South Korea’s former IT839/ u-IT839 strategy

Abstract

South Korea’s economy depends heavily on international trade and its IT-related products account for almost one third of its total exports. In particular, the mobile telecommunication sector is a strategic trade commodity for South Korea to maintain its global market leadership for mobile telephony services and cell phone production. This study seeks to illustrate the impact of the former IT839/u-IT839 master plan, from 2004 to 2008, and its impact on the South Korean mobile telecommunications sector. Having successfully pioneered the world’s first commercialisation of the Code Division Multiple Access (CDMA) mobile telecommunications services since 1996, South Korea forged ahead with the deployment of next-generation techniques that evolved from CDMA such as Wideband CDMA (W-CDMA) and Orthogonal Frequency Division Multiplexing (OFDM) technologies under the new directions of the IT839 master plan in 2004. As a result, Korea became exceptionally strong in mobile telecommunications and broadband technologies. The IT839/u-IT839 master plan contributed to the strengths of South Korea’s mobile phone industry today: world class mobile communications infrastructure, leading position in business related to the CDMA mobile standard, and the presence of diverse content developers.

Case study fact sheet

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<th>Organisation/programme:</th>
<th>The IT839/u-IT839 master plan, spearheaded by the then Ministry of Information and Communication under President Roh Moo-hyun’s administration (political reign ended on 24 February 2009)</th>
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<td>Main activity:</td>
<td>Developing South Korea’s ICT and broadcasting sector</td>
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<td>Strategic objectives</td>
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Background and objectives

Characteristics of the IT839/u-IT839 master plan

According to 2008 data for nominal GDP of members of the International Monetary Fund, South Korea’s economy is the 5th largest in Asia Pacific and 15th largest in the world. This is due to the rapid growth and maturity of its semiconductor, broadband internet, computer, digital electronics and mobile telecommunications industries. The then Ministry of Information and Communication (MIC), currently known as the Korea Communications Commission, under President Roh Moo-hyun (2003 – 2008) estimated that the Korean IT industry accounts for almost one-third of total national exports. Mobile technologies plays a key role to its global IT industry commercialisation success.

In 2004, the MIC launched a national ICT roadmap, coined as the “IT839 master plan” – shorthand for IT industrialisation focuses in eight services areas, three infrastructure plans, and nine hardware-related businesses. The upper part of Exhibit 1 shows the focuses of the original IT839 master plan. Two years later, an updated and renamed IT master plan - the "ubiquitous IT839" or "u-IT839", was commissioned to realise the vision of a knowledge-based economy for South Korea. The programmatic shift from the IT839 master plan to the u-IT839 master plan included the following new growth areas:

- **Services changes.** "Broadband Convergence Services" and "IT Services" were included as internet telephony had been put into commercial service, and Digital Multimedia Broadcast (DMB) and digital TV were subsequently combined.

- **Infrastructure changes.** Internet Protocol Version 6, one of the three infrastructure networks specified in the IT839, was unified under the Broadband Convergence Network (BCN) and "soft infraware" was added as the new infrastructure focus.

- **Hardware-related businesses changes.** Mobile telecommunication and telematics had converged and radio frequency identification (RFID) and universal sensor networks (USN) were newly added to the next-generation growth engines.

Hence the then Roh administration sought to enhance South Korea's economic competitiveness and productivity through the aggressive promotion of the IT industry and the application of IT throughout the society as a whole. Exhibit 1 explains the IT839/u-IT839 master plans in detail.

According to Miok Jun, IT Business Development Manager with the Korea Business Centre in Singapore for the Korea Trade-Investment Promotion Agency (KOTRA), the IT839/u-IT839 served as "an influential government platform with strong economic interests in the promotion of the South Korean ICT industry such as telecommunications companies, cable television operators, IT manufacturers and software developers. In addition, it created a vision for the rapid and widespread acceptance of computing culture within the local society."

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1 Soft infraware is software infrastructure that effectively realises IT convergence and creates a reliable and convenient user environment. It is composed of u-computing common platforms such as Wireless Internet Platform for Interoperability (WIPI), u-service linked platforms using webservices, SW quality guarantees, and information security. Source: Korea’s IT839 Strategy (Ministry of Information and Communications, South Korea), [http://www.localret.cat/revistesinews/broadband/num19/docs/num4.pdf](http://www.localret.cat/revistesinews/broadband/num19/docs/num4.pdf).
The importance of IT839/u-IT830 for the mobile industry

Having successfully pioneered the world’s first commercialisation of the Code Division Multiple Access (CDMA) mobile telecommunications services since 1996, South Korea forged ahead with the deployment of next generation techniques that evolved from CDMA such as Wideband CDMA (W-CDMA) and Orthogonal Frequency Division Multiplexing (OFDM) technologies under the new direction of the IT839 master plan in 2004. As a result, Korea became exceptionally strong in mobile telecommunications and broadband technologies.

"The strengths of South Korea's mobile phone industry can be summed up as follows: world class mobile communications infrastructure, leadership position in the CDMA business, and the presence of diverse content developers," says Miok. "The current challenges however are found in the lack of information on foreign markets, considerably low brand awareness internationally, high dependency on key components imports, and profit drops due to high raw material costs."
In the fourth quarter of 2008, IDC’s Asia/Pacific Mobile Voice, Data and Multimedia Service Tracker estimated a total of 45.6 million mobile subscribers in South Korea. This amounts to a high statistical mobile services penetration rate of 93.8% of the population. Key players in South Korea’s mobile telecommunication services market include SKT (SK Telecom), KTF (Korea Telecom Freetel), LGT (LG Telecom) and KT (Telecom Korea). Exhibit 2 shows the market shares for these four companies.

**Replacement of the IT839/u-IT839 strategy in 2008**

The then Ministry of Information and Communication (MIC) under President Roh Moo-hyun transformed the Korean IT industry through the years 2002 to 2008 with the IT839/u-IT839 master plans. However, the reputation of Roh’s administration was continually plagued with allegations of incompetence and conflicts. On 25 February 2008, a political changeover ensued with a new administration under President Lee Myung-bak taking office. This brought about new administrative reforms which consequently affected certain changes towards the government’s push for Korean IT.

The new government through the newly formed Ministry of Knowledge Economy came up with a new IT master plan called the “3-3-7” strategy. This new strategy however still incorporated large elements from the previous IT839/u-IT839 master plan. The focus however is aimed at providing better market positioning and support for the Korean IT sector to penetrate the global market. 13 items were selected and divided into the following categories:

- **3 strategic items** - DMB, WiBro, e-government
- **3 flagship items** - semiconductors, display, wireless
- **7 potential items** - RFID/USN, robot, network, software, e-health, light-emitting diodes (LEDs), security

With the new “3-3-7” strategy, South Korea has apparently maintained certain elements of the IT839/u-IT839 master plan such as ensuring market leadership in research for broadband, mobile and wireless technologies. However, the new government has also recognised the need for increased government marketing support schemes that can help invigorate the globalisation of its ICT sector.

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Activities to support ICT research, development and innovation and their impact

**Embracing growth-positive development policies**

The IT839/u-IT839 strategy served as a powerful economic engine that helped propel South Korea into a leading information economy that it is today.

The IT839/u-IT839 strategy outlined a holistic economic roadmap to develop both the South Korean technological infrastructure and its electronics manufacturing capabilities, with technology "growth engines" that fuelled a regenerative cycle of investments, returns, and ultimately rising national income levels. It provided guidance on how to fully exploit the country's existing academic, technical, and social resources in a focused and well-targeted manner, so as to enable its electronic industry to play a more dominant role in several critical electronics markets. It was estimated that the IT839/u-IT839 strategy would cost both government and the private sector as much as 70 billion US dollar by 2010. In 2006, with the introduction of the updated u-IT839 masterplan, the-then MIC expected South Korea's ICT and ICT-related industries to grow at an annual average of 14.2% through 2010, so as to achieve almost 500 billion US dollars in total revenues with an estimated 230 billion US dollars in production value-add across all economic sectors. These expectations of the Korean government suggest that the investments of the master plan would trigger considerable additional yields that justify the activity.

Overall, the IT839/u-IT839 strategy helped align South Korea to succeed strongly in the IT industry due to the swift adoption of growth enablement policies such as investing robustly in R&D and education, creating substantial trust and reliance in the local private sector, some degree of marketing and research support internationally through the establishment of Free Technology Zones (FTZ), and creating a favourable climate for capital investment.

There are several key components of the IT839/u-IT839 strategy that impacted strongly on the IT industry and on the mobile industry in particular, as outlined in the following.

**Government’s support for mobile technologies: ETRI**

What distinguishes South Korea from other economies such as the US and Europe is the intense cooperation between the IT industry and the government, where the government allocates adequate resources towards the development of broadband, mobile and wireless technologies. In fact, the birthplace to several of Korea's technologies is not in the laboratories of corporate IT giants such as Samsung Electronics or mobile operator SK Telecom, but at the non-profit government-funded Electronics and Telecommunications Research Institute (ETRI). The ETRI was established in the year 1976 and located in Daeduk Valley, a high-tech region in Daejeon City, 170 kilometres south of Seoul. In 2008, ETRI had hired an approximate 3000 employees with almost two-thirds being researchers.

The ETRI's primary objective is to develop basic and core technologies which subsequently are sought to feed into new products by private companies. Over the years, the ETRI has successfully invented information technologies such as the TDX-Exchange, the high density semiconductor microchips and the TiCOM mini-super computer. Notably, it pioneered the widely used CDMA.

Under the IT839/u-IT839 strategy, the ETRI championed the terrestrial Digital Multimedia Broadcasting (DMB) technology that institutionalised the global "TV in my hand" phenomenon. DMB services – which enable the transfer of digital media content such as mu-
Economic assessment of ICT-related industrial policy

sic and video clips via mobile devices like mobile phones, PDAs or portable TVs – is expected to generate an estimated 13.36 billion US dollar in revenues by 2010.

In addition, wireless broadband (WiBro) technology was introduced by the ETRI under the IT839/u-IT839 strategy for mobile internet connectivity. WiBro is a Korean-developed portable internet service that provides high-speed wireless internet connection. The service operates in the range of 2.3Ghz frequency bandwidth, and is designed to provide a 1Mbit/s internet connection to mobile devices moving at speeds up to 70 kilometres per hour.

At an e-government forum in April 2008 Dr Jeongwon Yoon, Director of the IT Policy Division in the Global Cooperation Team of the National Information Society Agency, attributed the commercial success of WiBro in Korea to the government's IT strategy and the tech-savvy culture of the Korean public. He added that the u-IT839 strategy allowed many Korean companies to penetrate the mobile market and compete against foreign rivals. Furthermore, he asserted that the Korean public is very well informed of developments in the IT industry and continually remain receptive to the adoption of new technologies. Consequently, Dr Yoon notes that this brought about a sustainable mobile sector ecosystem within Korea.

Most recently, the ETRI is spearheading with its New Nomadic Local Area Wireless Access (NoLA) technology, which is quoted as the 4th Generation (4G) mobile data transfer system. The South Korean government funds the ETRI – with budgets amounting to hundreds of million US dollar annually – to focus on intensive IT research. However this does not take into account the billions invested into commercial packaging of the technologies developed by the ETRI through private enterprises such Samsung Electronics, LG Electronics and SK Telecom for product research and marketing rollouts.

In a five-year period from 2004 to 2008, the ETRI earned more than 254.8 billion South Korean won (200 million US dollar) in technology royalties with a total of 1,294 cases of technology transfer. Exhibit 3 shows the ETRI’s total earnings from technology royalties and its cases of technology transfer.

Exhibit 3: ETRI’s earnings from technology royalties and cases of technology transfer 2004 - 2008

Source: ETRI
Significant investments in education

The improvements of academic infrastructure and standards at Korean universities encouraged more students to stay at home for advanced training as compared to travelling overseas (for instance, to the US) to complete their advanced degrees. Due to extensive educational reforms from 1986 to 1999, the number of students graduating locally in South Korea with PhDs tripled. This ensured a large supply pool of creative scientists and engineers, which became a key factor in the successful execution of the IT839/u-IT839 strategy. However, according to Prof. Jin Hyung Kim, President of the Korea Information Science Society and Professor at the KAIST Computer Science Department, Korean schools of engineering began facing a reduction of enrolment at the turn of the century, not only in the conventional fields of engineering but also in high-tech areas. This was attributed to the lack of industrial relevance in curricula. The consequence may be a potentially serious decline of technology transfer to Korean IT industries. To counteract this, the then MIC, through the IT839/u-IT839 strategy, supported the reformation of the IT education system. It turned educational focuses towards providing a robust IT industry curricula and the pursuit of industry-oriented research in academia. For example, the new curriculum was jointly developed between industry experts and professors with strong funding support from the government. This resulted in better training and retention of local computing talent.

Dedicated promotion of the local mobile sector

The mobile telecommunications market, both globally and locally, was widely seen as a strategic economic opportunity for South Korea to establish leading market positions. The IT839/u-IT839 strategy recognised the following characteristics of the mobile industry: mobile technologies are relatively lightweight and thus easily to be exported at low costs; the adoption of universal standards facilitates entry of new firms; explosive global demand for mobile technologies offers large business opportunities; and the largest market, the US, was relatively open. Examples of government promotion of the local mobile sector included trade protection, incentives for private R&D, intensive government spending on R&D, creation of dedicated research institutes (beside ETRI), recruitment of foreign expertise (e.g. recruitment of foreign scientists at the ETRI), supply of inexpensive and efficient real estate and tax breaks.

On 8 February 2006, the MIC launched an ambitious M1 Project (Mobile No. 1) in tandem with the u-IT839 strategy which had a vision to create a “100% mobile literacy, 0% mobile virus” environment for South Korea. In doing so, the MIC designated a special district that will host all existing and potential mobile technologies worldwide as a test bed for burgeoning mobile platforms – dubbed as “mobile paradise”. This “special mobile-district” was expected to be a free technology zone that will create a new environment of services through the use of mobile communication technologies.

Consequently, this project was aimed at nurturing the technological competitiveness of South Korea’s next generation mobile technology as well as standardisation activity strengthening; initiating the evolution of a whole new mobile business environment such as the establishment of the mobile content industry and mobile software field; laying the foundation to groom creative manpower for the mobile industry; and building a solid mobile industry infrastructure. “Mobile paradise” is expected to be a mobile technology test bed district which can allow constituents to leverage on the various services without an obstacle of technology and standardisation.
This is part of the government’s efforts to promote Korea as a Free Technology Zone (FTZ) so as “to enhance product competitiveness with curtailment of the development period as well as timely market entry, plus supporting innovative product development through a free test/experience environment” 3.

Promoting local entrepreneurship in the IT industry

In addition to massive research and development funding, the then MIC and its various IT institutions also promoted sustained and bold investments in the IT industry by nurturing the Korean venture capital industry. In the framework of the IT839/u-IT839, the South Korean government allocated a substantial amount of public funds into creating a domestic venture capital market for the IT industry. Prominent examples of government venture capital funds include the Small and Medium Business Fund (SMBF) which comprise of initiatives like the “Dasan Venture” and “Limited partnership funds”, the “Technology Credit Guarantee Fund”, and special funds such as “Informationalisation Promotion Fund” and the “Science and Technology fund”. In addition, the government has encouraged entrepreneurship through certain legislation such as the freedom of venture investments by banks, extending tax incentives to venture capitalists, and the creation of the Korean Securities Dealers Automated Quotations (KOSDAQ) for trading activities of high technology start-ups.

Promoting industry and adapting to behaviour in society

The national ICT strategies of South Korea are an example of policies not only adopted to promote the national ICT industry, but also adapted to the types of behaviour that are entrenched in society and not quickly changed. A good example is the business behaviour of the South Korean IT industry to accord market leadership and guidance roles to the then MIC while working closely in tandem. This intense cooperation of business and government within South Korea can be considered as key to the continuous development of cutting-edge technologies.

Lessons learned

The South Korean economy is heavily dependent on international trade, of which IT-related products account for almost one-third of total exports. Considering this high dependence on external trade and the huge potential of the IT industry, it is rational for the national government to focus development efforts on the IT industries.

The following highlights the lessons learned from the IT839/u-IT839 master plan for the successful development of the mobile industry.

- **Proactive government support is crucial:** The South Korean government plays a dominant role in influencing the country’s IT industry. The proactive role of government policy in the telecommunications industry was crucial in propagating new standard platforms such as ADSL for the Internet and CDMA for mobile phones. As the policy of IT839/u-IT839 has shown, the integrated development of IT services, infrastructure, and devices creates synergies and is essential along the industry’s value chain. The government also fosters business networks and develops well-equipped infrastructures to support entrepreneurship in the local IT industry. Furthermore, the government maintains close international linkages.

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Assisting entrepreneurs and enabling them to help others: With the presence of an increasing number of successful entrepreneurs, the South Korean government can tap into a pool of positive role models to help mentor the less experienced ones. Through support programmes and entrepreneurial educational programmes, potential inventors can be encouraged to commercialise their ideas. Many established entrepreneurs have become key players in establishing business networks among technical specialists, venture capitalists and angel investors. A noticeable obstacle that most technical specialists faced is the difficulty in launching their inventions despite inventing technologically innovative and cutting-edge products. A positive business atmosphere that shares market-related knowledge such as customer contact and access to distribution channels would in turn motivate innovative scientists and engineers to create new firms.

Internationalisation: The IT839/u-IT839 strategy has encouraged entrepreneurs to build ventures based on technical innovations, however most venture firms are noted to concentrate primarily on the domestic market. This is in part due to the lack of contacts, experience and business collaborations with and in foreign markets. Thus, strategic partnerships could be encouraged to alleviate this trend. As with the current “3-7-7” IT strategy of the Ministry of Knowledge Economy under the newly-elected presidential administration, the focus is now aimed at providing better market positioning and support for the Korean IT sector to penetrate the global market even stronger.
References

Research for this case study was conducted by Wang Jiawei Gerald, Market Analyst, IDC Government Insights, on behalf of the Sectoral e-Business Watch. Sources and references used include desk research plus:

- Interview with Miok Jun, IT Business Development Manager with the Korea Business Centre in Singapore for KOTRA (Korea Trade-Investment Promotion Agency) on 22 September 2009.

- Extracts from previously published or from conference presentations:
  - Jin Hyung Kim, President of the Korea Information Science Society and Professor at the KAIST (Korea Advanced Institute of Science and Technology) Computer Science Department.
  - Dr Jeongwon Yoon, IT Policy Division, Global Cooperation Team, National Information Society Agency, South Korea.

- Websites:

- Papers and books:
  - Korea’s IT839/u-IT839 Strategy (Ministry of Information and Communications, South Korea) http://www.localret.cat/revistesinews/broadband/num19/docs/num4.pdf
This case study was initially published as part of a comprehensive Sectoral e-Business Watch study report "An economic assessment of ICT-related industrial policy" (2009). The European Commission, Enterprise & Industry Directorate General, launched the Sectoral e-Business Watch (SeBW) in late 2001 to monitor, study and assess the implications of ICT for enterprises and sectors. The results support policy formulation, notably in the fields of industrial and innovation policy. All study reports and further resources such as data on ICT adoption in enterprises are available online at the SeBW website (www.ebusiness-watch.org).

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