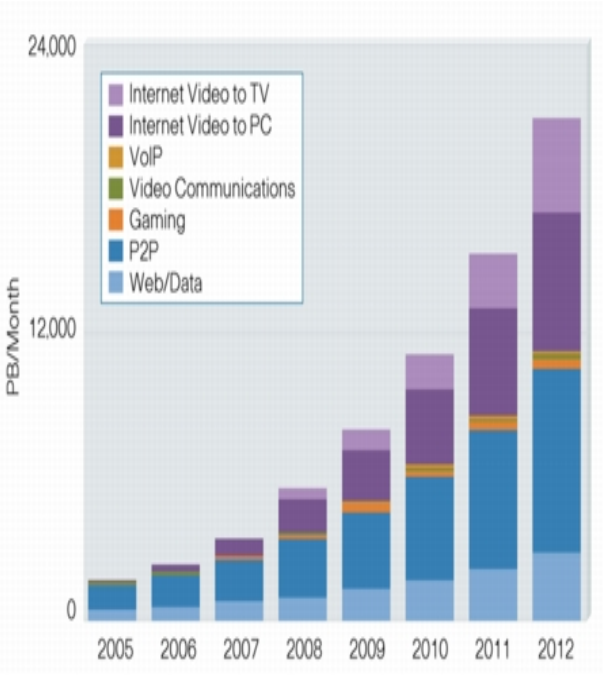
Originally based on 'best effort' delivery

- All users obtain best effort service
  - → Bit rate and delivery time depend on the current traffic load and the quality and length of the local loop
- No quality of service guaranteed ("jitter", "latency", packets lost, …)

But more and more traffic to handle

- Broadband has become a standard for Internet access at home
  - → Traffic nearly doubling every two years
- Explosion of new applications and usages with strong constraints
  - → Video services
  - → P2P
  - → Online gaming

Consumer Internet traffic forecast



Source: Cisco

5. Facing Net neutrality debate (2): the problem is …in some solutions!

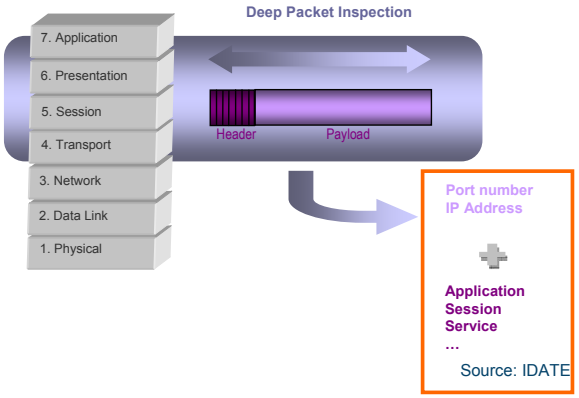
Impacts

- Infrastructure congestion
  - → Video services and P2P could congest the last mile broadband Internet access
- Traffic asymmetry
  - → Troubles on peering agreements

Possible solutions

- Investment to increase bandwidth
- Caching, CDN services, IP-VPN (based on MPLS), …
- New interconnection agreements
- Optimization of bandwidth consumption
  - →Use of **Deep Packet Inspection** (DPI) to support 'prioritization'
- Pricing …

Deep Packet Inspection



But, for the 'purist', …
'a bit is a bit is a bit' !

And network congestions can be avoided by "fatter pipe" and without dramatic boost in capital investments

5. Facing Net neutrality debate: (3) the ISPs… *as « gate-keepers »*

have ability to disavantage /avantage certain: customers, applications or web content providers…

IDATE Consulting & Research www.idate.org

- **Port blocking**
  - → Block all access to particular content providers or particular applications
- **Traffic shaping**
  - → Quality degradation : Limit the bandwidth or performance of particular applications or particular customers
- **Interconnection**
  - → Allow some content providers to interconnect close to end user (better performance, lower cost) while forcing others to interconnect at a distance (lower performance, higher cost)
  - → Refuse some types of interconnection such as peering

- **Quality of Service (QoS)**
  - →Priority and reservation approach:
  - →Use QoS to get a fee from the content providers which want offer their applications to the ISP's customers
- **Tarification**
  - → Consumer payment (speed/usage/QoS/peak hours)
  - →Application provider payment (to get access to the ISP's customers)
- **Service bundles**

→ Services (such as Internet access, voice and video services) often provided with guaranteed QoS

→ 'Switching costs' can be higher: a way to increase customer fidelity but also a way to lock him in…

… identify good and bad use of traffic management: all discriminations are not vertical foreclosure !

- We must accept **a 'weak' form of access-tiering** (but subject to "common carriage" rules)
- **Traffic optimization may be required** to avoid network congestion and guarantee QoS, but authorities should be careful to harmful and unjustified discrimination and can require **"clear justification"** and **'transparency'**
- …there is still to choose between **Antitrust action** (stopping certain anticompetitive practices) and **Regulatory practices** (integrating *ex ante* all the potential risks)

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5. Facing Net neutrality (4) …*the 'zero price' debate (no termination fee) and the Internet ecosystem as a 2 sided-markets platform*

IDATE Consulting & Research www.idate.org

→ End-users

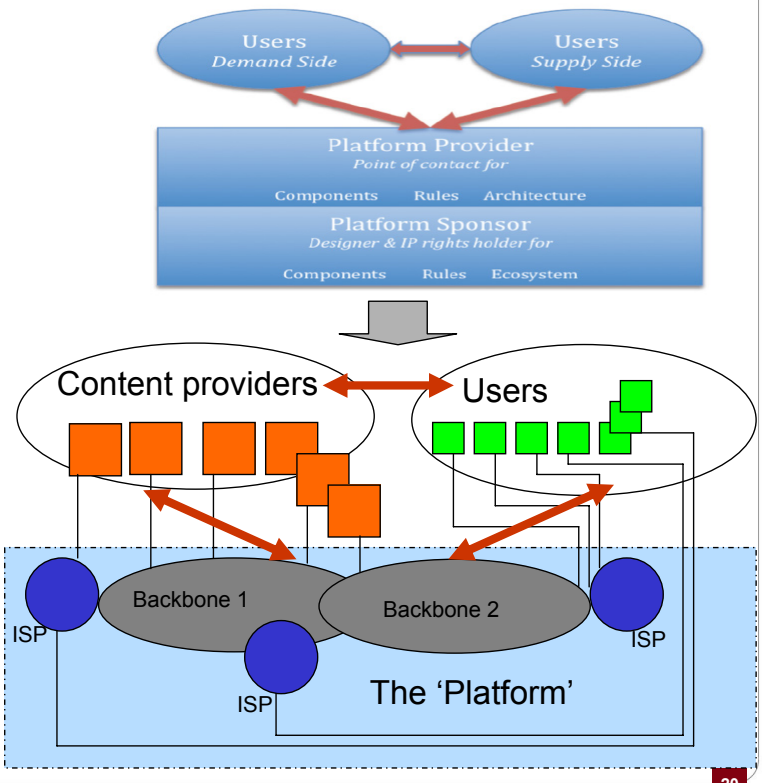
- Pay ISPs to get access to web services and applications
- Pay a monthly fee no matter how much bandwidth they use ('as you can eat')

→ Application and content providers

- Pay fees to their ISP/Internet backbone operators/CDN for connectivity
- Pay for a certain bandwidth according to their expected use

→ISPs/Telcos (the 'platform')

- ISPs and Backbones are interconnected (peering or/and transit)
- ISP may be considered as platform providers (but with a one sided pricing): the end-user is "single home" (/ one ISP), the content provider is "multi home"(/customers' ISPs); this is in contrast with classic 2 sided markets models…



20

5. Facing Net neutrality (5) Toward new borderlines between Content players and telcos…

For the telcos, the Internet Giants would be « free riders», …

But they have to take care : the future of the Internet ' Infrastructure may be based on the links and cache servers of few big content agregators…

➡ ***Cf. Tier 1: top ten 07 versus top ten 09 (Source: Atlas)***

Rank	Provider	Percentage
1	Level(3)	5.77
2	Global Crossing	4.55
3	ATT	3.35
4	Sprint	3.2
5	NTT	2.6
6	Cogent	2.77
7	Verizon	2.24
8	TeliaSonera	1.82
9	Savvis	1.35
10	AboveNet	1.23

(a) Top Ten 2007

Rank	Provider	Percentage
1	Level(3)	9.41
2	Global Crossing	5.7
3	Google	5.2
4		
5		
6	Comcast	3.12
7		
8	*Intentionally omitted*	
9		
10		

(b) Top Ten 2009

21

5. Facing Net neutrality debate: some first conclusions

1. Without fully avoiding the debate, an efficient competition in the access market should reduce the problems,
2. The strong and pure version of the NN (« a bit is a bit is… ») has to be abandonned. The full « neutrality » would justify to forget CDN offering and the strong investments made by the largest agregators to locate their servers near the telcos's subscribers…Incentives to invest and to innovate has to be preserved.
3. We must ban anticompetitive behaviour, « bad discrimination » (ie. Vertical foreclosure, …but not all forms of vertical integrations!). However, it would be strange to forbid any customers price segmentation policy, and to avoid any form of traffic management (particularly on the cellular broadband accesses).
4. Rather to act as gatekeepers asking fees to get access to their customers, the telcos should take into account the needs of the midsize content providers.
5. Be carrefull with an illimited *ex ante* regulation through a NN legislation. Implement a light-handed regulation based on the principles introduced in the new European framework, and let the antitrust give its opinion on the potential new anticompetitive behaviours which may emerge from the Internet of The Future.

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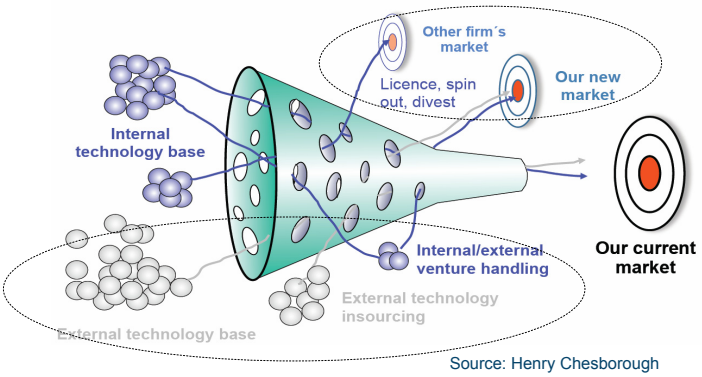
6. Telcos have to reinvent the way they address their business: ''Open Innovation'' concept strongly linked with ''Strategies of platforms »

Open Innovation major principles

- Commercialize both external and internal ideas/technologies
- Use both external and internal resources

Open Innovation



Source: Henry Chesborough

Outside-in

Detection and sourcing of external innovation and knowledge (users, academics, start-ups, employees, etc…)

Integration of external innovation for improvement of core technology

Open platforms allowing use of third party technologies and helping to generate new direct or indirect revenues

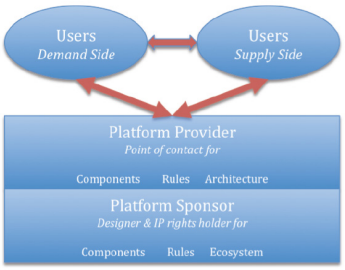
Inside-out

Finding alternative ways to monetize in-house innovations (new final markets, new business models, …), for instance through 3rd party platforms

Open APIs allowing use of its services in third party services

Platforms

Allowing interaction between different parties to generate direct and indirect revenues



6. Open Innovation & Platforms strategies: the Internet Giants

Internet Giants focus the monetization of data on a few killer apps inventory/services

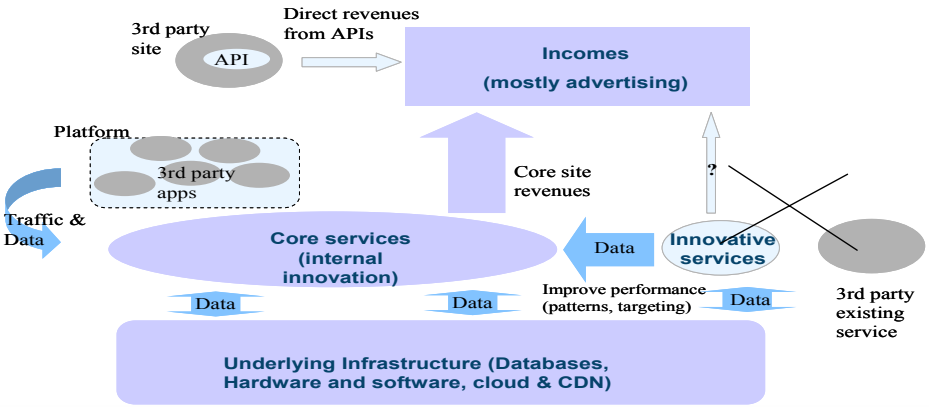
- Rely on an adapted and scalable infrastructure (mostly closed)
- Improve core services through selected acquisitions or internal closed R&D
- Find new potential customers beyond the traditional large companies

Internet Giants use open innovation to accelerate the development of inventory and income

- Get more data from user or from other websites, through platforms and APIs
- Get more direct revenues by larger exposure bringing additional traffic and audience
- Improve core services monetization through the exploitation of new data

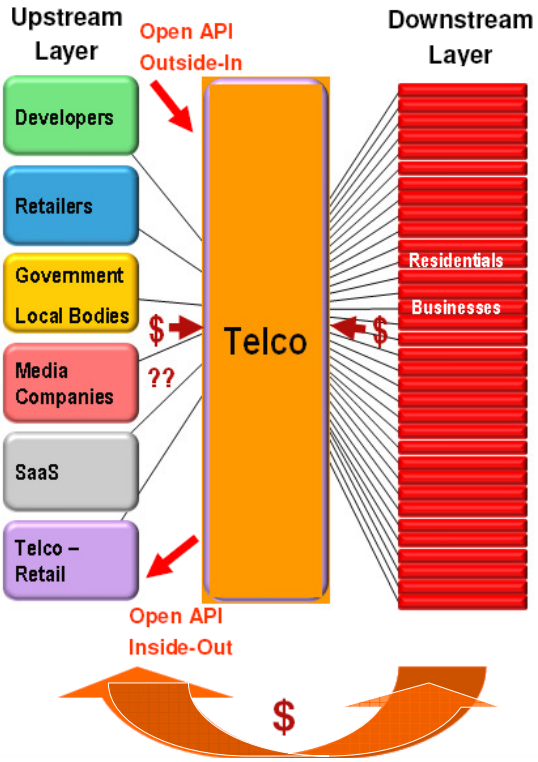
Internet Giants have therefore a huge potential of disruption

- Infrastructure as an enabler of new data-driven services
- Many innovative services have for goal to collect new data rather than being profitable on their own

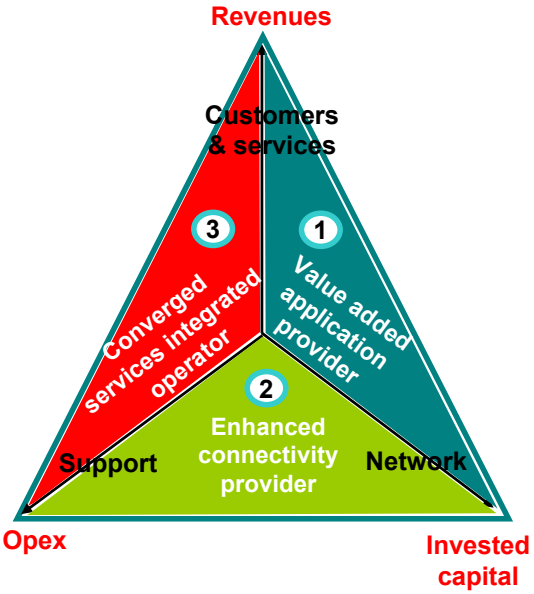


7. Telcos' futures: the 2 sided model

- The Fully integrated Telco is not really a privileged option
- Two Sided Business
  - Telco provides services to 'upstream' service providers and 'downstream' end-users by enabling them to interact via a platform operated by the Telco
  - The operator Collects revenue from either or both sides
  - Going from a "Dump Pipe" Model to a "Full Service" Model implementing a Service Delivery Platforms and Open APIs
  - Open APIs can be Outside-In (Platform aggregator) or Inside-Out (on external platforms)
- Operator will avoid Risk of disintermediation



7. Telcos' futures : Next generation carriers will achieve agility through increased specialization



Market approach	Strategic imperatives for ROIC optimization	Likely candidates
1 Value added application provider	Primarily allocating resources to the proliferation of applications targeting niches and short-lived opportunities to increase customer base and/or revenue per customer. Network no longer considered a strategic asset and outsourced to reduce invested capital base.	3, e-plus, skype
2 Enhanced connectivity provider	Maximizing utilization of best-of-breed network to enable economies of scale, at the lowest possible cost per Mb provisioned. Revenues generated from leased capacity of enhanced connectivity. End user service creation and commercialization left to 3rd party providers.	BT, kpn, iliad
3 Converged services integrated operator	Leveraging owned fixed and mobile networks to offer truly converged and seamless multimedia-rich premium services in addition to over the top content.. Incremental revenues by targeting the premium digital content opportunity and tight cost control through converged IP network architectures.	Deutsche Telekom, france telecom, Telefónica

THANK YOU

y.gassot@idate.org

Presentation 2
주제 발표 2

"The future of TV: Can it survive the digital age?"

By **Jan Dawson**
Chief Telecoms Analyst
Datamonitor

BIOGRAPHY

Jan Dawson

Jan Dawson is Ovum's Chief Telecoms Analyst, and is responsible for leading the overall Ovum Telecoms research agenda. He works closely with clients to understand their needs and how to ensure that the Ovum Telecoms team meets those needs through their research. Jan also leads the Collaborative Intelligence initiative on behalf of the Ovum Telecoms group.

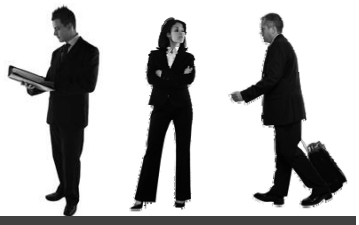
Jan joined Ovum in 2000, and has held a variety of roles since that time. He began his time at Ovum in the field of regulation, where he advised clients on interconnection and regulatory policy. He led Ovum's research on wireline carrier strategy globally. He moved to the United States in 2004, where he took on responsibility for North American enterprise coverage as well as coverage of the North American carriers. Immediately before his current role, he managed Ovum's Wholesale, Telco Operations and Regulation practices.

During his time at Ovum, Jan has spoken frequently at industry and client events and worked closely with clients. He is also frequently quoted in industry and business publications. Jan has a BA in Politics and Psychology from the University of Manchester.

Can TV survive the digital age?

Ovum Technology

Jan Dawson

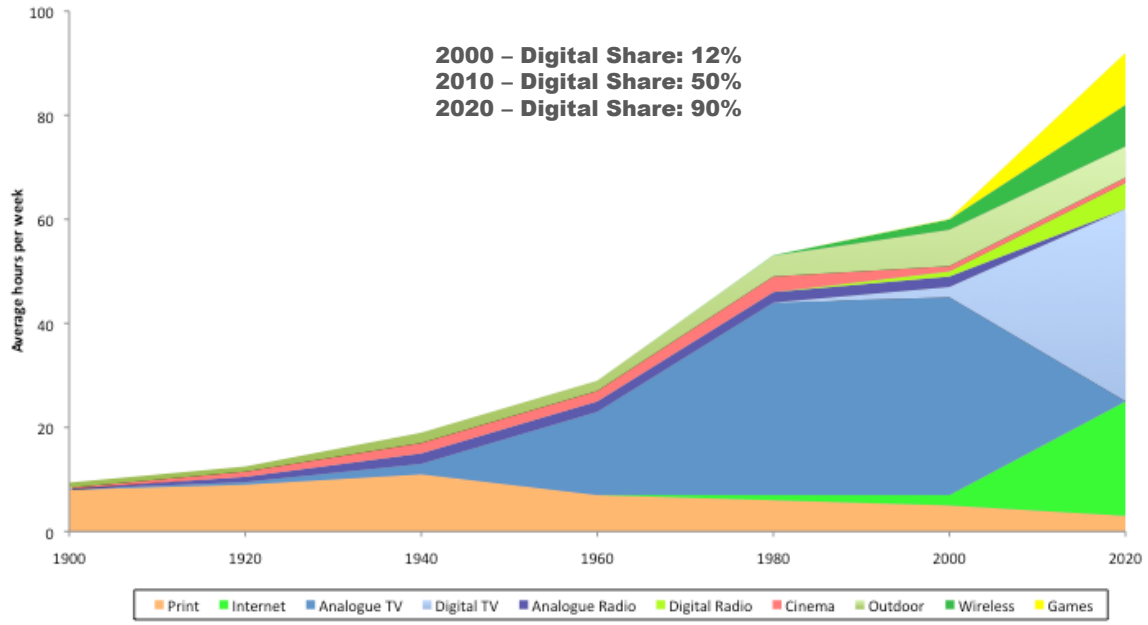


WWW.OVUM.COM

5.1 hours

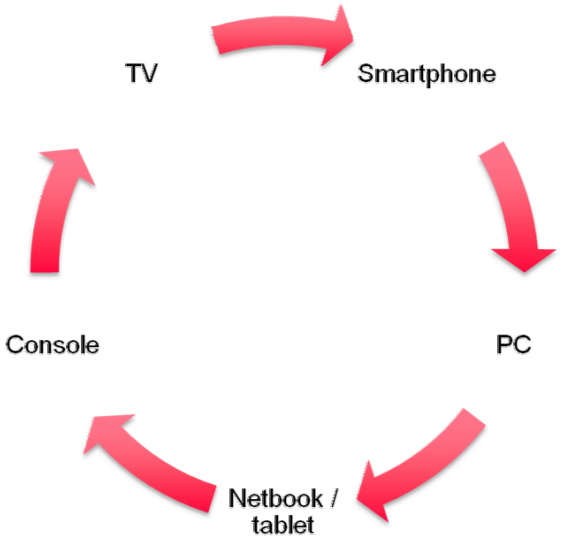
US TV viewing is at an all time high

Global media consumption is growing because the web is not zero sum



WWW.OVUM.COM

New devices creating new scope for media penetration at home, at work and in between



But the web is changing audience behavior and how programmers and advertisers think about TV

- The #1 activity people used to engage in while watching TV was eating. It is now surfing the net
- Facebook and Google own 40% of all US dwell time on the internet
- The TV industry no longer has a oligopoly on the sofa

The shift to digital is also changing the value chain

- Linear to on-demand, personalized and targeted
- New distribution channels, more consumer choice, fragmentation
- Advertising is served against behavior – not just context

Disruption and volatility is creating an economic crisis in broadcast

- Polarization of content production – value clusters around few assets
- Uncertain investment outlook for IT and production technology spend
- Untested convergence models for network infrastructure, channel and content production with high execution risk

Aggressive new entrants with engineering and web heritage that own pivot points in the market

Google™

facebook

Can the broadcasters survive the transition to digital? Yes if...

- They continue to invest and secure content to differentiate their controlled channel experiences
- They keep the browser off the TV where Google rules and the price of information tends to zero
- They build controlled content distribution channels and distribution platforms that allow them to follow their audiences on to non-TV screens and retain audiences ownership

Next generation broadcaster technology strategy has to deliver:

a) Production and distribute content across multiple platforms

b) Own the video audience customer identity

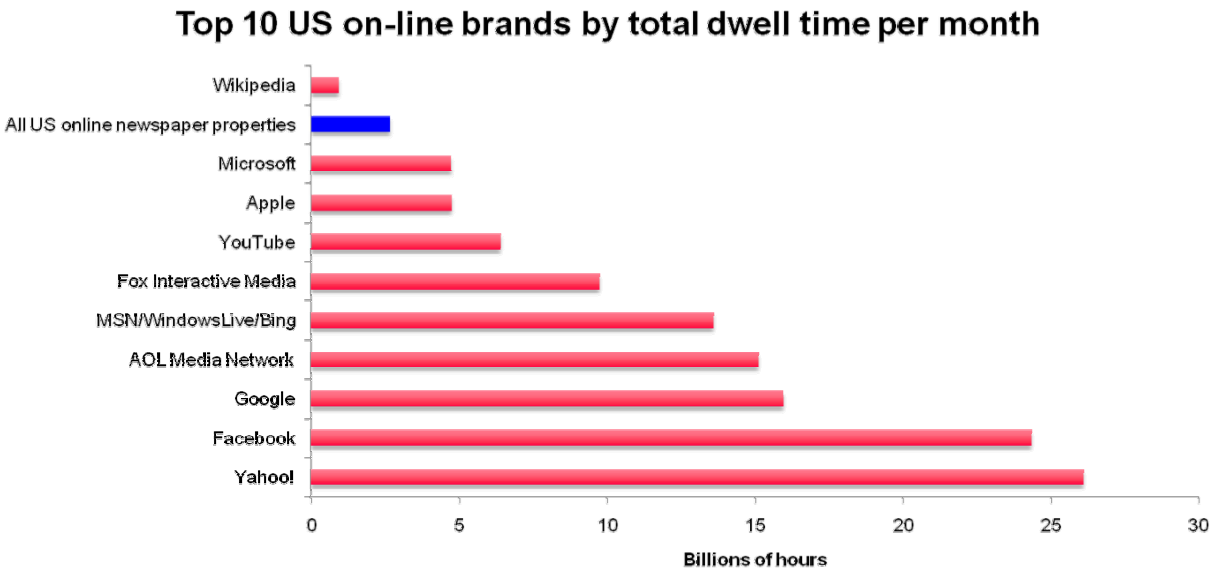
c) Own the advertising exchange

d) Aggregate content from multiple sources and remain the primary channel choice for video

Execution challenges

- This is technically difficult
- Not their core organizational or engineering competency
- Expensive
- Requires restructuring of existing media ownership and competition regulation that precludes co-operation or consolidation

The price of failure



The final question – can TV survive the transition to digital?

Presentation 3
주제 발표 3

"Evolutionary Dynamics of Broadband Convergence: The Case of Korea"

By **Suk-Gwon Chang**
President
Korea Association of Telecommunications Policies

BIOGRAPHY

Suk-Gwon Chang

Suk-Gwon Chang is currently the president of Korea Association of Telecommunications Policies, and a professor of MIS and Telecommunications at the School of Business, Hanyang University, Korea. He got his Ph.D in management science from KAIST in 1984. During last twenty five years, he has initiated many academy-industry collaborations actively. He founded research forums in the areas of telecommunications management, IT strategies and digital convergence policies, and coauthored two books, *Internet Industry Analysis* (HYU Press, 2002) and *Digital Convergence Strategy* (Kyobo Book, 2005). He also published numerous academic papers in *IEEE Transactions on Communications*, *Telecommunication Systems*, *Telecommunications Policy*, *Information Economics and Policy*, *Operations Research*, *Decision Support Systems*, *Journal of Knowledge Management*, etc and more than 35 research reports.

Suk-Gwon Chang has served as editor-in-chief and associate editor in many academic journals including *Telecommunication Systems*, *Korean Telecommunication Policy Review*, *Journal of the KORMS society*, *Telecommunications Review*, and *Journal of the MIS Research*. He founded in 2004 *Digital Convergence Research*, a non-profit research institute which specializes in digital ecosystem researches on ICT policy and strategies, and has consulted World Economic Forum, Ministry of Information and Communication (MIC), Korean Communications Commission (KCC) and many telecom, IT and media companies.

His research interest is focused on national ICT policy, socio-economic justification of ICT investments, IT-based competition strategy, digital convergence business models and digital ecosystem strategies. He serves now as the president of the Korea Association for Telecommunications Policies.

Evolutionary Dynamics of Broadband Convergence: The Case of Korea

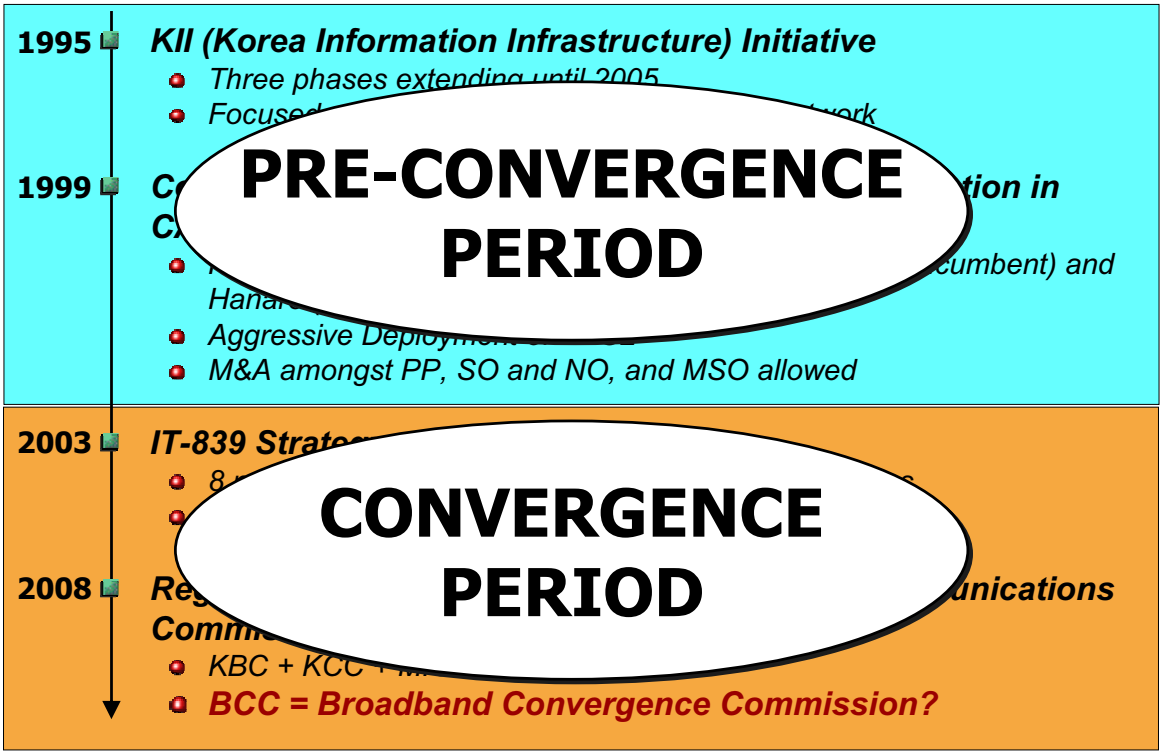
Suk-Gwon Chang
Professor, Hanyang University
President, KATP
changsg@hanyang.ac.kr

April 30, 2010

KISDI 25th Anniversary-Celebrating Seminar

1

Broadband Policies of Korea since 1995



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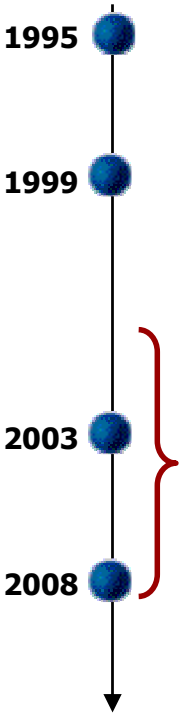
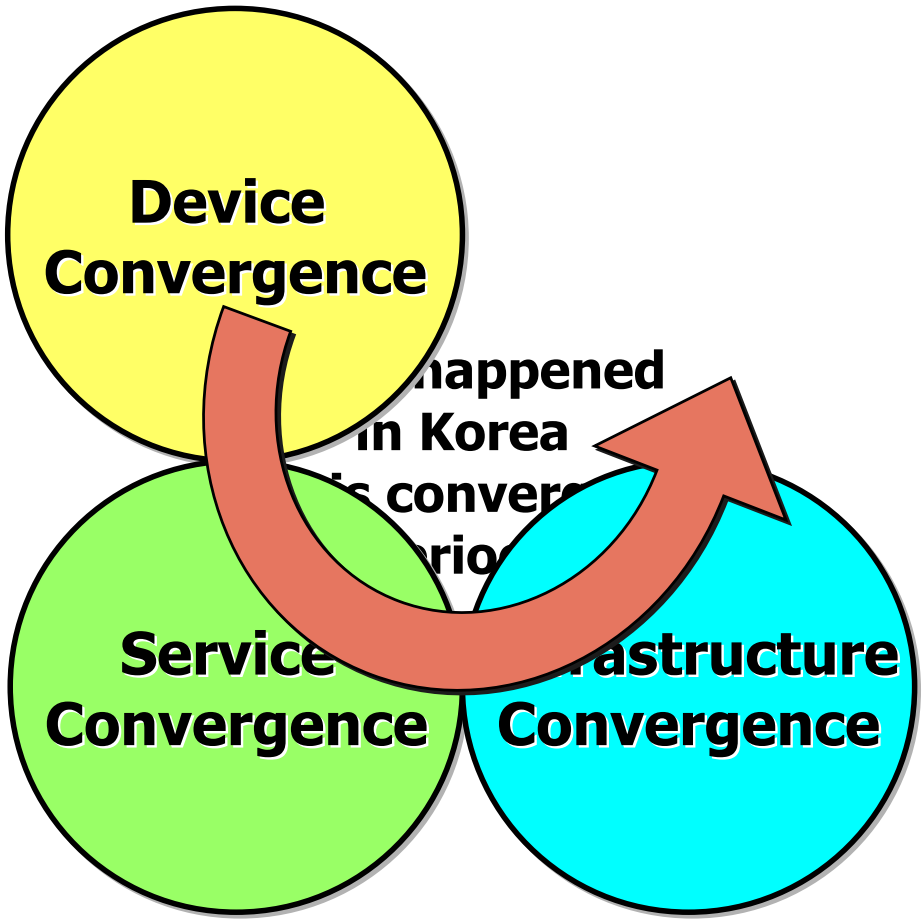


What happened in Korea in this convergence period?

3



4

Device Convergence by Samsung 2001~ (1)

Device Convergence

- ***The Origin of Convergence Concept (2002)***

- Integrated A/V Receiver
- Integrated DVD Player
- Integrated Digital Amplifier

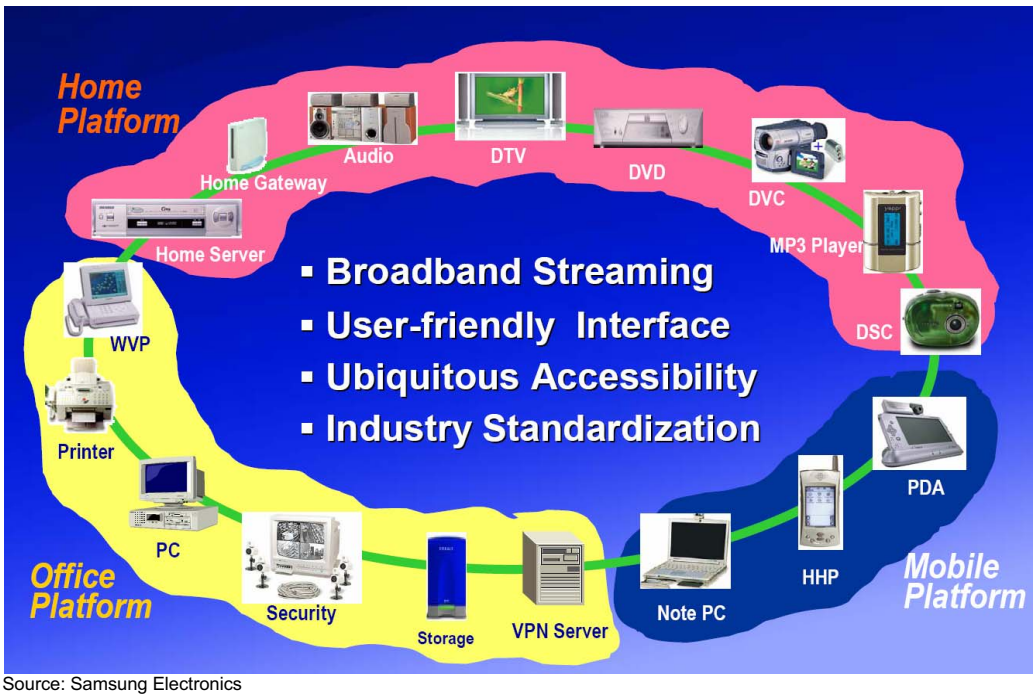
Entertainment Systems Converging into a Single Convenient Form Factor

Source: Samsung Electronics

Device Convergence by Samsung 2001~ (2)

Device Convergence

- ***Seamless Digital Network Concept (2002)***



Source: Samsung Electronics

Device Convergence by Samsung 2001~ (3)

Device Convergence

Device Convergence Concept (2002)

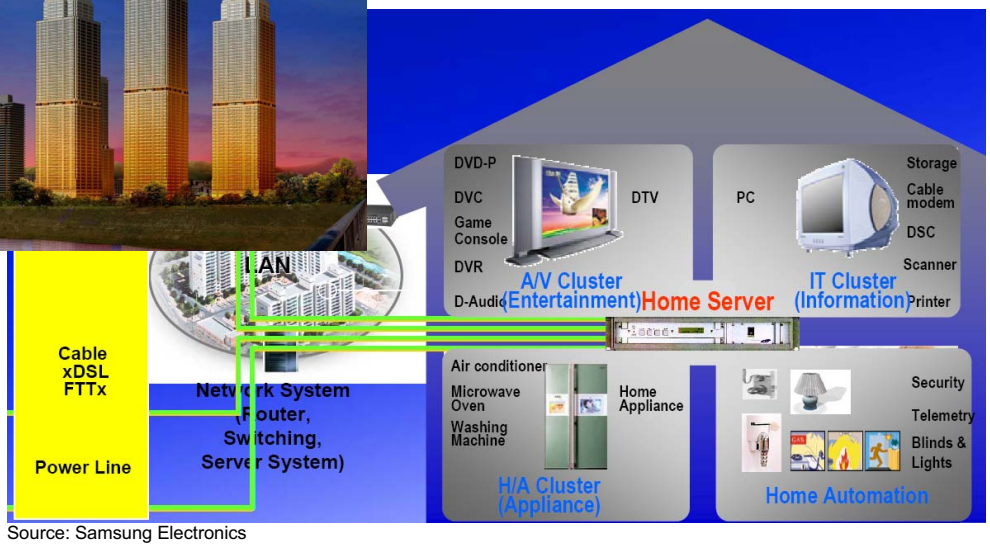
Source: Samsung Electronics

Device Convergence by Samsung 2001~ (4)

Device Convergence

Digital Home Network Concept (2002)

- *The First Home Network-Ready Apartments*
- *High-end Apt with Established Home Network*
- *Equipped with Total Integration Capability*
- *Security, Remote Home Appliance Control, Home Theater, etc*

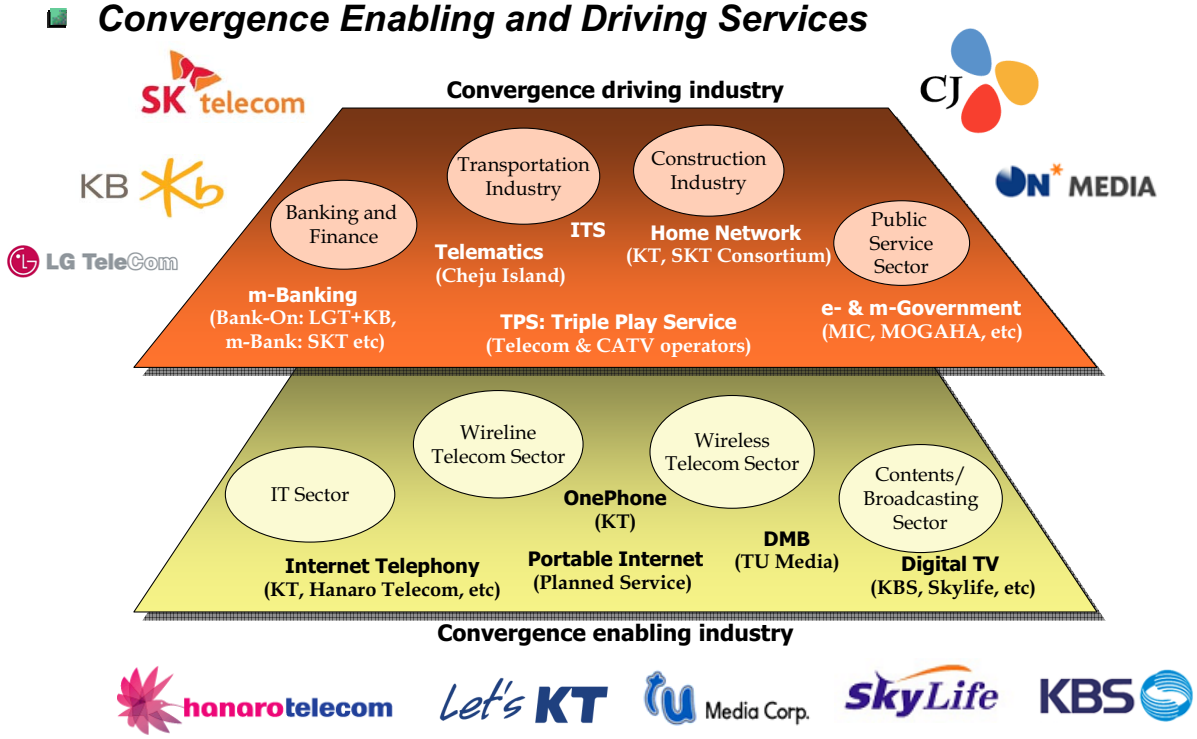


Source: Samsung Electronics

Service Convergence by Telcos 2003~ (1)

Service Convergence

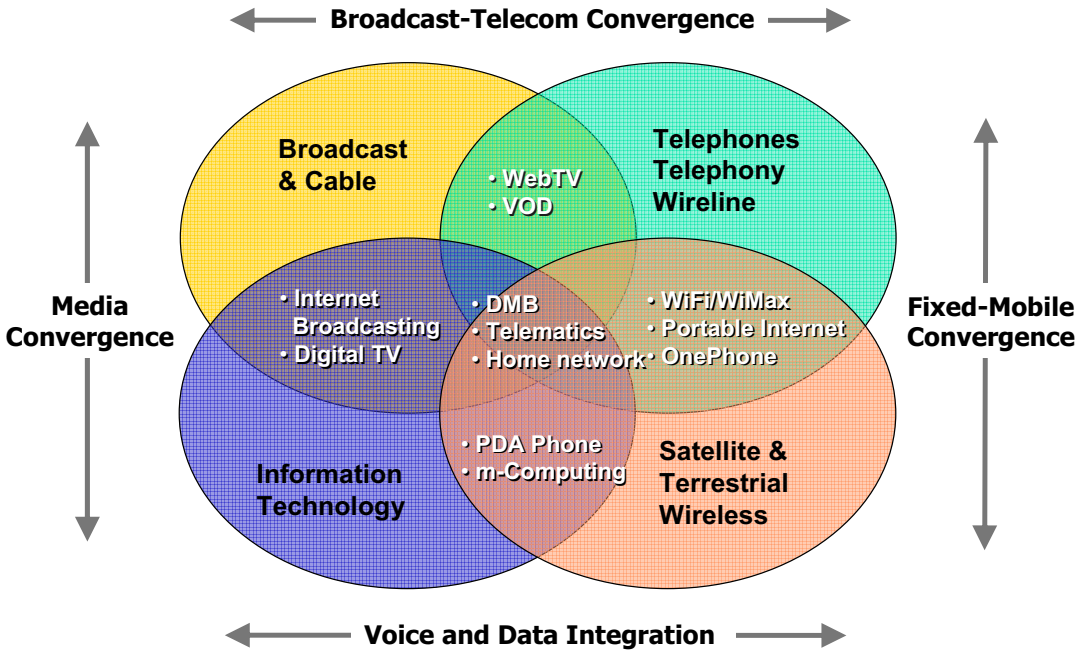
Convergence Enabling and Driving Services



Service Convergence by Telcos 2003~ (1)

Service Convergence

Convergence Service Trials



Service Convergence by Telcos 2003~ (3)

Service Convergence

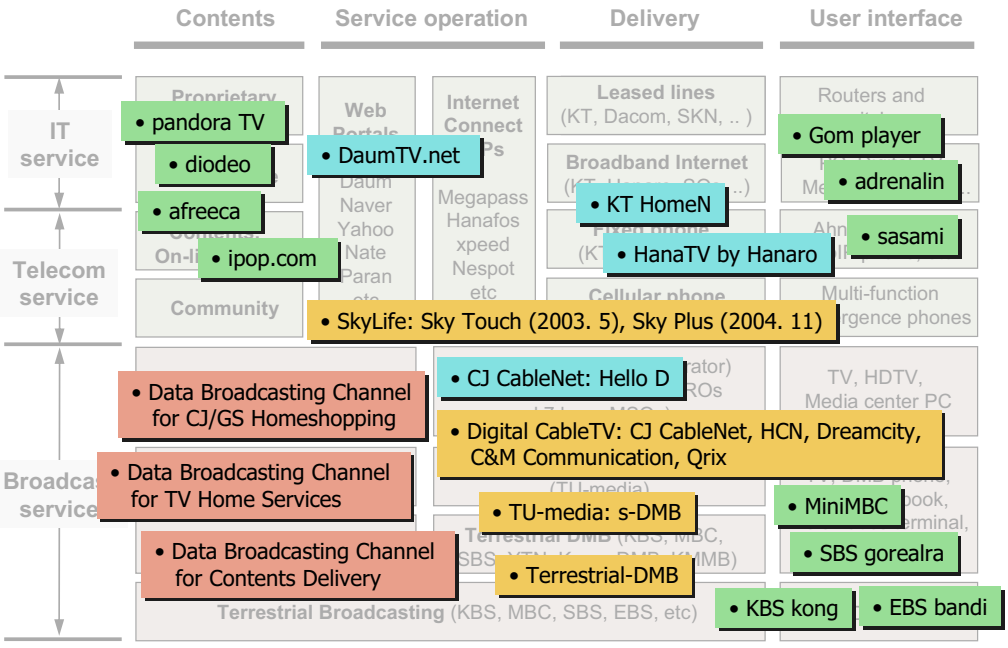
Convergence Industry Landscapes

	Contents	Service operation		Delivery	User interface
IT service	Proprietary sites	Web Portals Daum Naver Yahoo Nate Paran etc	Internet Connect ISPs Megapass Hanafos xpeed Nespot etc	**Leased lines** (KT, Dacom, SKN, ..)	Routers and switches
IT service	e-Commerce			**Broadband Internet** (KT, Hanaro, SOs, ..)	PC, Digital TV, Media center PC, ..
Telecom service	Contents, On-line game			**Fixed phone** (KT, Hanaro, etc)	Ahn/One phone, VoIP phone, etc
Telecom service	Community			**Cellular phone** (SKT, KTF, LGT, etc)	Multi-function convergence phones
Broadcast service	**PPs for CATV** (178 PPs with 9 large MPPs)		**CATV SO, RO** (Relay Operator) **and MSO** (119 SOs, 188 ROs and 7 large MSOs)		TV, HDTV, Media center PC
Broadcast service	**PPs for s-DMB** (9 video, 25 audio channels)		**Satellite-DMB** (TU-media)		TV, DMB phone, PDA, Notebook, Telematics terminal, Web pad, etc
Broadcast service	**PPs for t-DMB**		**Terrestrial DMB** (KBS, MBC, SBS, YTN, Korea DMB, KMMB)		
Broadcast service	**Terrestrial Broadcasting** (KBS, MBC, SBS, EBS, etc)				TV, Digital TV

Service Convergence by Telcos 2003~ (3)

Service Convergence

Convergence Industry Landscapes



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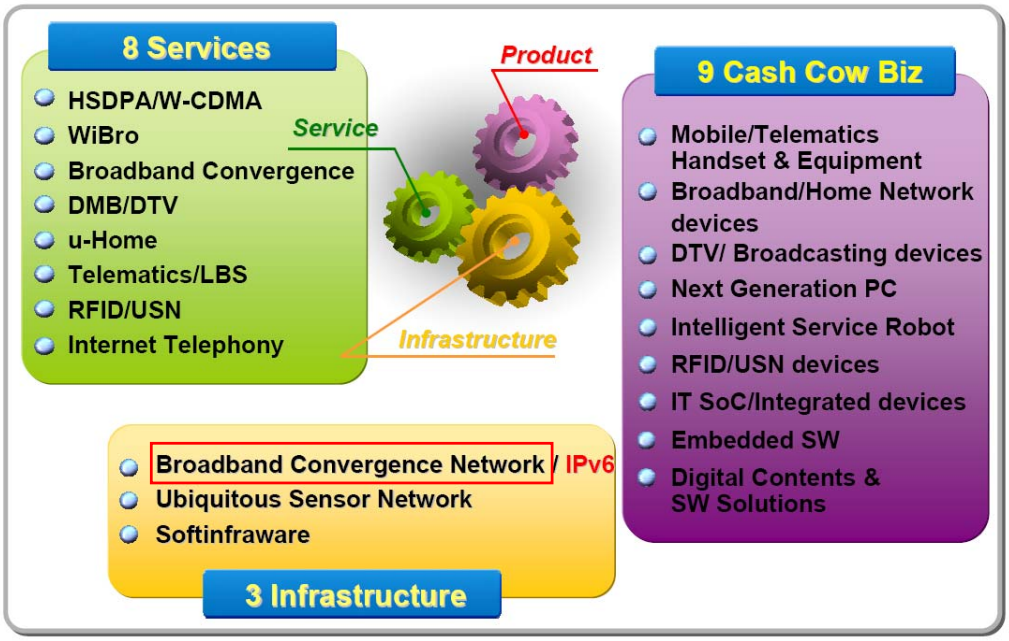
Infrastructure Convergence 2005~ (1)

Infrastructure Convergence

- *Implementing BcN-based IT-839 Strategies (2005~)*



Infrastructure Convergence 2005~ (2)

Infrastructure Convergence

- *Basic Concept of BcN (2005~)*

BcN (Broadband Convergence Network)

Access speed of 50~100 Mbps with QoS, enhanced security and IPv6 support by 2010

Telecom Network	Broadcasting Network	Broadband Internet
PSTN/PLMN	Terrestrial/Satellite/CATV	xDSL/FTTH/HFC

Infrastructure Convergence 2005~ (3)

Infrastructure Convergence

Four BcN Consortia for Service Trials

- **Octave Consortium: KT, KTF, Bridgetec, Directmedia, etc**
- *Test-bed: 600 subscribers across 3 cities*
- *Focused services: Fixed Mobile Convergence (FMC) services, W-CDMA-based video, Mega-TV (IP-TV), and u-Work services*

- **UbiNet Consortium: SKT, Hanaro, etc**
- *Test-bed: 600 subscribers across 3 cities*
- *Focused services: HSDPA/WiBro-based FMC services, Hana-TV (IP-TV), QPS, USN applications (RFID, WPAN), etc*

- **Kwanggaeto Consortium: LG Dacom, etc**
- *Test-bed: 350 subscribers in 5 areas*
- *Focused services: myLG070 (VoIP service), WiFi-CDMA interoperable service to FMC services, TV portal & HD-VoD, etc*

- **Cable BcN Consortium: Suwon Cable, etc**
- *Test-bed: 700 subscribers across 7 areas*
- *Focused services: HD T-Commerce, T-Entertainment, T-Banking 200Mbps Cable Internet, TPS over HFC, etc*

Infrastructure Convergence 2005~ (4)

Infrastructure Convergence

BcN-based Services Developed

- ***Over 25 categories of new service models including Internet TV, Video Phone, u-Work, TV-learning***
  - ***14 Commercialized Services: Hana TV, Mega TV, MyLG070, C&M DV***
- ***Interoperable video phone between fixed and mobile networks***

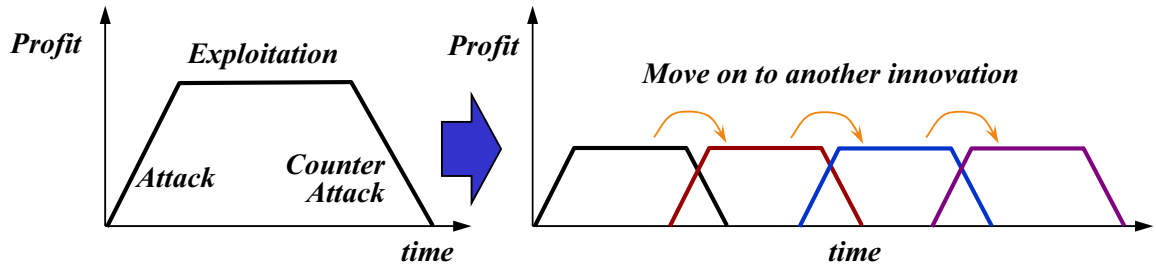
What drives them to happen?

17

Hyper-competition View of Convergence

- **Convergence is a Kind of Hyper-competition Process.**
  - Hyper-competition = Dynamic Strategic Interaction

- **A Dynamic View to Hyper-competition.***



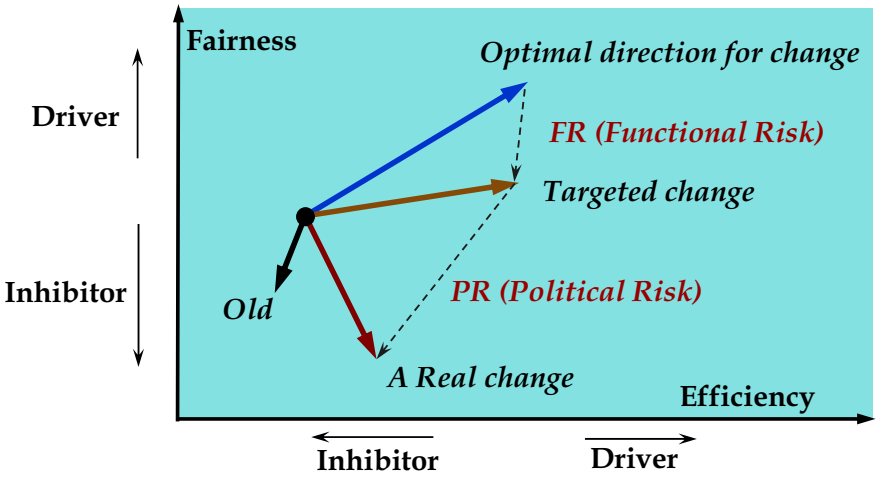
- **Implications**
  - Every advantage is eroded
  - Sustaining advantage can be a deadly distraction
  - The goal is disruption, not sustaining advantage
  - Seizing the initiative with a series of small steps

* R. A. D'Aveni, Hypercompetition: Managing the Dynamics of Strategic Maneuvering, The Free Press, 1994.

18

Change Management View of Convergence

Convergence is a Kind of Change Process.



- **Conditions for a successful change**
  - **Small functional risk**
  - **Small political risk**
  - **Small friction**

Stage Model View of Convergence

Convergence Is a Kind of Evolution Process !

- **Stage 4: What's Next? (2008~)**
  - *Driven by whom?*
  - *What kind of services and applications?*
- **Stage 3: Infrastructure Convergence (2005~)**
  - *Driven by BcN consortia like Octave, UbiNet, etc*
  - *FMC services, W-CDMA video, IP-TV, u-Work, TPS/QPS, USN applications, T-Commerce/Banking, T-Entertainment*
- **Stage 2: Service Convergence (2003~)**
  - *Driven by large telcos like KT, SKT, KTF, LGT, MSOs, . . .*
  - *OnePhone, DMB, telematics, m-Banking, ITS, web-TV, media player, data broadcasting, etc*
- **Stage 1: Device Convergence (2001~)**
  - *Initiated by device manufacturer/system vendors like Samsung, LGE, etc*
  - *DVD/VCR combo, multifunction terminals, digital home appliances and networks*

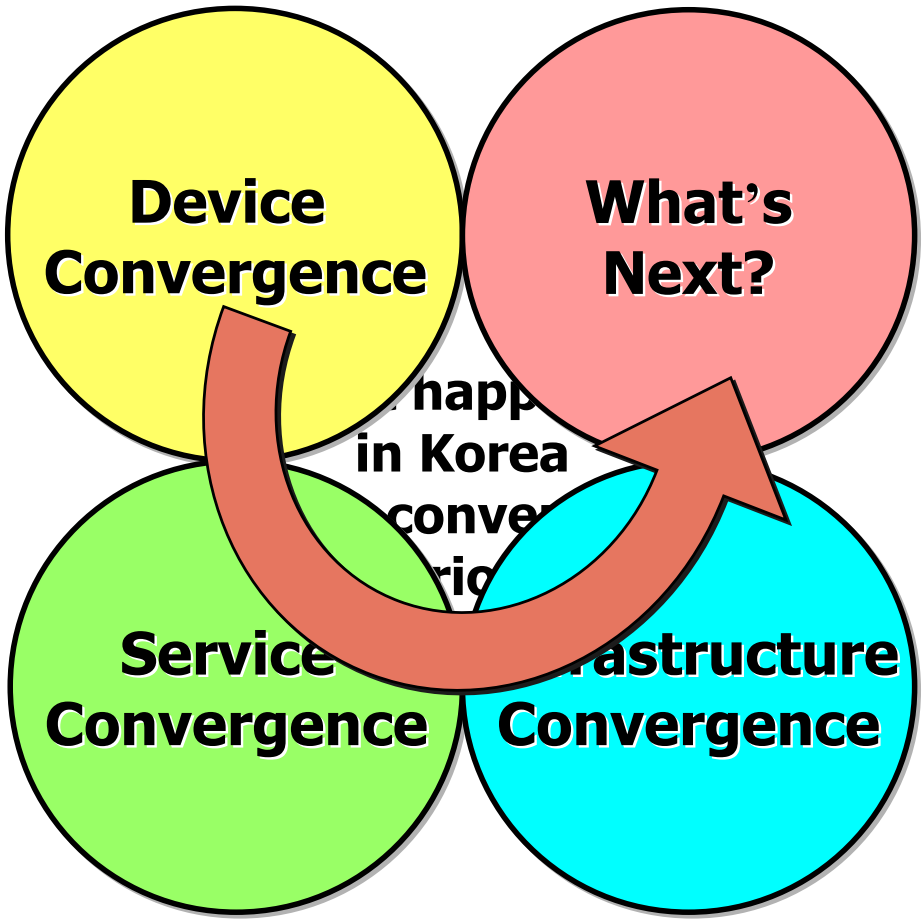
Increasing Complexity

Time

Dynamic Market Interactions

Stage	1: Device Convergence	2: Service Convergence	3: Infrastructure Convergence
Focus	• Cost/Quality	• Timing/Knowhow	• Strongholds
Target	• Cost reduction • Premium price	• Novelty • Synergy	• Oligopoly • Entry barrier
Attack	• Creative combination	• Becoming 'First' • Service creation	• Strategic alliance • Merger & Acquisitions
Exploitation	• Cost leadership • Differentiation • Focus	• First mover advantage • Customer lock-in	• Monopolistic rent • Market power
Challenges	• High quality/low priced goods abound	• Imitation • Retaliation • Coalition of followers	• Market saturation • Decreasing profitability • Mannerism

21



22

What will happen in Korea in the years to come?

Convergence vs. Innovation

What's Next?

- *Convergence Is a Consecutive Process of Innovations !*

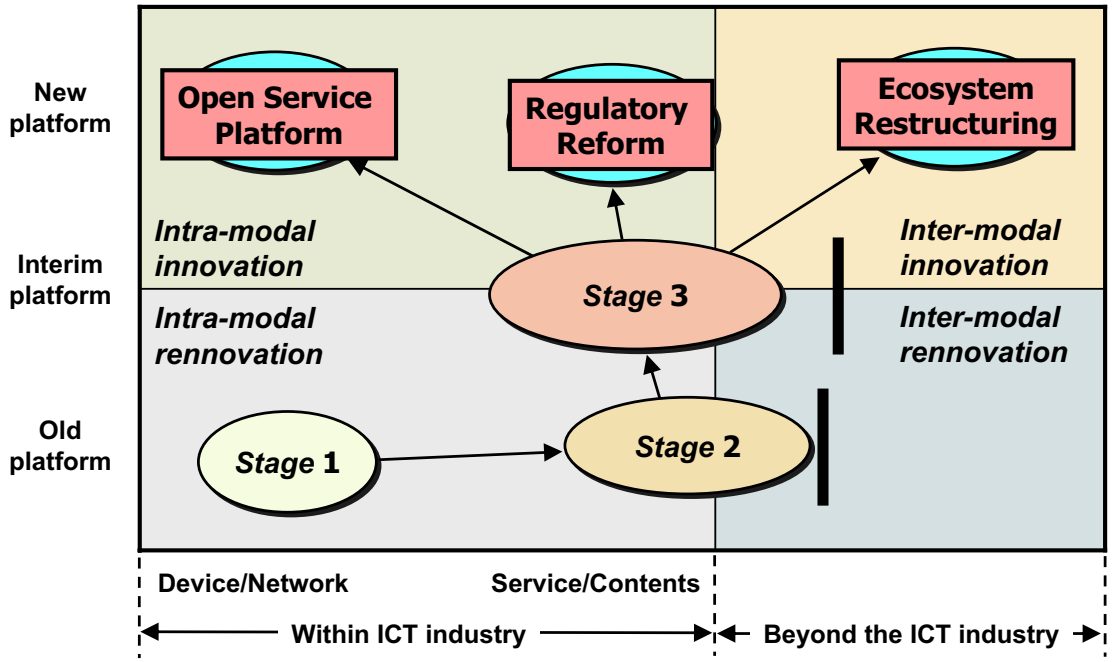
Past → Today → Future

	Mode of Attack	Type of Innovation	Strategies	Examples
Stage 1	Combination	Device Innovation	Product Extension	Combo
Stage 2	Creation	Service Innovation	Business Extension	DMB
Stage 3	Cooperation	Infrastructure Innovation	Co-opetition Strategic Alliances	BcN
Stage 4	Political Risk Reduction	Market Innovation	Regulatory Reform	KCC
Stage 4′	Functional Risk Reduction	Platform Innovation	Open Service Platform with Diverse Interfaces	Sensor BINT
Stage 4″	Architectural Risk Reduction	Industry Innovation	Ecosystem Restructuring	IT-Non IT

Next Evolution Paths?

What's Next?

Future Convergence – Which Way to Go?



Innovation #1: Regulatory Reform

What's Next?

Telecom and Broadcasting are Merged into Communications.

KOREAN BROADCASTING COMMISSION → 방송통신위원회 KOREA COMMUNICATIONS COMMISSION ← mc

Korean Communications Commission (KCC)

Innovation #1: Regulatory Reform

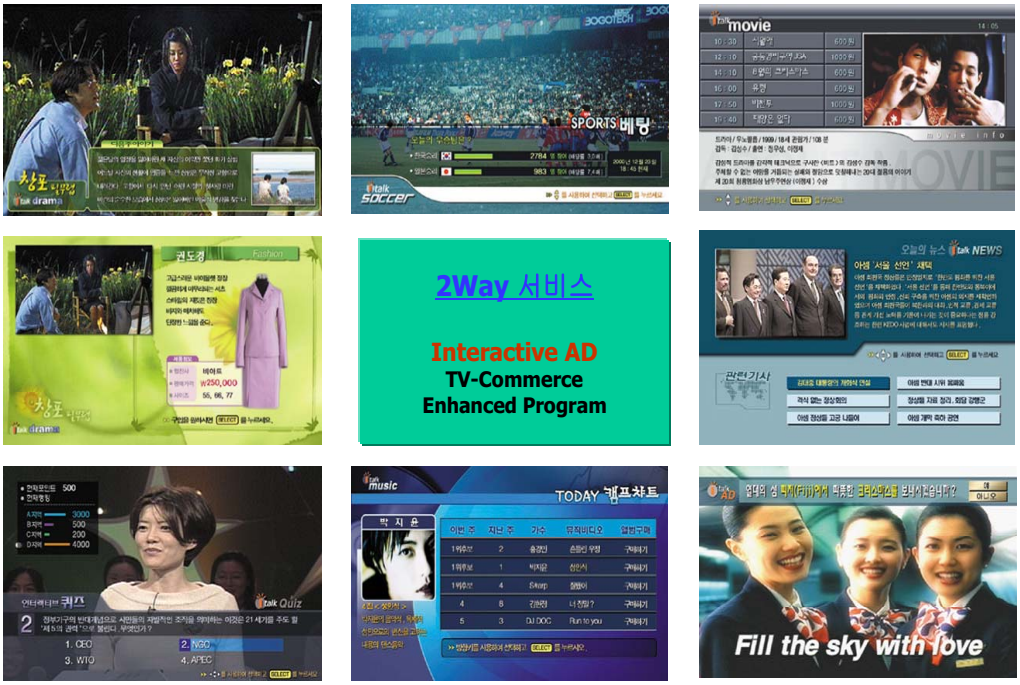
What's Next?

- *TV Portal, IP-TV, T-Commerce and Beyond*

Innovation #1: Regulatory Reform

What's Next?

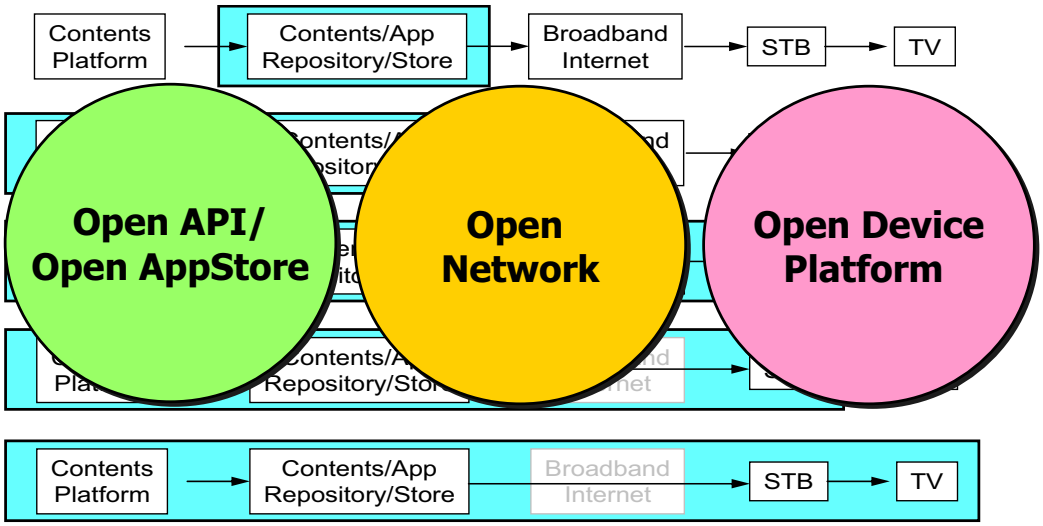
- *TV Portal, IP-TV, T-Commerce and Beyond*



Innovation #2: Open Service Platform

What's Next?

- *Open Service Platform is Pursued to Resolve the Lack of Compatibility among Convergence Services and to Accelerate the Deployment of Convergence Applications.*

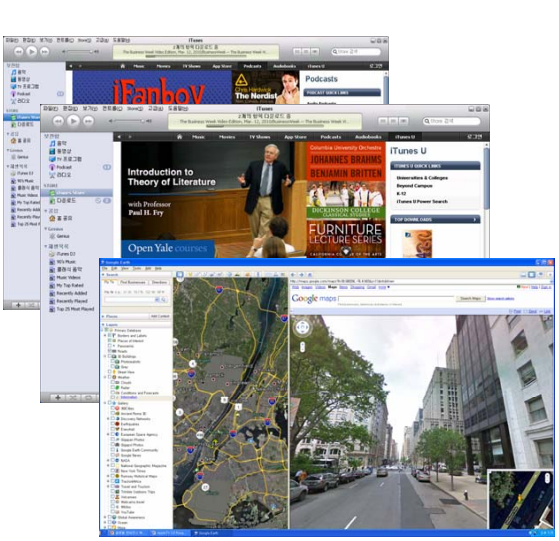


Innovation #2: Open Service Platform

What's Next?

- *Open IP-TV Ecosystem*

Contents Platform → Contents/App Repository/Store → Broadband Internet → STB → TV



Innovation #3: Ecosystem Restructuring

What's Next?

- ***Tight Coupling between IT Area and Non-IT Area is Pursued to Develop New Markets and to Attain Total Factor Productivity Enhancements.***

- ***New Architecture***

		IT Area	Non-IT Area
Layer 3	Ecosystem Living	u-Home, u-Office, u-City	u-Life, u-Health, u-Entertainment
Layer 2	Ecosystem Service	IT Convergence Service Platform	Manufacturing, Logistics, Banking, Education, etc
Layer 1	Ecosystem Technology	Digital Ecosystem Infra HiPOP*	Road, Park, Theater, Thema Park, etc

* HiPOP: High Performance Open Platform
Suk-Gwon Chang, "IT 3.0 Policy Vision and Digital Platform-based Growth", IT 3.0 Symposium, 2007. 11. 1.

Innovation #3: Ecosystem Restructuring

What's Next?

- ***New IT Vision by MKE***

Collaborative and Productive Digital Ecosystem

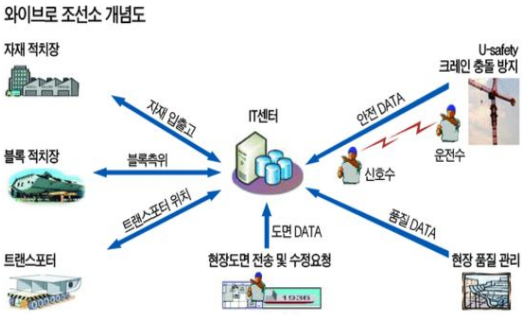
IT - Non-IT Fusion and Convergence

Ministry of Knowledge Economy
Source: Myung-Gi Lee, New IT Forum Presentation Material, 2008. 9. 25.

Innovation #3: Ecosystem Restructuring

What's Next?

- ***WiBro in Ship Building Plant***



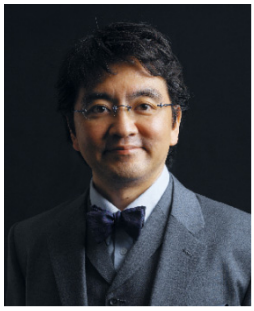
Thank you!

Presentation 4
주제 발표 4

"Beyond Digital Convergence"

By **Ichiya Nakamura**
Executive Director
You Go Lab

BIOGRAPHY

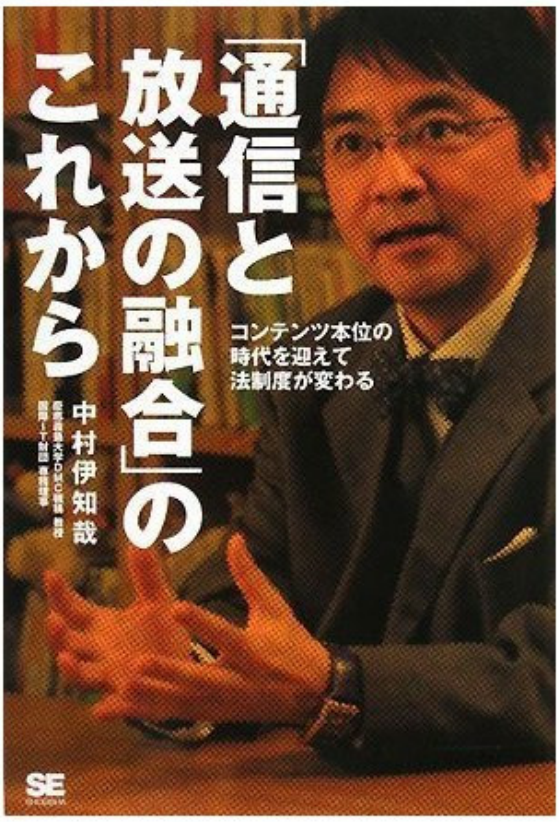


Ichiya Nakamura

Professor of Keio University Graduate School of Media Design
Ph.D in Media and Governance

He is currently a professor of Keio University Graduate School of Media Design. He also serves as a committee member of Japanese government including Chairman of Content WG of Intellectual Property Head Office, Expert of Communication Council and Culture Council. He is known as President of You Go Lab, Digital Signage Consortium, IPDC Forum, AMIO Forum, Vice President of CANVAS, Director of mixi corp., etc. He was Executive Director at the Stanford Japan Center (2002-2006), Visiting Professor at the MIT Media Laboratory (1998-2002), and a policy maker at the Ministry of Posts and Telecommunications Japan (1984-1998). Prior to joining the government, he was a producer of a rock band "Shonen Knife".

Beyond Digital Convergence



Tomorrow of media convergence 2008

TV Program

Web Content

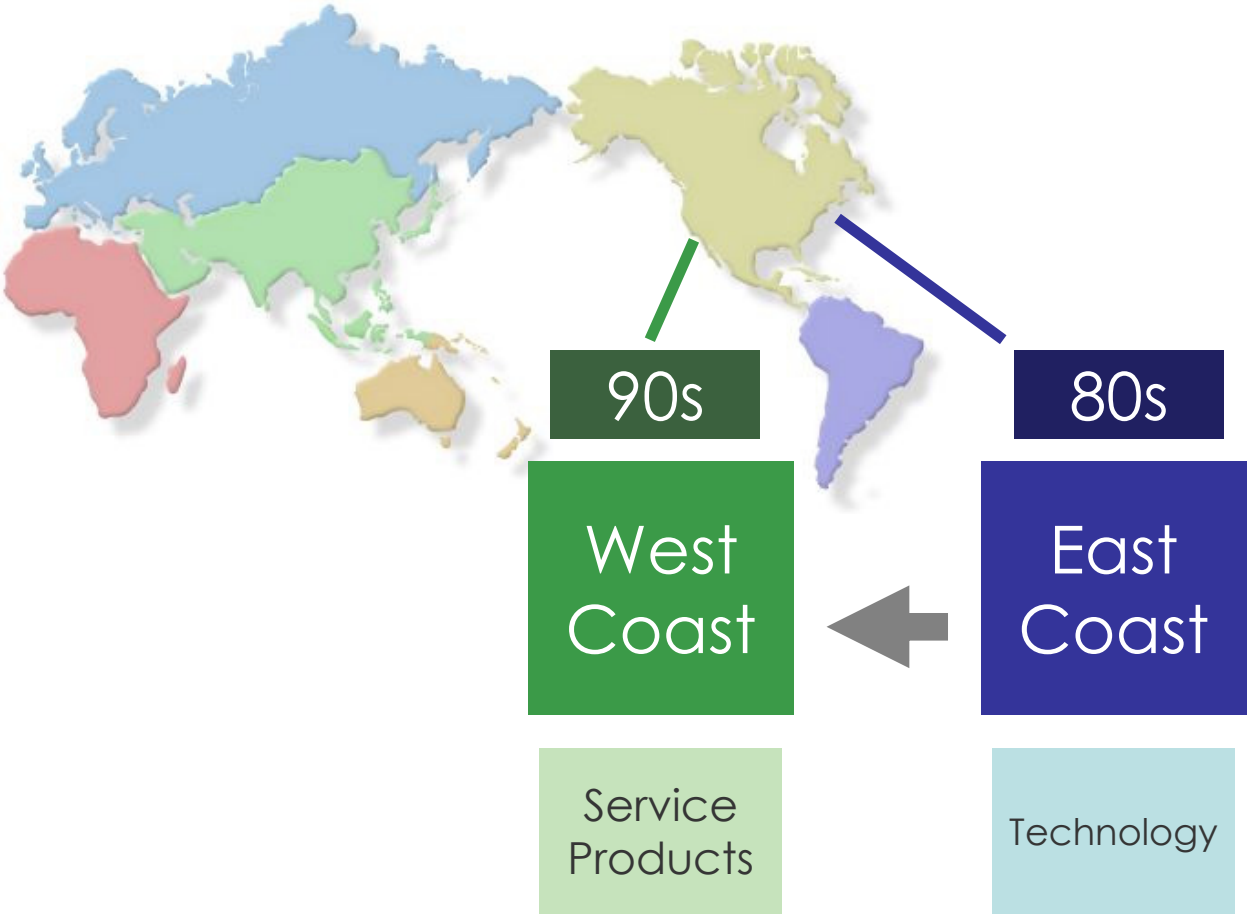
Broad casting Network

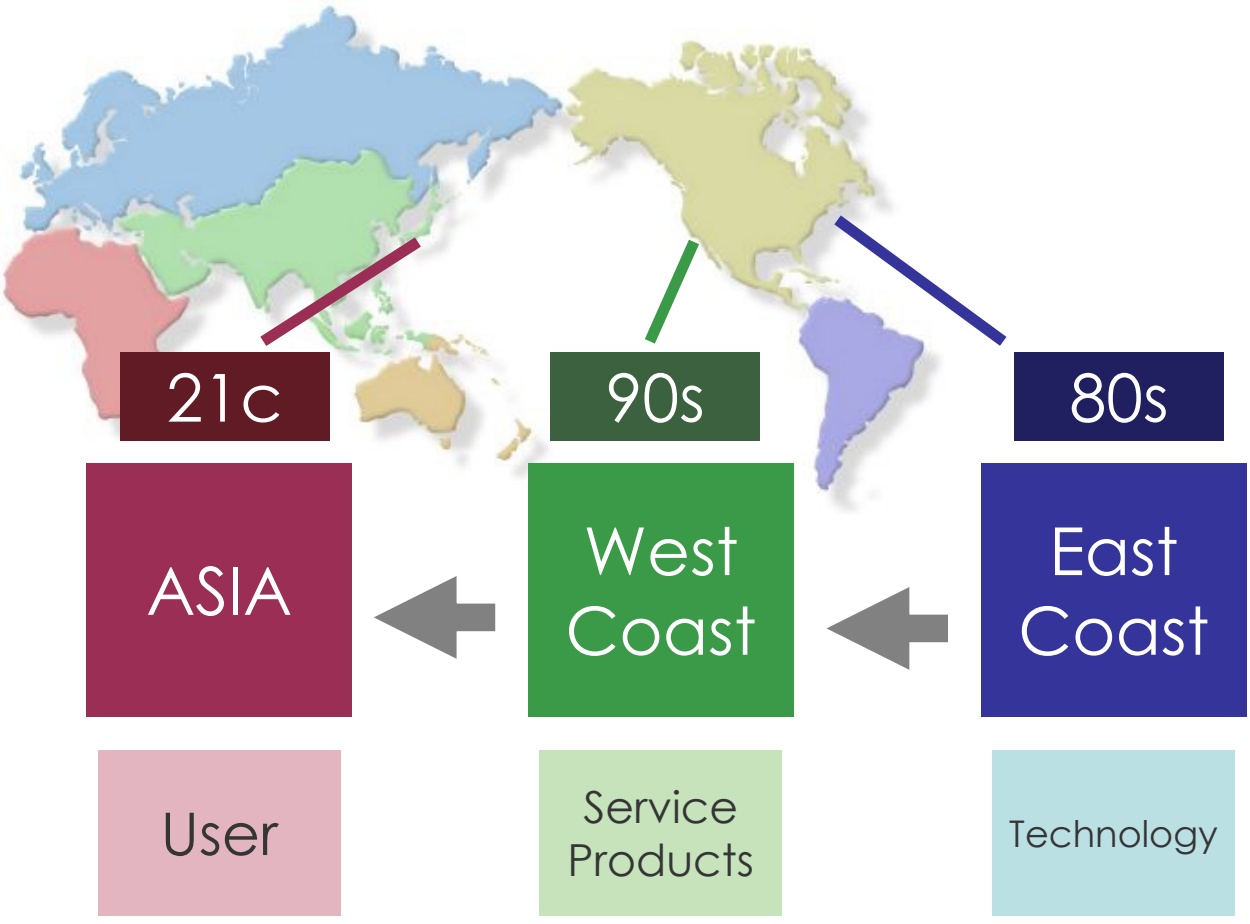
Telecom Network

80s

East Coast

Technology


90s
80s
West Coast
East Coast
Service Products
Technology


21c
90s
80s
ASIA
West Coast
East Coast
User
Service Products
Technology

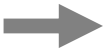

i-modeケータイを使って、
物語を作成します。


物語を日本とフランスで
交換し合います。


こどもたちは、楽しく
物語を作成しました。

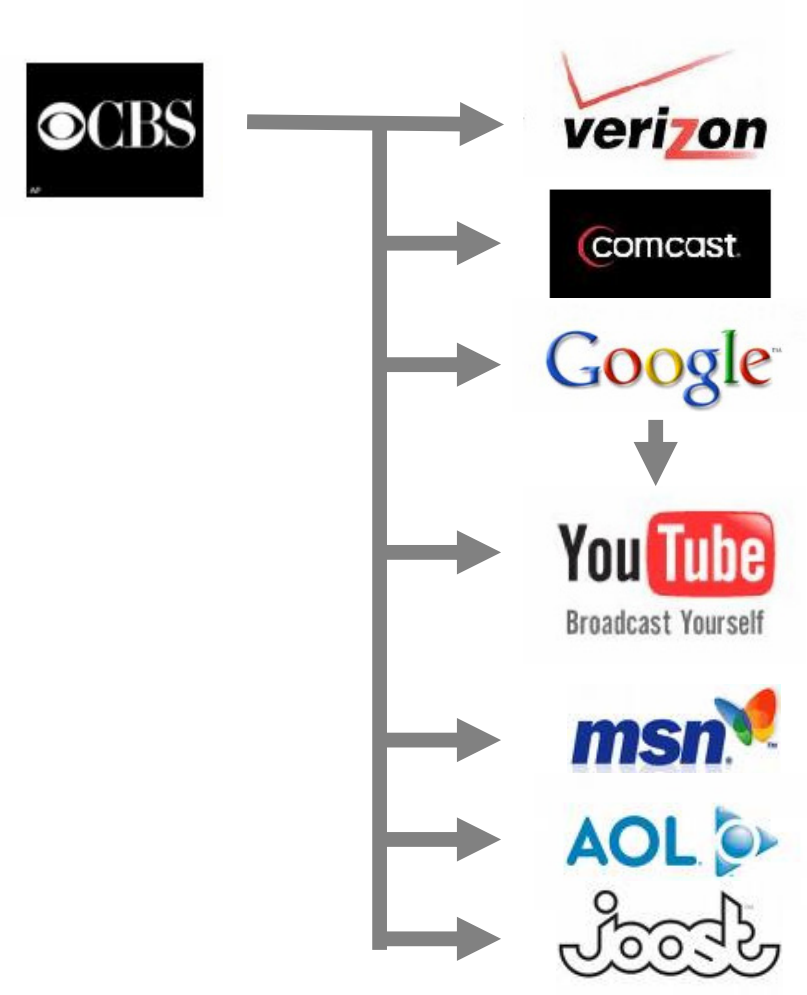

物語を通じて文化の違いを
知ることができました。


YAHOO!
Google
Microsoft




CBS
NBC
UNIVERSAL
ESPN
WALT DISNEY PICTURES
abc
MTV
MUSIC TELEVISION

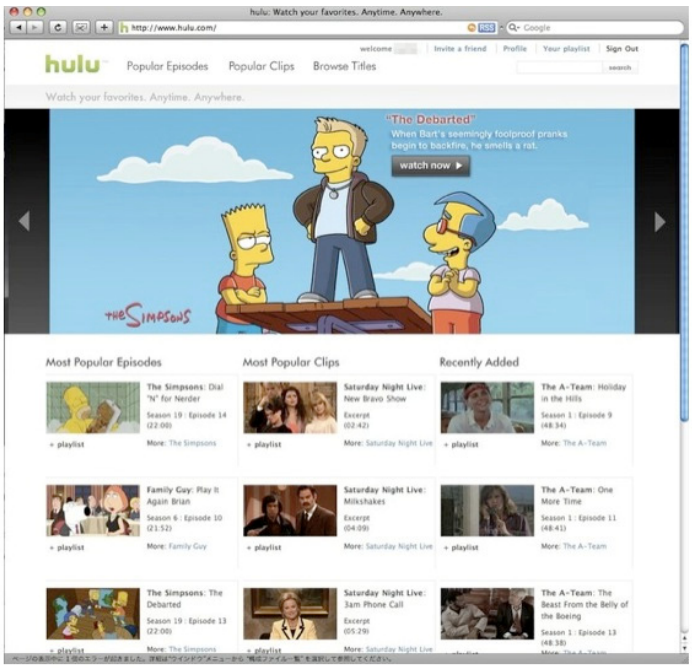
2006



2006

2007

2005.11



2005.12

2007.9

2007.10

BBC

YouTube
Broadcast Yourself

france 2

france 3

france telecom

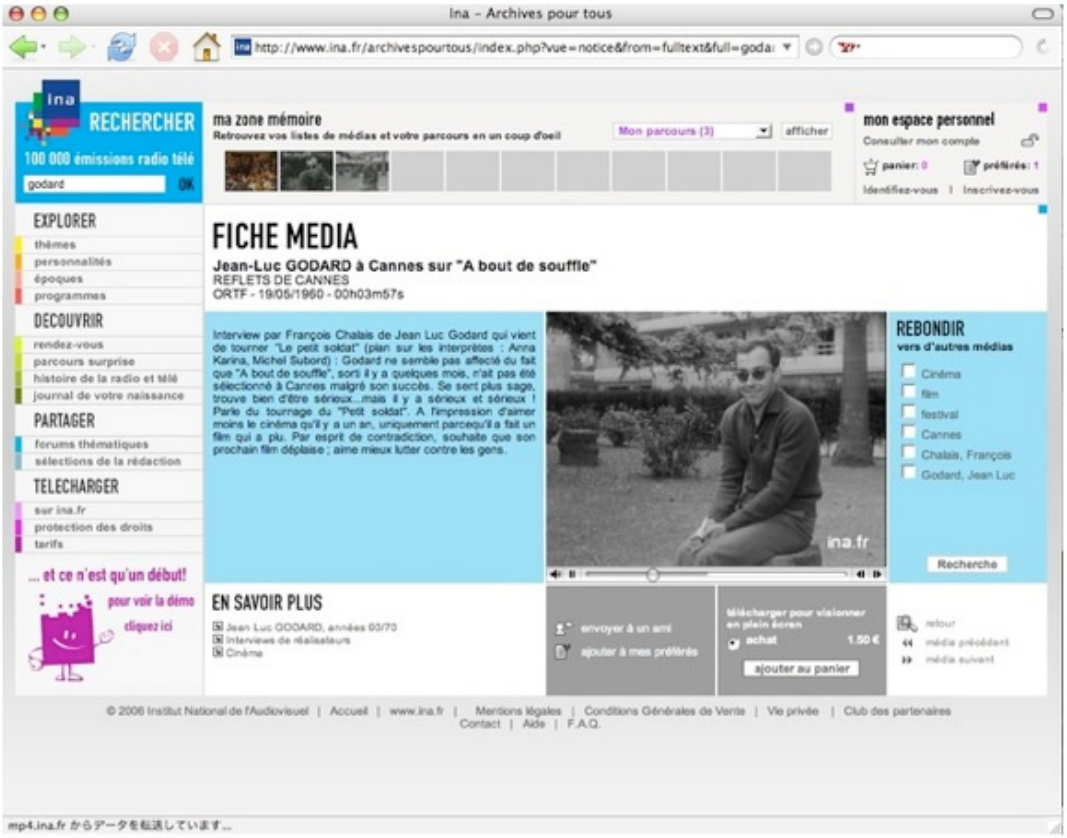
ARD
DEUTSCHES FERNSEHEN

ZDF

Deutsche Telekom

YouTube
Broadcast Yourself

2007.12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vers d'autres médias
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2006.4


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サービスの紹介


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先生
ゲーム
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の絵』～第６９回全国教育美術展から～【教育】２月２１日（日）午後４
番組ピックアップ！「今週放送のなかから5番組を選んで紹介します」
小学校5年 理科
ふしぎワールド
ストレッチマン2
カラフル！
えいごでしゃべらないとJr.
1.0min.ボックス 職業ガイダンス
おもりのうごき
教育 2/8(月),15(月)
午前10:15～10:30
番組ホームページをさがす
50音順に探す
◆番組ホームページ・ショートカット◆
学年・教科別一覧からさがす
NHKデジタル教材ブログ
番組やデジタル教材の情報、教育の話題をいち早くお知らせ！
－最新の記事－
★週刊こどもニュース 「こどもニュース...
週刊こどもニュース は、子どもにとって難しかったりわかりにくかったりす...
2010/02/12(金)
★土日の学校放送番組（2/13～14）
2月13日（土）午前5:00～8日（月）午前5:00までの学校放送番組のご案内です。...
2010/02/12(金)
★あすの学校放送番組（2/12）
2月12日（金）午前5:00～翌13日（土）午前5:00までの学校放送番組のご案内です。...
2010/02/11(木)
NHKデジタル教材通信
メールマガジン『NHKデジタル教材通信』を発行しています
ティーチャーズネット終了のお知らせ
ティーチャーズネットとNHKデジタル教材はひとつになりました
デジタル教材Q&A
番組やデジタル教材の活用方法を解説
授業での番組の使い方
悩み別おすすめ番組
デジタルコンテンツの利用方法 ほか
学校放送・デジタル教材利用ガイド（PDF）
各番組の内容や放送時間、デジタル教材の詳しい内容を紹介


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WNI weathernews
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24時間、空を
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コメント
コメント保存
マイリスト
秋川雅史オリジナル曲投稿
おまwwwwwwwwwww
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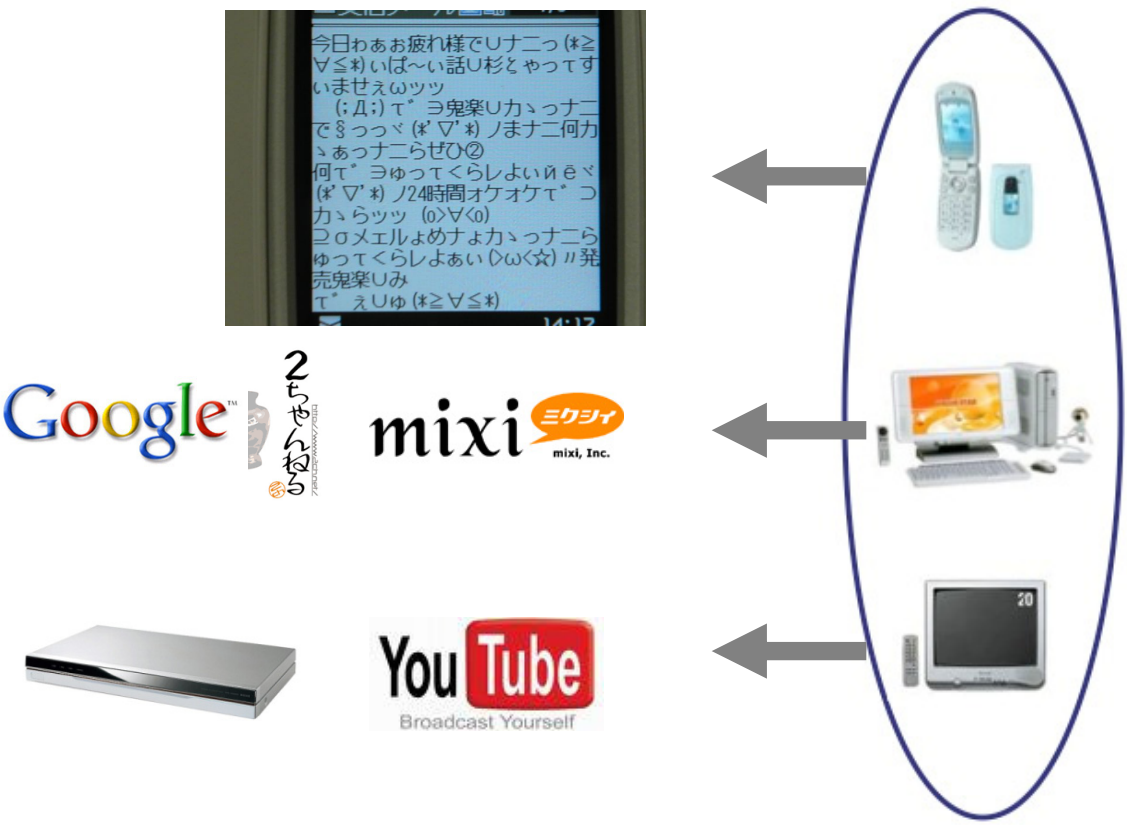
再生 112,178
コメント 38,129
コメント一覧
再生時
コメント
書込み日時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何τﾞヨゅってくらレよぃйёヾ(ｷ'▽'ｷ)ノ24時間ォケオケτﾞコカゝらッツ (o>∀<o)
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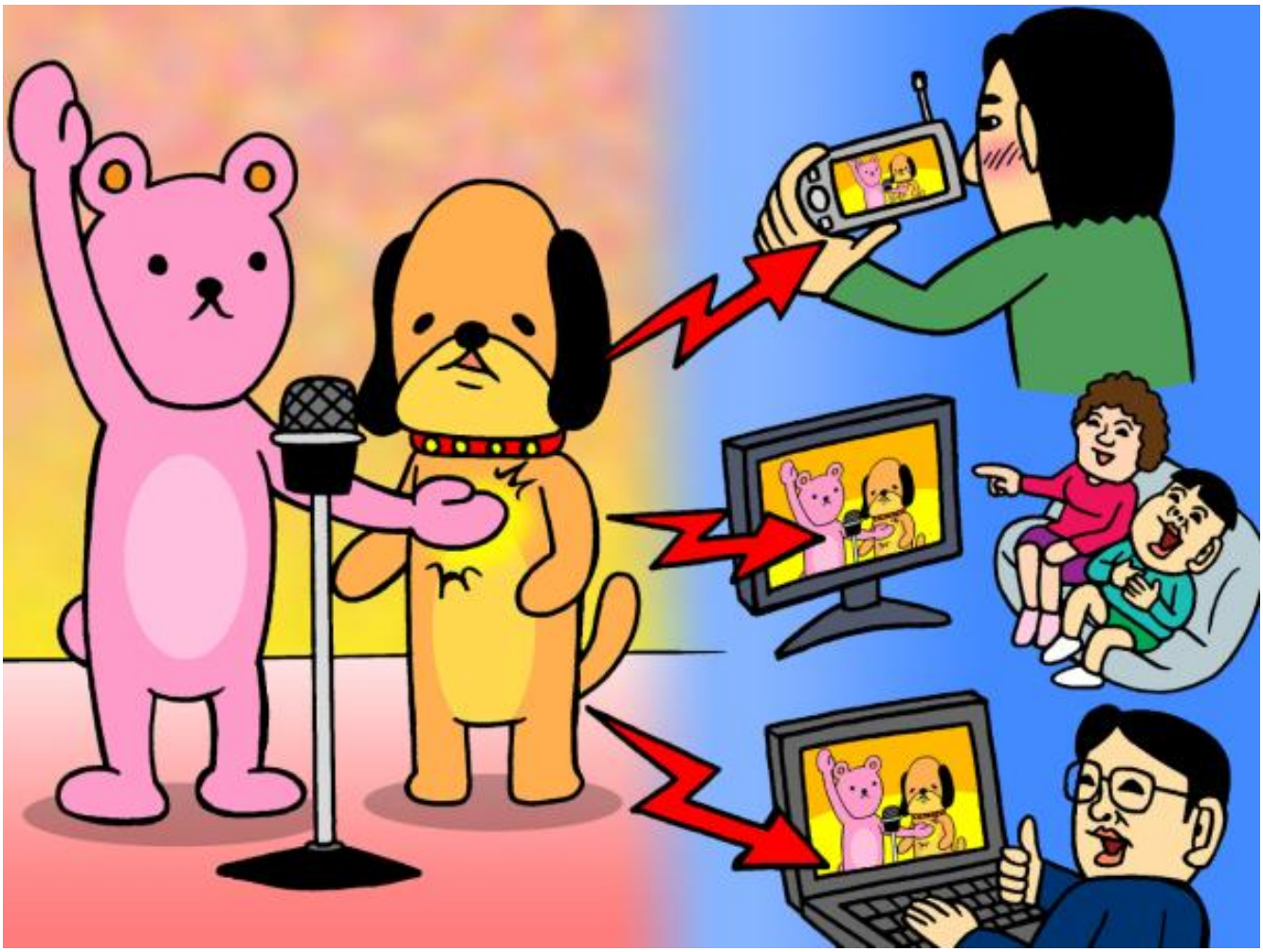
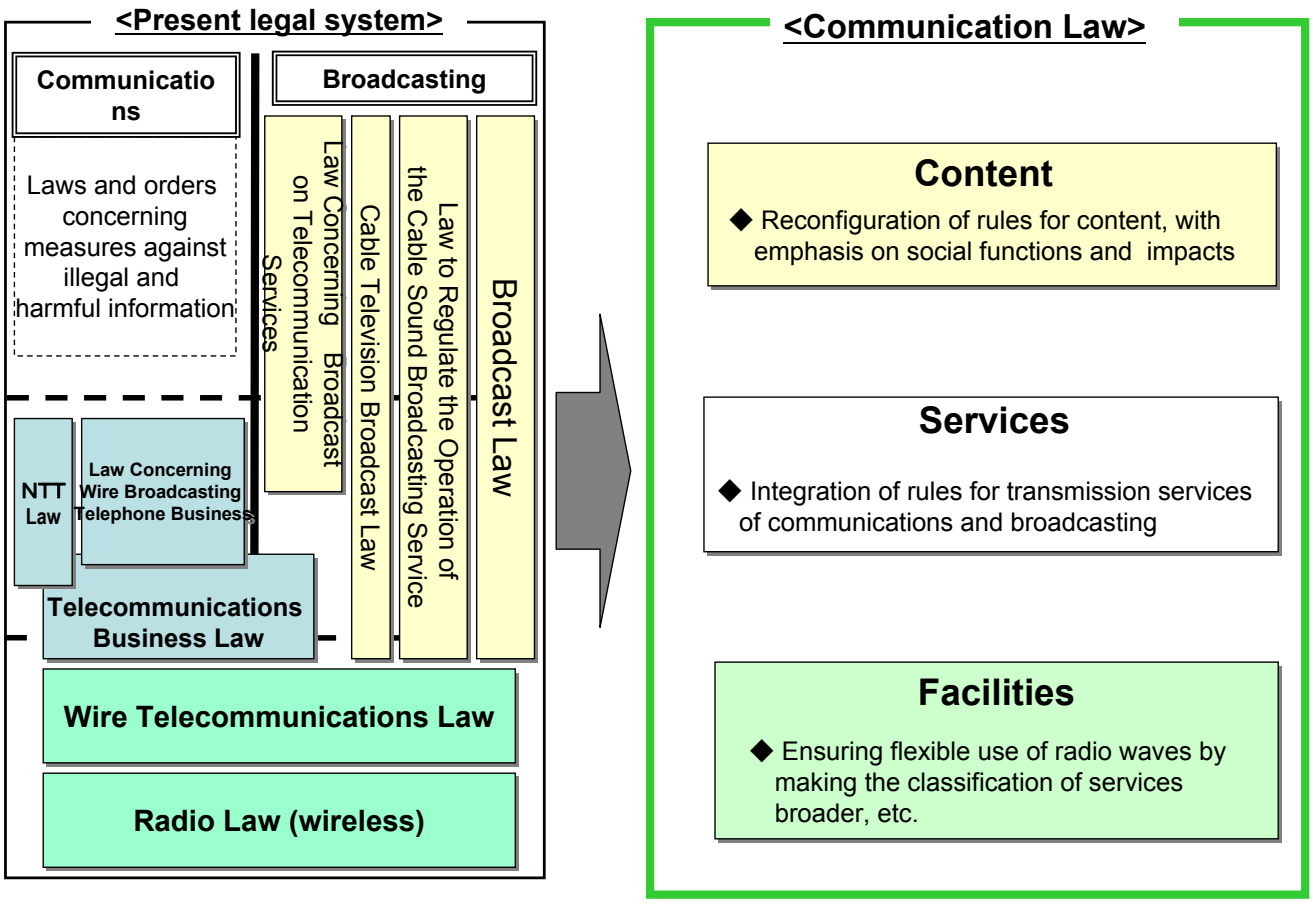
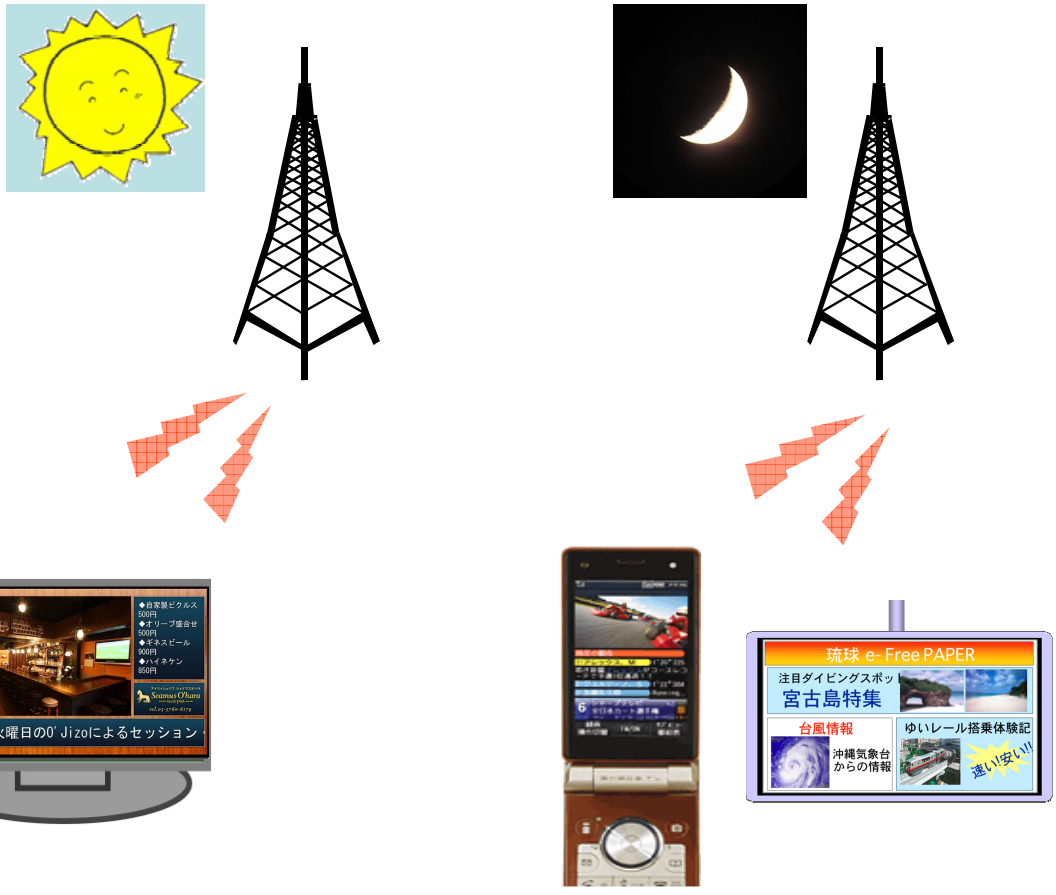
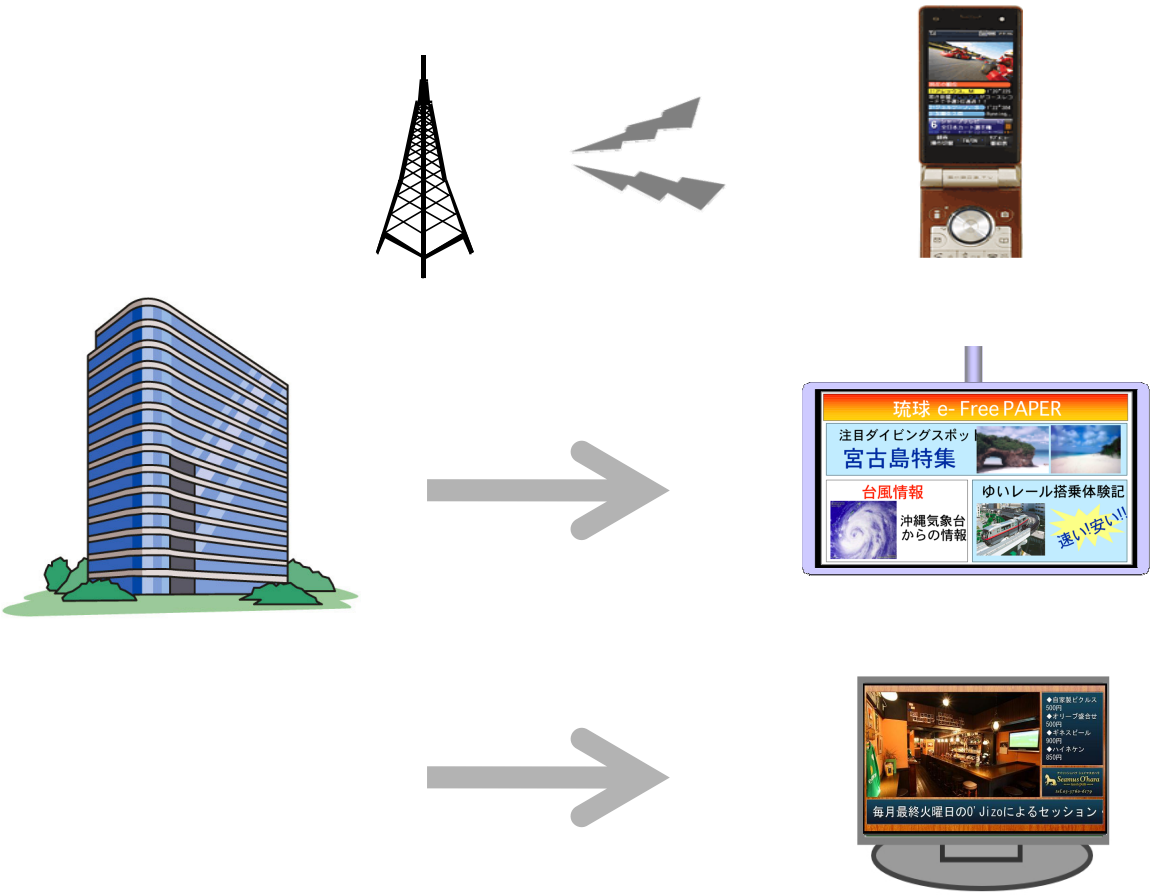
mixi
ミクシィ
mixi, Inc.
YouTube
Broadcast Yourself



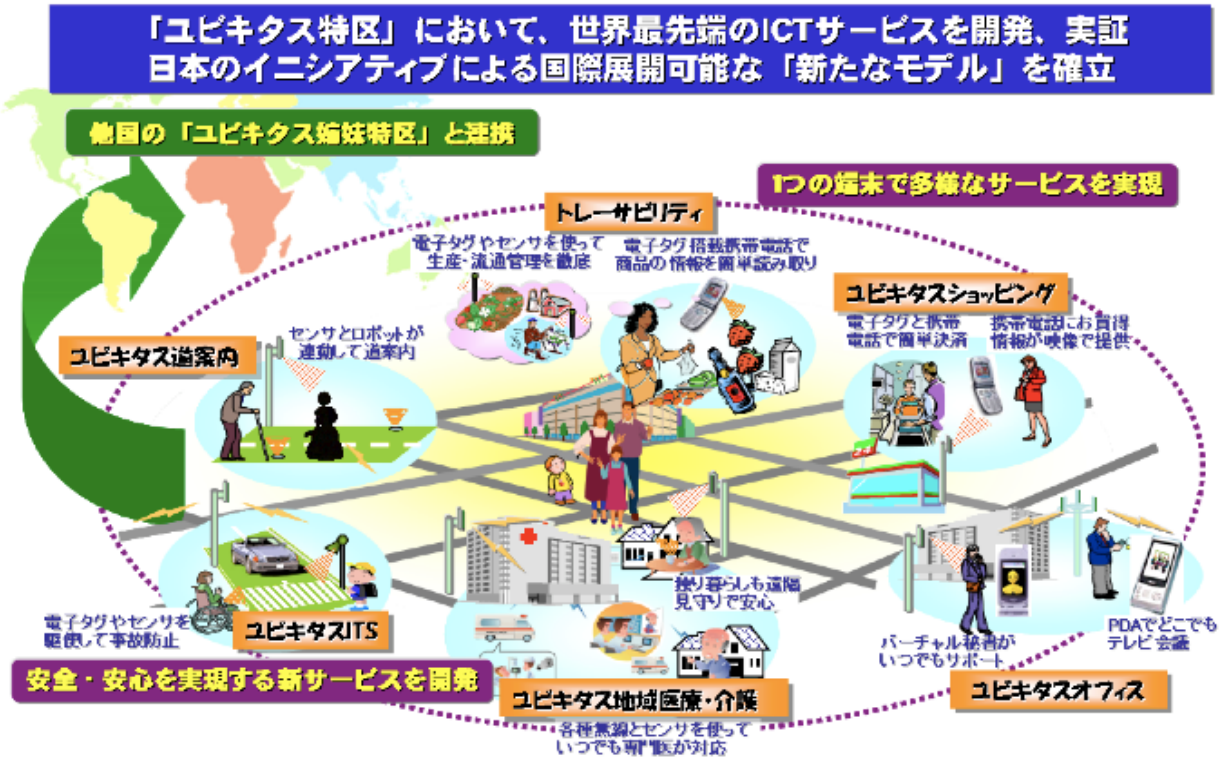
Restructuring of Legal System for Communications and Broadcasting







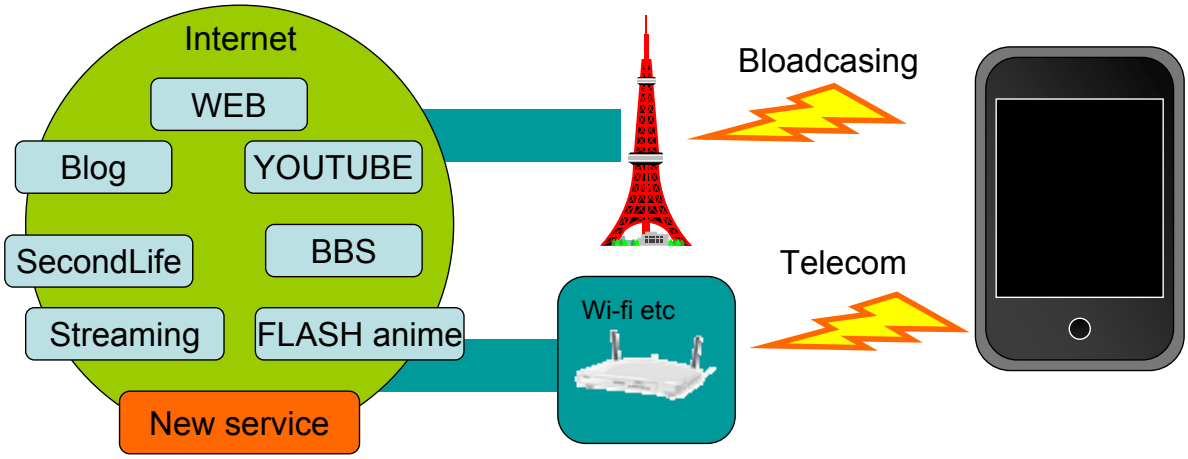
Ubiquitous Special Zone

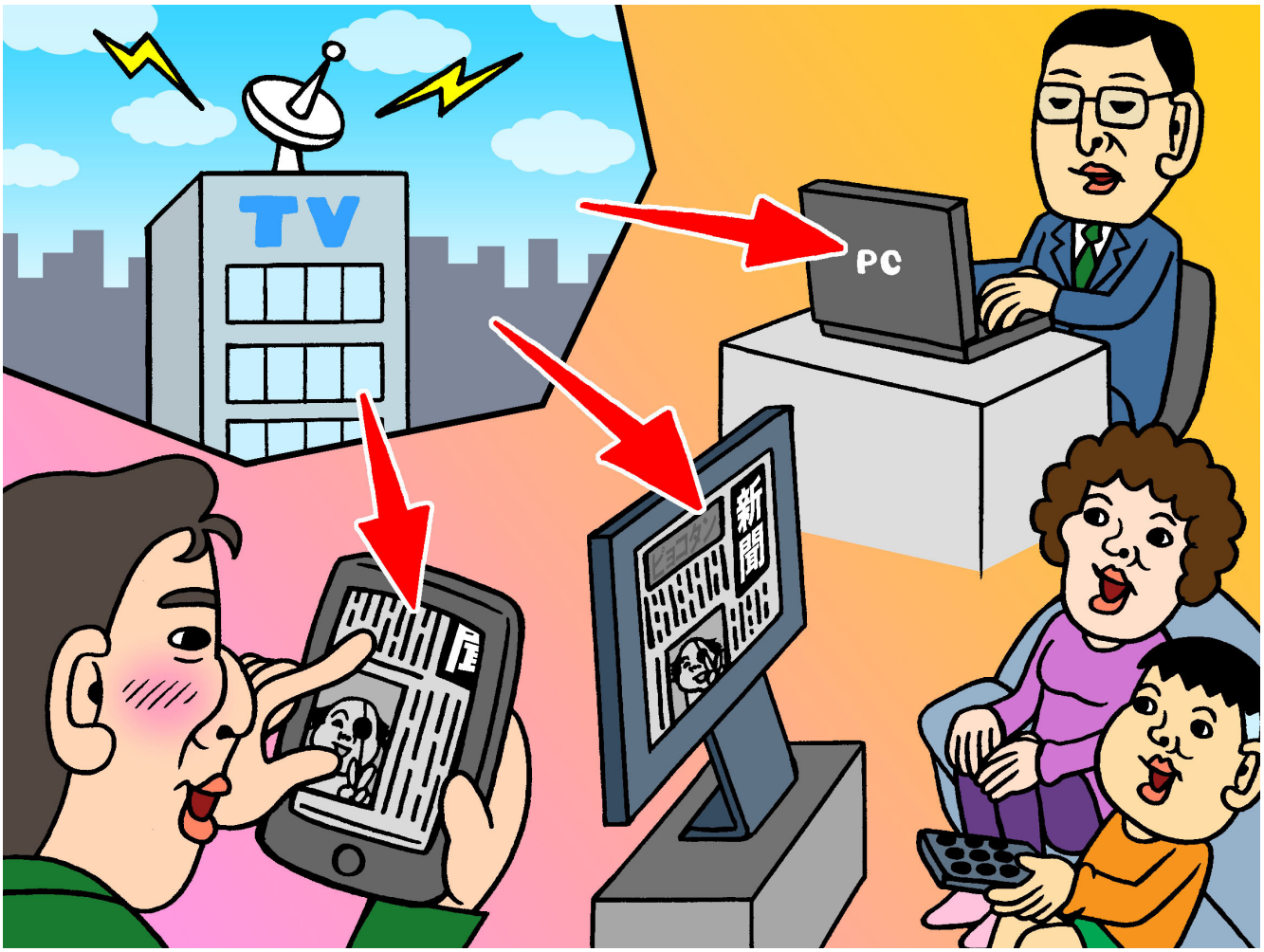


Ubiquitous Special Zone

IPDC フォーラム
IPDC Forum Internet Protocol Data Cast Forum

IP Data Casting experiment
on MediaFlo, ISDB-Tmm, IPTV, etc....






Mobile
転 送
Game


季節料理
宮城県南方町
水戸工業学校
忘年会で
乾杯!!
準備中
防犯連絡所
Touch+Vision
一白水星
AISIN
CARD


262
405
500
07 분
501
701
143
151
152
202
INFORMATION BOARD
143번 노선변경 안내
CONTIRON
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http://robot.watch.impress.co.jp/img/rbw/docs/318/718/html/01.jpg.html


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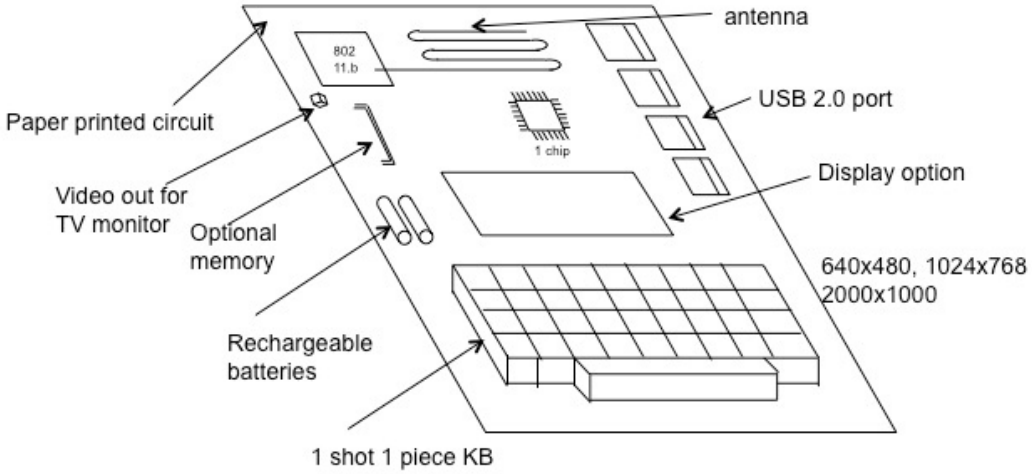
シンボル2
シンボル3
背景1
背景2
背景3

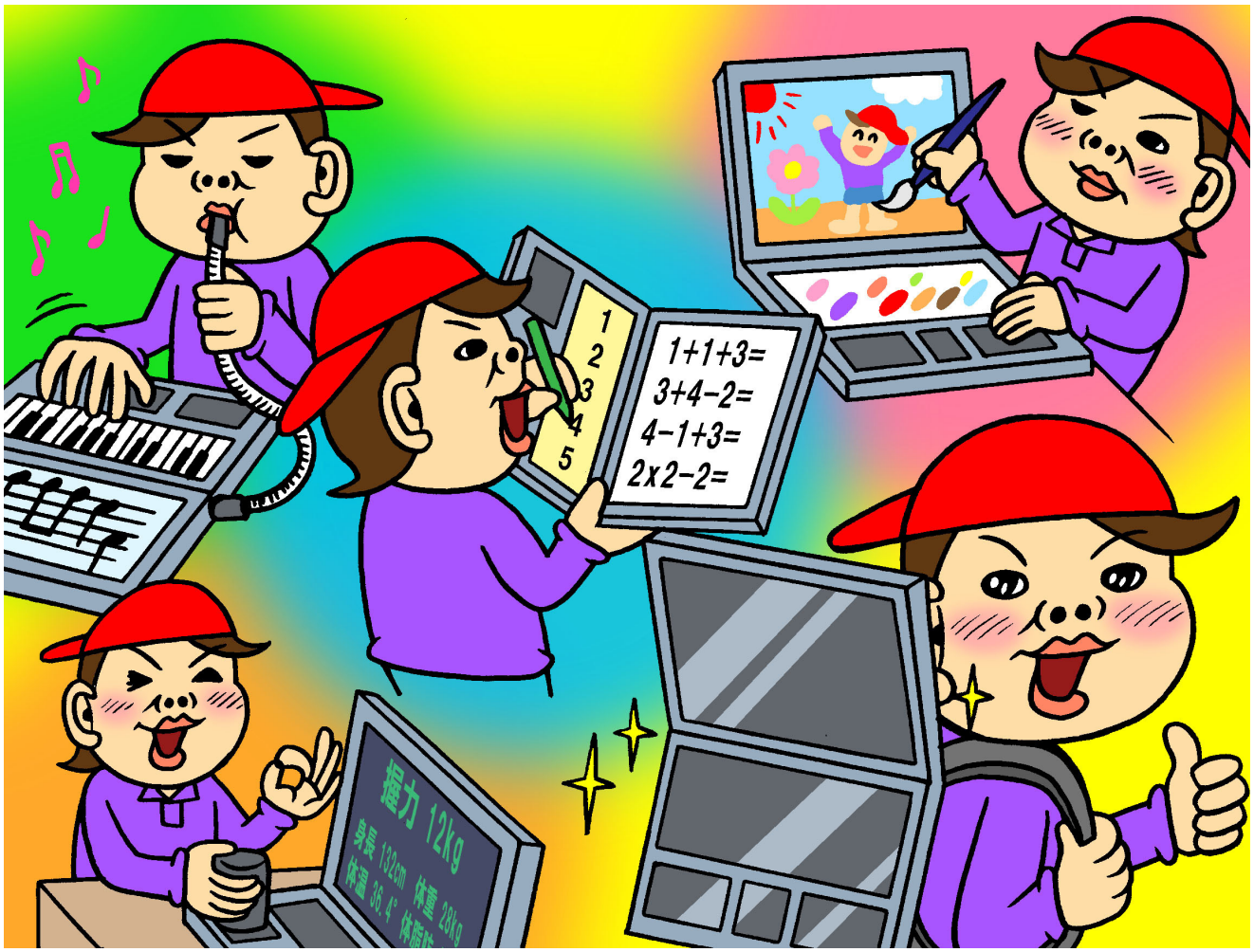
DIGITAL NATIONS Universal Knowledge

Developing $100 network PC

Cardboard PC based on one VLSI chip and circuits printed on paper



July 24 & 25, 2001
Media Laboratory
Massachusetts Institute of Technology
Cambridge, USA



Beyond Digital Convergence

ROUNDTABLE DISCUSSION

종합토론

BIOGRAPHY

Chu-Hwan Yim

Dr. Chu-Hwan Yim is the President of KLabs, the research institute for digital cable TV technology including cable cards and settop box. He joined KLabs in October 2007. Before joining KLabs he started his career as a research staff of ETRI in 1978. ETRI is a research institute covering main IT areas: telecommunications, computer and software technologies, he headed several ETRI divisions. In January 2001 he promoted to the President of TTA. TTA is the organization for standards in the area of IT in Korea. In November 2003 he came back to ETRI and was promoted to the President of ETRI. WiBro(Mobile WiMax) and DMB were the main outputs which were developed when he was the President of ETRI. He left ETRI in November 2006. He was a Chair-Professor of Kwangwoon University during 2007-2009. He graduated from College of Engineering, Seoul National University with a bachelor's and master's degree in 1972 and 1979, respectively. He earned a Ph.D. degree in telecommunications system at Technical University of Braunschweig in Germany. He was the President of Korean Institute of Communication Sciences in 2004.

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Dr. Myeong-Ho Lee is a Senior Research Fellow at KISDI. As an Executive Director of Telecommunications Policy Division, he is currently in charge of the research on telecommunications policies and the analysis of related industries. He received his Ph.D degree in Economics at Columbia University in the United States. Before joining KISDI, he was a professor at Yonsei University and Myongji University in Korea. He served as an editor in chief of the Korea Association for Telecommunications Policies and served on the editorial board of the Telecommunications Review. He also served as a member of several advisory committees for the Korean government such as Korea Communications Commission, Ministry of Strategy and Finance, Fair Trade Commission, and Ministry of Information and Communications. His current research interests include the analysis of IT industries and economics of regulation in the telecommunications sector. He co-authored *Digital Convergence, Rules for New Game* and *Fair Competition and Regulation in Telecommunications.* He published numerous articles in various journals such as Information Economics and Policy, Telecommunications Policy, ETRI Journal, Telecommunications Review, Korean Telecommunications Policy Review.

BIOGRAPHY

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Dr. Ko was previously an Assistant Secretary to the President for Science at the Office of the President, the Korean Delegate and Vice Chair for the Working Party on the Information Economy (WPIE) in OECD, Research Fellow at the Science and Technology Policy Institute, and a Lecturer at the Graduate School of Asia-Pacific Area Studies, Hanyang University, as well as the Graduate School of International Studies, Yonsei University.

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