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Mobile Killer Applications in South Korea & Recommendations for U.S. Policymakers

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MOBILE KILLER APPLICATIONS IN SOUTH KOREA & RECOMMENDATIONS FOR U.S. POLICYMAKERS

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I. INTRODUCTION

The Republic of Korea ("S. Korea") is known as a pioneer in broadband development and proliferation. This is due to its wide and efficient deployment and diffusion of broadband and mobile applications.[1] As of the end of 2001, twenty-nine million South Koreans ("S. Koreans") were mobile subscribers.[2] This figure represents more than 56% of the country's telephone subscribers, and a mobile penetration of nearly 61%.[3] In fact, with close to 60% of mobile phones outfitted with Internet browsers, S. Korea has one of the most rapidly growing mobile penetration rates in the world.[4]

There are two reasons why S. Korea has been so successful in expanding its mobile communications industry. First, the coun-

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1. INT'L TELECOMM. UNION, ITU INTERNET REPORTS: INTERNET FOR A MOBILE GENERATION, 4TH ED., at 103, U.N. Pub. No. 326-02 (2002) [hereinafter ITU INTERNET REPORT] (noting that "[a]s of the end of February, just over half of the 16 million households in Korea had broadband access"). The study also notes that "[w]hile most of the world has been discussing broadband access, Korea has been installing it." *Id.* at 103 box 5.2.

2. *Id.*

3. *Id.* Penetration is "[a] measurement of access to telecommunications, normally calculated by dividing the number of subscribers to a particular service by the population and multiplying by 100." *Id.* at xii.

4. *Id.* (noting that S. Korea "has one of the fastest-growing mobile penetration rates in the Asia-Pacific region"). "However, according to some analysts, actual mobile Internet use may be lower than these figures suggest, owing to underdeveloped content, high charges and slow download speeds." *Id.*

try successfully develops and deploys novel mobile applications. Some of S. Korea's mobile applications have earned the title "killer applications" because their financial return justifies the exorbitant expense that was required to develop, license and deploy them.[5] This Article will discuss three killer applications: mobile gift certificates, Mobile Coin ("M-coin"), and Color Ring, each of which successfully reached critical mass and increased "network externalities."[6] Second, South Korean ("S. Korean") socio-cultural norms also affect the country's rapid growth of mobile communications and technology. This Article will discuss three such factors that help drive mobile penetration: *Hangul*, *Nunchee*, and *Balli-Balli*.[7]

Although these socio-cultural conditions, unique to S. Korea, do not exist in the U.S., according to the International Telecommunications Union ("ITU"),[8] S. Korea may serve as a good indicator to forecast market growth in the United States ("U.S.").[9] Thus, the recent influx in demand for mobile services and technology in S. Korea may be a sign of things to come in the U.S.

Part II of this Article discusses the market growth of online and mobile gift certificates. It then examines a micro payment system, originally designed for vending machine purchases in 2000,[10] and how this system eventually became the *de facto* standard for mobile commerce in S. Korea. Finally, it discusses dial-back tone service, also known as Color Ring, which typifies the successful personalization of mobile service in S. Korea.

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5. Tomi T Ahonen & Joe Barrett, *Attributes of Services for UMTS–What Makes for Desirable Services, in* SERVICES FOR UMTS: CREATING KILLER APPLICATIONS IN 3G 21 (Tomi T. Ahonen & Joe Barrett eds., 2002) [hereinafter *Attributes of Services for UMTS*].

6. JEFFREY H. ROHLFS, BANDWAGON EFFECTS IN HIGH–TECHNOLOGY INDUSTRIES 8 (2001) [hereinafter ROHLFS]. (Network externalities "apply to products and services that use telecommunications networks. As the set of users expands, each user benefits from being able to communicate with more [people] who have become users of the product or service.").

7. *See infra* part III.A.

8. "The ITU, headquartered in Geneva, Switzerland is an international organization within the United Nations System where governments and the private sector coordinate global telecom networks and services." Int'l. Telecomm. Union, *at* http://www.itu.int (last visited Sept. 1, 2003).

9. ITU INTERNET REPORT, *supra* note 1, at 135.

10. *Id.* at 29.

Part III discusses the cultural, manufacturing, marketing and regulatory differences between S. Korea and the U.S. in an effort to understand how the S. Koreans create a "killer environment"[11] for their mobile industry. Part IV of this Article makes policy recommendations to U.S. telecommunications policymakers, including Congress, the Federal Communications Commission ("FCC"), and the National Telecommunications and Information Agency ("NTIA") in redefining their respective jurisdictions over the wireless Internet and streamlining the current spectrum allocation procedure to achieve "allocative efficiency."[12]

II. MOBILE KILLER APPLICATIONS IN S. KOREA

In 1984, the first mobile service in S. Korea was offered for car phones.[13] Unlike the explosive deployment rate for broadband services,[14] it took almost eighteen years to achieve thirty-three million mobile phone users by April 2002.[15] Despite the significant differences in their deployment rates, both broadband access and mobile phones are widely considered essential elements of the S. Korean lifestyle[16] and work pattern.[17] According to the Ministry of Information and Communications ("MIC"), the mobile market growth was due to a confluence of factors, including the introduction of a competitive market sys-

11. *Attributes of Services for UMTS*, *supra* note 5, at 21 (describing a killer environment as a place in which it is easy to create new services and experiment with unusual applications, to learn more about customers and to give users the wide range of choices that will encourage them use their UMTS mobile device for everything from paying for bus, train, and air tickets to downloading music video clips and short movies).

12. U.S. GEN. ACCOUNTING OFFICE, REPORT TO CONGRESSIONAL REQUESTERS, TELECOMMUNICATIONS: COMPREHENSIVE REVIEW OF U.S. SPECTRUM MANAGEMENT WITH BROAD STAKEHOLDER INVOLVEMENT IS NEEDED, at 17 GAO–03–277, (Jan. 31, 2003), *available at* http://www.gao.gov/new.items/d03277.pdf [hereinafter GAO TELECOMM. REPORT].

13. Hyunsung Ryu, *Yidong Jeonhwa Gayipja Shamchunmhan Numeseo* [Mobile Subscribers Exceed 30 Million], DIGITAL CHOSUN, Apr. 1, 2002, *at* http://www.chosun.com/w21data/html/news/200204/200204010130.html.

14. ITU INTERNET REPORT, *supra* note 1, at 103 box 5.2.

15. Ryu, *supra* note 13.

16. *Id*.

17. ITU INTERNET REPORT, *supra* note 1, at 127.

tem, continuously improving quality, reduction in the telecommunications pricing scheme, and mobile device subsidy.[18]

Both broadband and mobile access create a greater consumer demand by "interlinking,"[19] or progressively shifting Internet traffic to the wireless platform. This enhanced interconnectability has helped forty-eight million S. Koreans create a new mobile-based information technology ("IT") paradigm in which many e-business models have migrated successfully into mobile platforms such as the online gift certificate.

A. Mobile Gift Certificate

The online gift certificate was first introduced in the S. Korean Market in April of 2000,[20] and in 2002, the overall market was estimated to be $5 billion.[21] There are two types of online gift certificates in the S. Korean market: paper certificates and email certificates.[22] The former are the functional equivalent of paper gift certificates that can be downloaded and printed before finalizing a purchase.[23] The latter provide enhanced capabilities, such as email payment methods that enable the recipients to finalize their purchases by email confirmation without any paper printouts.[24] Due to the strong mobile infrastructure, the gift certificate model gradually came to the mobile platform in 2001, with an initial market of $77 million ($100 billion Won).[25]

18. Ryu, *supra* note 13.

19. ROHLFS, *supra* note 6, at 9, 56–57.

20. *Online Shangpumkwon Jalagayo* [Online Gift Certificate Market Explosion], HANKOOK DAILY, Apr. 30, 2002, *at* http://www.hankooki.com/netInfo/200204/ni20020430172125n0020.htm (last visited Sept. 25, 2003) [hereinafter *Online Gift Certificate*]. *See infra* Table 1, which shows various online gift certificate services offered in S. Korea.

21. Minjung Hahn, *Tongshin Gupchedo Sangpumkwon Shijang Nundeok* [Telecom Service Providers Entering Into Gift Certificate Market], NAVER FIN. NEWS, Oct. 9, 2002, *at* http://news.naver.com/news_read.php?oldid=2002100900000164046&s=4,191&e=96,327.

22. *Online Gift Certificate*, *supra* note 20.

23. *Id.*

24. *Id.*

25. *Id*.

In November of 2001, SK Telecom ("SKT")[26] launched *NEMO*, the first mobile financial service in S. Korea.[27] *NEMO* services are particularly convenient because users can transfer money to each other by dialing the recipients' mobile numbers.[28] Thus, SKT serves as a "financial intermediary"[29] in the mobile financial transaction.[30]

In November of 2002, SKT expanded its mobile payment services to include more than ten personal information services, including credit card, digital cash, transportation cards and personal identification cards.[31] This mobile payment method is considered more secure than a credit card because users must verify their passwords each time they finalize a purchase.[32] However, in order for subscribers to use these enhanced mobile payment services, they must purchase new mobile phones with built-in memory chips and infrared data transmission capacity.[33]

Recent technical trends show that the mobile phone has evolved from a mere wireless voice communications device to a multimedia mobile data communications device that acts like both a universal remote control[34] and an internet protocol ad-

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26. SKT is one of the three major mobile telecommunications companies in S. Korea. *See generally* SK Telecom, *at* http://www.sktelecom.com/ (last visited Sept. 25, 2003).

27. *Yidongtongshinsa – Gymyongyeopche Yongtosayum* [New Turf Battle Between Mobile Service Providers & Financial Service Providers], JOINS NEWS, Nov. 8, 2002, *at* http://www.joins.com/it/200211/08/2002110818393079 35500051005113.html [hereinafter *New Turf Battle*]. As of September 2002, Network money ("NEMO") had more than 1.83 million users. *Id.* Network money is a form of electronic money used for e-commerce advance payment. *See 7734 Jeonsahwapae Nemo* [Electronic Money Nemo], *at* http://www.011estation.com:8005/estation_front/point/FaqContent.jsp?id=7734 (last visited Sept. 25, 2003).

28. *New Turf Battle*, *supra* note 27.

29. *Attributes of Services for UMTS*, *supra* note 5, at 21, 27.

30. *New Turf Battle*, *supra* note 27.

31. *Id.*

32. *Id*.

33. *Id*. One such enhanced service is "IR-Zoop," which enables subscribers to maintain credit card information inside their mobile phones and transmit such data via infrared system. Sejung Chang, *Hwedaejeonhwaro Card-Kyoljae Yrheemyon Yidalmal Bongyuk Service* [Credit Card Payment by Mobile Phone], JOINS NEWS, Nov. 5, 2002, *at* http://www.joins.com/money/200211/05/20021105181631947130003500 3517.html.

34. *See* Chang, *supra* note 33.

dress at once.[35] Additionally, such technical developments gradually changed the conventional frameworks of financial structures in S. Korea.[36]

B. M-coin Payment

S. Korean mobile operators use a "walled garden"[37] content model under which a content provider ("CP")[38] receives 90% of its overall revenues.[39] Despite this CP-friendly revenue sharing scheme, the mobile commerce[40] industry already faced difficulties in its content commercialization.[41] Absent profitable business models, it is difficult for any CP to invest in the development of additional mobile applications.[42] Despite the overestimated expectations of business-to-business transactions ("B2B"),[43] business-to-consumer transactions ("B2C")[44] became

35. Internet Protocol Version 6 ("IPv6") is a recent version of a 128 bit IP addresses. Increased length of IP addresses provides more flexibility in dealing with the network address shortage. *Whatis.com*, IT-specific Encyclopedia, *at* http://searchwebser vices.techtarget.com/sDefinition/0,,sid26_gci212389,00 .html (last visited Sept. 25, 2003). IPv6 enables wireless service providers to assign individual IP addresses and control multiple electronic devices at home. *See* IPv6 Forum, *IPv6, An Internet Evolution*, 3, *at* http://ipv6forum. com/navbar/papers/IPv6-an-Internet-Evolution.pdf (last visited Sept. 1, 2003).

36. For example, the prepaid mobile payment system is an attractive alternative to mobile service providers because it can generate incidental revenues from interest and unused gift certificates as some recipients inattentively will fail to use them. Hahn, *supra* note 21.

37. ITU INTERNET REPORT, *supra* note 1, at 55 (noting that a walled garden is a content business model in S. Korea where content providers and service providers split revenues in a ratio of 90:10).

38. A CP is an entity that creates educational or entertainment information for the Internet, CD-ROMs or other software-based products. Content Provider, *TechEncyclopedia*, The Computer Language Company, *at* http://ww w.techweb.com/encyclopedia/defineterm?term=content+provider (last visited Aug. 6, 2003).

39. ITU INTERNET REPORT, *supra* note 1, at 55.

40. *Id.* at 45.

41. *See id.*

42. *See id.*

43. Hankook Internet Baekseo 2002 [Korea Internet White Paper], Nat'l Computerization Agency, Ministry of Information and Communication (2002), at 232 [hereinafter White Paper].

44. "[A]ny business or organization that sells its products or services to consumers over the Internet for their own use." Susannah Patton, *The ABCs of B2C*, CIO, Aug. 27, 2001, *available at* http://www.cio.com/ec/edit/b2cabc. html.

the driving force behind the successful mobile content commercialization in S. Korea.[45]

In August 2000, Wow-coin first began using micro payment services to maximize the company's low-profit margins from e-business sites.[46] Micro payment services increased the company's revenue because it now could charge users who otherwise were unwilling to pay credit card transaction fees for nominal payments.[47]

M-coin is a mobile credit payment system that enables subscribers to make cashless purchases.[48] The M-coin system functions via a three-step process.[49] First, the mobile phone subscriber logs on to the wireless Internet site and selects the M-coin category.[50] Next, the user provides his or her national identification number and mobile phone number as user verification.[51] Finally, after the micro payment company approves the combination, it sends a password to the subscriber's mobile phone using a text messaging service that enables the user to send short messages via mobile telephone, known as Short Message Service ("SMS").[52] In 2002, more than 80% of S. Korean e-transactions, including mobile cartoons, movies and games, were processed via M-coin.[53] In 2001, the total market for M-coin was $77 million (100 billion Won).[54] Clearly, M-coin plays a critical role in the successful commercialization and migration of B2C e-business to a mobile platform.

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45. Despite the B2B e-marketplace slowdown, it was the B2C mobile micro payment that introduced a profitable mobile commerce business model. This was the case because it was critical to the delivery of communications content and services. ITU INTERNET REPORT, *supra* note 1, at 35.

46. Heebyun Kim, *Balsangul Bagudeoni Gilee Haljak* [Innovative Thinking Changed My Path: Mobile Payment Service: Info Hub CEO Interview], DIGITAL CHOSUN, Sept. 8, 2002, *at* http://www.chosun.com/w21data/html/news/200209/200209080157.html [hereinafter *Innovative Thinking*].

47. *Id.*

48. *Innovative Thinking*, *supra* note 46.

49. *Id.*

50. *Id.*

51. *Id.*

52. SMS is "[a] service available on digital networks, typically enabling messages within up to 160 characters to be sent or received via the message center of a network operator to a subscriber's mobile phone." ITU INTERNET REPORT, *supra* note 1, at xiii.

53. *Id.*

54. *Id.*

Micro payment systems, like *NEMO* and M-coin, are economically significant in two respects. First, the micro payment system itself promotes demand for SMS, increasing the economy of scale in the mobile industry.[55] Second, the micro payment system allows mobile service providers to generate additional revenues.[56] The mobile service providers act as "financial intermediaries"[57] where the mobile service provider automatically includes surcharges on the subscribers' monthly bills in exchange for the users' exemption from making separate payments.[58]

This market success is based on two key factors: widespread mobile payment infrastructure and successful e-business commercialization.[59] Additionally, third generation ("3G") wireless technology subscribers also have a significant impact on mobile payment market growth.[60] Mobile content business uses four major applications that contribute to the growth of the micro payment market: ring tone, downloads, characters and mobile games.[61]

C. Color Ring (Ring-Back Tone Services)

Like ring tone download services, "Ring-Back Tone Service"[62] is a mobile "rich calls"[63] service unique to the S. Korean mar-

55. *See generally Attributes of Services for UMTS*, *supra* note 5, at 26–30.

56. *See id.* at 30.

57. *Id.* at 21, 27.

58. *Innovative Thinking*, *supra* note 46.

59. White Paper, *supra* note 43, at 232.

60. CDMA 2000 is a third generation ("3G") wireless technology which has doubled voice capacity and data speed. It was also the first 3G IMT-2000 technology that was commercialized in late 2000. CDMA, *TechEncyclopedia*, The Computer Language Company, *at* http://www.techweb.com/encyclopedia/defineterm?term=CDMA%32%30%30%30&exact=1 (last visited Aug. 8, 2003). 3G wireless technology refers to developments in personal and business wireless technology, especially mobile communication, that are expected to mature between 2003 and 2005. TechTarget Network, *Whatis.com*, IT-specific Encyclopedia, *at* http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci214486,00.html (last visited Sept. 24, 2003).

61. White Paper, *supra* note 43, at 232.

62. Heebyun Kim, *Handphone "Color Ring" Service Gaebal Park Sanghwan Shajang* [Mobile Phone Color Ring Service Developer CEO Sang-Hwan Park], DIGITAL CHOSUN, Oct. 6, 2002, *at* http://www.chosun.com/w21data/html/news/200210/200210060109.html.

ket.[64] Both are examples of a "manufacturer's 'club'" designed by device manufacturers to create a direct relationships with end-users.[65] However, there are some inherent differences between ring tone downloads and ring-back tone services. While the former is a simple electrical replacement of mechanical ring tones, the latter is an advanced service, which enhances the user's experience by allowing subscribers to personalize their ring-back tones based on incoming telephone numbers via caller identification ("Caller ID") service[66] and calling times.[67]

On April 14, 2002, SKT introduced Color Ring service into the S. Korean market.[68] Color Ring enables subscribers to download more than seven thousand, five-hundred different sounds, including Korean pop songs.[69] In October 2002, three million users subscribed to the Color Ring service.[70] In addition, Color Ring service is extremely inexpensive, costing the consumer 90 cents per month and an additional 10 cents for each thirty second update.[71] This low-cost pricing scheme interacts well with the micro payment systems because the low prices attract more

63. Russell Anderson et. al., *Services to Address the "Me" Needs–Extending Me and My Community*, *in* SERVICES FOR UMTS: CREATING KILLER APPLICATIONS IN 3G 105, 114 (Tomi T. Ahonen & Joe Barrett eds., 2002), at 105–107 ("Rich calls consist of calls combining different media and services, such as voice, video and mobile multimedia messaging, into a single call session."). Press Release, *Nokia and Omnitel Vodafone Make the First Rich Call in an End-to-End All IP Mobile Network*, Nokia (Feb. 20, 2002), *at*, http://press.nokia.com/PR/200202/849302_5.html [hereinafter *Nokia Press Release*].

64. *Nokia Press Release*, *supra* note 63.

65. ITU INTERNET REPORT, *supra* note 1, at 49. A manufacturer's "club" is a marketing approach in which manufacturers attempt to create a direct relationship with end-users. *Id.*

66. Jeongbotongshin Sayupbup [Telecomm. Bus. Act], Law No. 6360, art. 22 1–1 (S.Korea) [hereinafter Telecomm. Bus. Act].

67. Sanghoon Tak, *IT Chosun: Geebalhan Tonghwa Daegeeum "Feeling" Service Ingee* [Innovative Dial–Back Tone Service, Color Ring Becomes Popular], DIGITAL CHOSUN, July 21, 2002, *at* http://www.chosun.com/w21data/html/news/200207/200207210138.html.

68. *Id.* Using Color Ring, subscribers can distinguish themselves by replacing monotonous ring-back tones with their preprogrammed sounds to entertain for calling parties. *Attributes of Services for UMTS*, *supra* note 5, at 25.

69. *Id*.

70. *Id.*

71. *Id*. *See also Attributes of Services for UMTS*, *supra* note 5, at 28.

marginal users who otherwise would not incur monthly charges in excess of their reservation prices.

Inspired by SKT's success, the two remaining S. Korean service providers joined the dial-back tone market.[72] On July 1, 2002, LG Telecom ("LGT")[73] introduced a similar service called Feel Ring, which uses the pop song, "Feelings" as its default ring-back tone.[74] As of the end of 2001, LGT had over 400,000 subscribers.[75] Korea Telecom Freetel ("KTF")[76] finally entered into the ring-back tone market on October 1, 2002 with its "2Ring" service, which provides the same sounds both to incoming and outgoing calls.[77]

III. S. KOREAN MOBILE MARKET ANALYSIS

This Part focuses on the role of culture, manufacturing capabilities, market segmentation and telecommunications regulations in the S. Korean mobile market. In 2002, S. Korea had three major mobile service providers: SKT, KTF, and LGT,[78] each of which benefited from S. Korea's unique socio-cultural environment. To better understand S. Korean telecommunications regulations, this Part first reviews certain aspects of its local culture.

A. Cultural Factors

Before one can understand the S. Korean mobile market, it is important to understand how and why S. Korea has differentiated itself from the rest of the world.[79] One factor is the culture

72. Tak, *supra* note 67.

73. *See generally* LG Telecom, *at* http://www.lgtelecom.co.kr (last visited Oct. 7, 2003).

74. Tak, *supra* note 67.

75. *Id.*

76. Korean Telecom Freetel is "one of the world's fastest growing and largest Personal Communications Services (PCS) operators." *Korea Telecom Freetel Plans 1xEV Commercial Deployment*, Qualcomm (Mar. 20, 2001), *at* http://www.qualcomm.com/press/pr/releases2001/press112.html.

77. *KTF Yangbanghang Tonghwa Yeongyulum Service* [KTF Introduced Bi-directional Dial Back Tone Services], JOINS NEWS, Sep. 29, 2002, *at* http://www.joins.com/it/200209/29/20020929141935763250005100 5113.html. *See also infra* Table 2.

78. *See infra* Table 3 (showing the market shares and growth rates of the three major mobile service providers in S. Korea as of Sept. 2002).

79. *See* ITU INTERNET REPORT, *supra* note 1, at 103 box 5.2.

of S. Korea, and in particular, three cultural characteristics of Koreans: *Hangul*, *Nunchee*, and *Balli-Balli,* each of which is unique to the Korean culture.

1. *Hangul*

Use of the native Korean language, *Hangul*, in telecommunications provides this market with a unique competitive advantage.[80] Unlike ideographic Chinese characters, *Hangul* was designed specifically to be easy to learn and user-friendly.[81] *Hangul* consonants correspond to the speech organs and its vowels represent the round heaven, the flat Earth, and the upright human.[82]

In mobile applications, *Hangul's* simplicity plays a significant role in the success of S. Korean telecommunications due to the language's high level of local reference and the availability of handsets with the *Hangul* alphabet.[83] Moreover, it lends itself well to the mobile environment where the terminals have smaller display screens and limited keypad functions.[84]

2. *Nunchee*

S. Korea has a strong tradition of peer pressure, known as *Nunchee.* The Korean concept of community of interest generally creates interpersonal rapport among citizens through feelings of sociological security, oneness, and consensus.[85] Interest-

80. *Hangul* is an alphabet, currently consisting of 24 letters, which was invented by King Sejong in 1443. Korean Online, History of Hangul – Part I, *at* http://www.sigmainstitute.com/koreanonline/hangul_history.shtml (last visited Sept. 25, 2003). *See also* Korean Online, History of Hangul — Part III, *at* http://www.sigmainstitute.com/koreanonline/hangul_history3.shtml (last visited Sept. 25, 2003) [hereinafter History of Hangul – Part III].

81. *See generally Hangul Iran* [What is Hangul], The Hangul Foundation, *at* http://www.hangul.or.kr/M3-1.html (last visited Oct. 7, 2003). *See* History of Hangul — Part III, *supra* note 80.

82. History of Hangul — Part III, *supra* note 80. The famous Korean scholar, Inchee Jung, once mused about *Hangul* that a smart person could master *Hangul* in one morning's time, and that even a silly person could master it within ten days. *See Hangul Goa Hanja Beegyo* [Comparison between Hangul and Chinese], The Hangul Foundation, *at* http://www.hangul.or.kr/M3-4-1.htm (last visited Sept. 25, 2003).

83. ITU INTERNET REPORT, *supra* note 1, at 104.

84. *Id*. at 92.

85. *See* Anderson et. al., *supra* note 63, at 114.

ingly, *Nunchee* is a substantial factor in making S. Koreans "early adopters."[86] S. Koreans embrace new products and services more easily because they tend to compare their personal electronic devices with each other.[87] Peer pressure increases mobile phone replacement cycles, which, in turn, promotes higher sales revenues for device manufacturers.[88] Thus, manufacturers are more willing to invest in development and deployment of new devices.[89] *Nunchee* is most prevalent in the teenage market, the leading market driver in S. Korea.[90]

3. *Balli-Balli*

Balli-Balli is a Korean expression, literally translated as "quickly, quickly."[91] Many Koreans, both the North and the South, consider themselves Mongolian descendents and, accordingly, accept the typical nomadic cultural characteristics.[92] Unlike an agricultural people, nomadic tribes are early adopters.[93] As such, *Balli-Balli* influences trends within the IT industry. For example, according to the 2002 U.S. Wireless Mobile Phone Evaluation Study conducted by J.D. Power & Associates, while the average U.S. subscriber replaces his or her mobile phone every eighteen months,[94] the average S. Korean replaces his or her mobile phone every seven months.[95] This significantly faster replacement rate generates higher sales revenues for mobile phone manufacturers.[96] Over time, greater

86. *Id.*
87. *Id.*
88. *Id.* at 114.
89. *Id.*
90. ITU INTERNET REPORT, *supra* note 1, at 131.
91. KUM SUNG CONCISE KOOKASAJEON [Kum Sung Concise Korean Language Dictionary] 653 (1st ed., 1988).
92. Yong-Sam Kim, *Chicago Hanin Saegaesungyodaehwe Chyijaegee* [Report on Korean World Mission Conference 2000], MONTHLY CHOSUN, Sept. 2000, *at* http://monthly.chosun.com/html/200008/200008210021_12.html.
93. Yong-Sam Kim, *Report on Korean World Mission Conference 2000*, MONTHLY CHOSUN, Sept. 2000, *at* http://monthly.chosun.com/html/200008/200008210021_12.html.
94. Press Release, *2002 U.S. Wireless Mobile Phone Evaluation Study*, J.D. Power & Associates, Oct. 24, 2002, *at* http://www.jdpa.com/presspass/pr/pressrelease.asp?ID=2002116.
95. Deborah Orr, *The Rise of Samsung*, FORBES.COM, Nov. 11, 2002, *at* http://www.forbes.com/global/2002/1111/023.html.
96. *See id.*

consumer demand encourages manufacturers both to invest in further research and development at home, and to enter into the global market with new models, like color phones.[97]

B. Manufacturing Capabilities

1. The Color Phone Era

Historically, wireless service providers subsidized their subscribers' mobile phone purchases as a means of competing in the S. Korean market.[98] In April 2002, the MIC banned this practice.[99] This anti-subsidization regulation negatively impacted the domestic demand pattern, immediately decreasing the monthly growth rate to historic lows.[100] On October 11, 2002, the Korean Assembly introduced Bill No. 161797, which added anti-subsidy provisions to the Telecommunications Business Act ("TBA").[101]

The introduction of mobile phones with color displays was the driving force behind increased demand for mobile phone sales. End-users disposed of otherwise current black-and-white phones to purchase the state-of-the-art multimedia mobile devices with Internet access.[102] The advent of color display phones rejuvenated the saturated S. Korea mobile market.[103] Due to this high market saturation, the main issues became how to stimulate the domestic mobile phone manufacturers, including the Korean conglomerates, Samsung Electronics and LG Electronics ("LGE"), to meet the demand for new handsets.[104] In ad-

97. *Id.*

98. Chanwook Park, *Hewdaefone Gayipjasu Jeunggasaero Banjeon* [Mobile Subscription Rate Goes Up Again], DIGITAL CHOSUN, June 5, 2002, *at* http://www.chosun.com/w21data/html/news/200206/200206050034.html.

99. *Id.*

100. *Id.* (noting that the growth rate dipped in May 2002).

101. Jongbotongshin Sayupbubjong Gaejungbup Jaeahn [Korean Assembly, Bill No. 161797], *available at* http://search.assembly.go.kr/bill/doc_10/16/pdf/161797_10.HWP.PDF. *See* Telecomm. Bus. Act, *supra* note 66, art. 35(1)(a)(5), art. 36(3)(b).

102. Kihong Kim, *Hwudaefon Shijang Caladaejeon*, [Mobile Market: Color War], DIGITAL CHOSUN, Apr. 28, 2002, *at* http://www.chosun.com/w21data/html/news/200204/200204280238.html (last visited Sept. 25, 2003) [hereinafter *Color War*].

103. ITU INTERNET REPORT, *supra* note 1, at 46.

104. *Id.* at 104.

dition to existing users, both dominant manufacturers have offered new products with both enhanced features and color screens, thus taking part in the global trend towards competing with PDA manufacturers. This, in turn, results in the creation of products that are better suited for multimedia viewing and delivery.[105]

In the first quarter of 2002, color display mobile phones exceeded 50% of S. Korea's total mobile phone market.[106] Thus, the mobile telephone industry is evolving from a text and black-and-white generation to a graphics and color generation.[107] In order to provide graphics and motion picture services, the display for mobile devices became larger and lighter.[108] Accordingly, Samsung Electronics,[109] LGE,[110] and Motorola[111] are focusing on further development and production of high-definition color phones, both because the average revenue per user[112] for mobile data from subscribers to the new generation CDMA x1 is more than twice that of the previous model users, and because four-fifths of color phone subscribers use mobile data facilities.[113] Likewise, the introduction of color handsets in September 2001 has played a key role in increasing the level of mobile data demand in S. Korea.[114]

105. ITU INTERNET REPORT, *supra* note 1, at 46. PDA stands for Personal Digital Assistant (electronic handheld information device). PDA, Acronym Finder, *at* http://www.acronymfinder.com (last visited Sept. 2, 2003).

106. *Color War*, *supra* note 102.

107. White Paper, *supra* note 43, at 317.

108. *Id*.

109. Young-Cheol Park, *Mobile Phones: The Latest Features*, Samsung.com, *at* http://www.samsung.com/myguide/mcmn/mcmn005.asp? (last visited Oct. 4, 2003).

110. Press Release, *LGE Organic EL*, LG Electronics Inc. (Jan. 2002), *at* http://www.lg.co.kr/English/product/new/hitproduct/list.jsp?life_num=51&edit_date=200201 (last visited Aug. 28, 2003).

111. Press Release, *Motorola Introduces Java Technology-Enabled Phone with Color Display*, Motorola Inc. (Mar. 25, 2002), *at* http://www.motorola.com/mediacenter/news/detail/0,1958,1275_962_23,00.html.

112. ITU INTERNET REPORT, *supra* note 1, at 132.

113. *Id*. CDMA x1 is a 3G technology that provides high transmission speeds. *Id.*

114. *Id*.

2. Creative Destruction

In addition, the color phone competition gave rise to "creative destruction."[115] LGE rapidly destroyed the then-existing market structure by introducing color phones into the Korean market, taking the "first-mover advantage,"[116] thus narrowing the gap between it and Samsung Electronics, the dominant domestic manufacturer.[117] Moreover, LGE benefited from its own vertical integration[118] because LGE was the only domestic mobile service provider in S. Korea with manufacturing capabilities.[119] This vertical integration plays a crucial role in allowing LGT to secure shares of the future market through "complementary bandwagon effects."[120]

Moreover, there has been a significant shift in the market trend. Due to the emergence of the market presumption that color phone manufacturability is the most important factor for corporate survival in the domestic mobile market race, the number of manufacturers that do not market color phone prod-

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115. ROHLFS, *supra* note 6, at 39 (noting that creative destruction has been defined as the process whereby a new technology firm usurps an existing firms' market share to enter effectively into the market).

116. *Id*. at 38. The first mover advantage exists where the initial producer has a "head start in moving down the learning curve to reduce costs and improve service quality. These competitive advantages often allow firms to earn large profits." *Id.* LGE introduced the first 65,000 color phones in January 2002. *Id.*

117. *Color War*, *supra* note 102.

118. Vertical integration is "the degree to which a firm owns its upstream suppliers and its downstream buyers." Vertical Integration, Strategic Management, QuickMBA, *at* http://www.quickmba.com/strategy/vertical-integration/ (last visited Sept. 2, 2003).

119. *See* Yeonsoo Shin, *Kyungjae Focus: Samsung and LG Jeonja "Gupchirok Dyuchirok" Yidungdatum* [Samsung & LG Electronics Shooting for the Number One Position], DONGA.COM, Apr. 28, 2002, *at* http://www.donga.com/fbin/moeum?n=it$k_701&a=v&l=71&id=20020918159.

120. ROHLFS, *supra* note 6, at 8–9. Complimentary bandwagon effects as the concept whereby a product's

> value derives, at least in part, from use of competitively supplied complementary products. For example, as more consumers purchase a hardware product, software vendors have greater incentives to produce software for that product. As the vendors respond to those incentives, purchasers of the hardware benefit from greater availability of software.

Id.

ucts has declined.[121] The market success of color phone brands also has had a significant impact on online content (like online cartoons) since the color function improved the display quality for many wireless Internet subscribers in S. Korea.[122]

C. Subscriber Membership System

Market segmentation is the practice of breaking down markets by certain traits,[123] usually by social groupings or other demographics.[124] Segments primarily divide along age and gender lines because there is a discernable difference in mobile Internet usage in terms of income and gender.[125] In addition, both the physical limitations of the mobile phone's small display and slow Internet speeds encourage mobile service providers to focus on more targeted uses.[126]

Profiling services and strategic alliances are two trends within segmentation that should be emphasized.[127] A profiling service is an ongoing process that enables mobile service providers to centralize customer databases on multiple platforms.[128] In so doing, the service providers use profiling servers, which store the end-users' profiles when the users have multiple access to content on the Internet, thus replacing the current e-commerce cookie structure across multiple access devices.[129]

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121. *Color War*, *supra* note 102.

122. Kihong Kim, *Mobile Manhwa Service Nuleo* [Mobile Cartoon Services Increase], DIGITAL CHOSUN, Mar. 30, 2002, *at* http://www.chosun.com/w21data/html/news/200203/200203030149.html.

123. *Attributes of Services for UMTS*, *supra* note 5, at 1.

124. *Id.* This practice sets as its ultimate, if unachievable, goal the creation of "segments of one," at which point, "a marketer can target each individual on a one-to-one basis and has the greatest opportunity to take the potential customer through the buying cycle: Awareness, Interest, Decision, Action." *Id.* This S. Korean practice of market segmentation also may lead to a global trend. ITU INTERNET REPORT, *supra* note 1, at 105.

125. *Id.*

126. *Id*. at 46.

127. *Attributes of Services for UMTS*, *supra* note 5, at 6–11.

128. A multiple platform uses "two or more operating environments, which typically include the CPU family and operating system." Multiple platforms, *TechEncyclopedia*, The Computer Language Company, *at* www.techweb.com encyclopedia/defineterm?term=Multipleplatforms&exact=1 (last visited Oct. 3, 2003).

129. Joe Barrett & Tomi T. Ahonen, *Intro to Services for UMTS – The Future Starts Here, in* SERVICES FOR UMTS: CREATING KILLER APPLICATIONS IN 3G,

Second, manufacturers and service providers have developed strategic alliances that are directed at certain market segments.[130] For example, KTF and Samsung Electronics formed an alliance to service the female market. KTF provides Drama Plans to its subscribers[131] while Samsung Electronics provides them with complementary Drama Color Phones.[132] This complementary bandwagon effect enables the S. Korean mobile industry to cope effectively with the recent market saturation at home by introducing a variety of telephones with new designs and functions.[133]

1. Age-Specific Market Segmentation

As the domestic mobile market moves closer to market saturation, the main issue shifts from an analysis of quantitative market patterns to an analysis of mobile Internet user patterns because Internet use has become more important than mere access to the Internet.[134] Accordingly, the major mobile service providers have begun to focus on niche markets defined by segmentation.[135] Initially, mobile service providers segmented the mobile market based on the age group of their subscribers.[136]

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supra note 14, at 11 [hereinafter *Intro to Services for UMTS*]. Cookies are text data created by an Internet Service Provider ("ISP") that is stored on a user's personal computer. Cookies are designed to keep track of a user's web-surfing patterns and preferences via web-browsers. Cookie, *TechEncyclopedia*, The Computer Language Company, *at* http://www.techweb.com/encyclopedia/defineterm?term=cookie (last visited Aug. 8, 2003).

130. *See* Sunku Byun, *Hwudaefon Hanaro Yeoleenun Yeojasaeshang* [Entrance to Cellular Women's World], JOINS NEWS, Sept. 24, 2002, *at* http://www.joins.com/it/200209/24/20020924162440980150005100 5113.html.

131. *Id.* (noting that drama plans target women by providing them free access to women's personal services, like beauty salons).

132. *Samsung Jeonja, Yeosungjeonyong Culeohwudaefon Chulshi* [Samsung Electronics Introduces Pro-Female Color Mobile Phone], JOINS.COM, Aug. 19, 2002, *at* http://www.joins.com/it/200208/19/20020819104734107250005100511 3.html [hereinafter *Pro-Female Color Mobile Phone*].

133. Byun, *supra* note 130.

134. White Paper, *supra* note 43, at 106.

135. Keehong Kim, *Tonghawshijang: Pohwashangtae Tagae Tumsaenulpeegee* [Telecom Market Saturation: Niche Market Search], DIGITAL CHOSUN, July 8, 2002, *at* http://www.chosun.com/w21data/html/news/200207/200207080231.html.

136. White Paper, *supra* note 43, at 311. *See infra* Table 4 (showing age-specific services offered by three mobile service providers in S. Korea).

Then, in order to generate higher revenues, they employed an age-specific marketing strategy to appeal to the differing needs of users within their respective age groups.[137]

Due to its "connectedness"[138] and intrusiveness, the mobile Internet gradually changed the lifestyle of S. Koreans. For example, teenagers have proven to be the most avid users of the mobile Internet, as evidenced by the fact that one-third of their overall phone bills are spent on mobile data.[139] Due to high mobile data use by teenagers, the market for cartoon animation, known as Avatar, has emerged.[140] Originally, Avatar was designed "to represent the user when entering chat rooms or sending messages,"[141] but it gradually evolved into a mobile culture exemplified by programs such as the Avatar Mobile Dating Simulations Game, which imitates blind dates using graphic images and chatting on the mobile Internet.[142] In order to facilitate the use of Avatar for teenagers who typically do not have stable income sources, e-business sites provide a deferred payment system.[143] However, due to recent misuses, the S. Korean Fair Trade Commission[144] prohibited further use of any deferred payment arrangements with teenagers without express parental consent. Additionally, parents, at their discretion, have the

137. White Paper, *supra* note 43, at 311. While the younger generations tend to prefer games, chatting, and entertainment contents, the older generations want financial information, sports, and weather forecasts. *Id*. at 310. Like in other countries, teenagers are the market demand drivers in S. Korea. ITU INTERNET REPORT, *supra* note 1, at 131.

138. ITU INTERNET REPORT, *supra* note 1, at 131. Connectedness is the joining and linking of websites and people through mobile technology. *Id.*

139. *Id.*

140. *Id*.

141. *Id.*

142. Ushik Jung, *Mobile "Yanaegame Chunsangyeonbun" Service Gaeshi* [Mobile Dating Simulation Game Services Introduced], DIGITAL CHOSUN, Nov. 11, 2001, *at* http://www.chosun.com/w21data/html/news/200111/20011119036 4.html [hereinafter *Mobile Dating Simulation Game*].

143. Young Jin Kim, *Gongjeonwe: Chongseoyeon Hwudaejeonhwa Gyuljae Bumodongyu Yichseoya Jeegup* [Fair Trade Commission: Teenagers Required Parental Consent For Deferred Payment], DIGITAL CHOSUN, July 1, 2002, *at* http://www.chosun.com/w21data/html/news/200207/200207010212.html [hereinafter *Teenagers Required Parental Consent*].

144. *Mobile Dating Simulation Game*, *supra* note 142.

ability to establish credit limits on their children's monthly usage.[145]

The question arose as to whether price-conscious and less loyal teenagers would continue to use mobile data applications as they reached adulthood.[146] Recently, the ITU attempted to answer this question using a parallel comparison study with the video game market, where the teenage groups have continued to play video games as they reached adulthood.[147] Like the ITU, S. Korean operators have targeted the teen and pre-teen markets on the theory that while wireline broadband services have widespread, age-neutral acceptance, wireless Internet services are popular only among younger generations[148] who desire any new products and services.[149] In part, the trend results from advertisers' marketing strategies, which overlook other segments of the population, like the senior citizen class.[150]

Recently, however, mobile service providers have begun to pay closer attention to the senior citizen class because it remains a sizable niche market, and the gap between it and other age groups has increased.[151] Mobile service providers have created "Silver Plans" that discount incoming rates and limit outgoing calls for seniors.[152] On the hardware side, LGE provides Silver Phones that are designed specifically for senior citizens with larger keypads and easy-to-read screens.[153]

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145. *Teenagers Required Parental Consent*, *supra* note 143.

146. ITU INTERNET REPORT, *supra* note 1, at 131.

147. *Id.*

148. Changok Park, *Hwudaefon Museonintenet Yeeyongyul Jeojo* [Mobile Internet Usage Still Low], DIGITAL CHOSUN, July 21, 2002, *at* http://www.chosun.com/w21data/html/news/200207/200207210029.html. The younger generations are people in their teens and twenties. *Id.*

149. Kihong Kim, *Gaesungyupnun Hwudaejeonhwa – PDA nun Gara* [Say Goodbye to Mobile Devices with Personalization], DIGITAL CHOSUN, June 16, 2002, *at* http://www.chosun.com/w21data/html/news/200206/200206160159.html. *See infra* Table 4.

150. *Id*. The senior class group comprises people over fifty. *See* White Paper, *supra* note 43, at 26.

151. *See* White Paper, *supra* note 43, at 26, 31.

152. Jeonglae Lee, *Hwudaefondo Silver-yugum Naonda* [Silver Plans Introduced for Mobile Phones], DIGITAL CHOSUN, Dec. 23, 2001, *at* http://www.chosun.com/w21data/html/news/200112/200112230028.html.

153. *See, e.g.* ITU INTERNET REPORT, *supra* note 1, at 132. Also, in May 2002, telecommunications service providers agreed to extend a thirty percent discount rate on wireless data services for disabled and low-income groups.

2. Gender-specific Market Segmentation

In order to take advantage of recent market analysis indicating that women comprise a niche market, S. Korean mobile providers marketed new service plans for female subscribers.[154] In February 2000, KTF launched its Drama service, which now serves over 750,000 subscribers.[155]

As part of their plan to target the female demographic, mobile service providers also offer off-line customer benefits, such as KTF's Drama House, which allows its subscribers and a guest to use its beauty salon and Internet café services free of charge.[156] In conjunction with KTF's offer, Samsung Electronics provides Drama Color Phones designed for savvy female subscribers.[157] As the base-product supplier, Samsung Electronics profits by introducing a complimentary product, like Drama Color Phones, to KTF, its corresponding mobile service provider.[158] This exemplifies Rohlf's concept of successful supply coordination designed to induce complementary mobile services.[159]

D. Korean Telecommunications Regulations

1. Calling-party-pays & Per-minute-based Billing System

There are two significant regulatory differences between the U.S. and the S. Korean billing structure. The first is the S. Korean calling-party-pays (or "CPP")[160] method in which mobile service providers only charge calling parties, while the fixed line user must pay a premium to contact a mobile user.[161]

Mobile Phone Consumer Rights to Be Bolstered: The government has unveiled a list of measures aimed at promoting the rights of mobile phone users, KOREA TIMES, May 13, 2002.

154. *See* White Paper, *supra* note 43, at 106 (noting that while female groups have higher annual growth rates than their male counterparts, their overall Internet usage rate is still lower).

155. Byun, *supra* note 130. *See infra* Table 5.

156. *Id.*

157. *Pro-Female Color Mobile Phone*, *supra* note 132.

158. Byun, *supra* note 130.

159. ROHLFS, *supra* note 6, at 47 (explaining that supply coordination occurs when base-product suppliers design their products to "work well with the product designs of the complementary products").

160. ITU INTERNET REPORT, *supra* note 1, at 42.

161. *Id*.

Unlike the receiving-party-pays ("RPP") system[162] used in the U.S., CPP shifts the entire financial burden of the mobile call from receiving parties to calling parties on the home network, increasing reachability[163] and improving overall mobile traffic since CPP users do not carry any financial burden in receiving incoming calls.[164] The second is the S. Korean per-minute-based billing ("PMBB")[165] system for local fixed line telephony calls. Unlike the flat rate system used in the U.S., PMBB gradually decreases dialup Internet access and migrates voice communications from fixed lines to a mobile platform.[166] PMBB did not stunt early mobile growth, in part, because mobile subscribers are not penalized for receiving calls.[167]

Due to the RPP unlimited local call environment, U.S. mobile operators have not been as profitable as their S. Korean counterparts.[168] Such market conditions will not improve significantly unless they start levying above-cost termination charges on fixed-line operators.[169] Despite the differences between the U.S. and S. Korean systems, however, S. Korea adopted many regulatory concepts directly from the U.S., but then developed its own regulatory requirements for issues specific to wireless communication, such as mobile privacy.[170]

2. Mobile Privacy

Given the prevalence of mobile and broadband access in S. Korea, it is not surprising that communications privacy invasion is a concern. Under the current CPP billing system, mobile phone subscribers are vulnerable to intrusion by commercial advertisers or "spammers," which has financial consequences.[171] For instance, if a caller inadvertently calls back a commercial

162. *Id.*
163. *Intro to Services for UMTS*, *supra* note 129, at 1, 14.
164. ITU INTERNET REPORT, *supra* note 1, at 42.
165. *Id.* at 81.
166. *Id.* at 42.
167. *Id.*
168. *Id.*
169. *Id.* at 42.
170. *See* White Paper, *supra* note 43, at 214.
171. ITU INTERNET REPORT, *supra* note 1, at 93. "Spam mail is mail that is unsolicited by receivers, and that is typically sent for the purpose of advertising the services of the sender." *Id.*

number via the user's Caller ID service, the caller will incur additional charges for such unsolicited mobile advertising.[172]

The legal basis for communications privacy derives directly from Article 18 of the S. Korean Constitution.[173] Notably, it comes before Article 21, which confers Freedom of Speech.[174] Such constitutional priority plays a pivotal role in advancing the adoption of new technology-based privacy laws, such as anti-spamming law.[175]

In order to protect the stability of Internet communication,[176] the MIC revised its Ministerial Order No. 117 entitled "The Act on Promotion of Utilization of Information and Communications Network," which regulates commercial information transfers.[177] Now every unsolicited commercial advertiser is required to identify its email content as an advertisement in the subject line[178] and provide the sender's name and contact information,[179] as well as either its telephone number or email address in the body of each email.[180] Advertisers also must allow recipients to opt-out of their group email lists.[181]

However, Ministerial Order No. 117 does not protect mobile communications privacy because the Order applies only to traditional email transfers.[182] Therefore, on November 8, 2002, the S. Korean Assembly passed Bill No. 161975[183] to extend its anti-

172. ITU INTERNET REPORT, *supra* note 1, at 93.

173. "The secrecy of correspondence of no citizen may be infringed." S. KOREA CONST., ch. II, art. 18, *available at* http://assembly.go/kr/english/laws /constitution/constitution2.html (last visited Aug. 12, 2003).

174. *Id.* art. 21(1).

175. Jeongbotongshinmang Yiyongchokjeenmik Jeongbobohodungye Kwonhanbupyul [Act on the Promotion of Utilization of Information and Communications Networks], Law No. 6797, art. 50(1)(2) (S.Korea) [hereinafter Korean Communications Networks Act].

176. *Id.* art. 45(1).

177. *Id.* art. 50(1–2). Among other things, the purpose of the Act is to promote the utilization of information and communications networks by preventing a spam overload from unknown sources. *Id.*

178. Jeongbotongshinmang Yiyongchokjeenmik Jeongbobohodungye Kwonhanbupyul Shihangyoung, Ministerial Order No. 117, art. 11 § 2 (S. Korea) [hereinafter Ministerial Order No. 117].

179. Ministerial Order No. 117, art. 11 § 1.

180. *Id.*

181. Telecomm. Bus. Act, *supra* note 66, art. 50(2)4.

182. *See generally* Ministerial Order No. 117.

183. Jeongbotongshinmang Yiyongchokjeenmik Jeongbobohodungye Kwanhanbupyuljoong Gaejungbupyulan, S. Korea Assembly, Bill No. 161957 (Nov.

spamming laws to mobile phone, facsimile, and telephone[184] advertisements.[185] The recent amendment keeps the current industry-friendly opt-out format, and adds to it a toll-free opt-out call in-service and an automatic filtering service.[186] Additionally, the amendment imposes criminal penalties of up to two years of imprisonment on advertisers who send harmful materials to juveniles.[187]

3. Legislative Efforts on Digital Opportunities

Under Ministerial Order No. 111 to the TBA, "universal services"[188] comprise three categories: wireline telephone services, emergency telephone services, and free telephone services for disabled and low-income individuals.[189] In order to promote social welfare, the TBA provides free telephone services, including local and long-distance, directory assistance, personal mobile and paging for disadvantaged groups.[190] S. Korea's universal service[191] widens its consumer base and promotes greater supply and demand for new mobile services by increasing telecommunications use throughout the country.

The S. Korean legislature supported its forward-looking philosophy by passing the Act on Digital Divide Solution ("ADDS"), which defines the digital divide as a gap in accessing or in using

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8, 2002), *available at* http://search.assembly.go.kr/bill/doc_10/16/pdf/161975_10.Hwp.Pdf.

184. As for telephone and mobile phone advertisements, the senders are required to identify their messages as advertisements before starting any communications. Ministerial Order No. 117, art. 11, § 1.

185. Press Release, MIC, Anti-Spam Laws Apply to Telephones & Faxes (Nov. 9, 2002), *at* http://www.mic.go.kr/jsp/report/report_r.jsp?m_code=d100-2814-1 [hereinafter Anti-Spam Press Release].

186. ITU INTERNET REPORT, *supra* note 1, at 93 (describing filtering as the systematic deletion method based on specific senders or specific words by email servers or terminals). Filtering is a systematic deletion method based on specific senders or specific words by email servers or terminals. *Jeongbotongshin: Hwudaejeonhwa Spam Moonja Message-edo Gyataeryo* [Penalties Extend to Mobile Phone Spamming], DONGA NEWS, July 29, 2002, *at* http://www.donga.com/fbin/output?f=k_s&code=k__&n=200207290035&curlist=0.

187. Anti-Spam Press Release, *supra* note 185.

188. Telecomm. Bus. Act, *supra* note 66, art. 2–2(1) (S. Korea).

189. Jeonggitongshinsayup Shihangkyuchik, Ministerial Order No. 111, art. 2–2 § 1 (S. Korea).

190. *Id.*

191. Telecomm. Bus. Act, *supra* note 66, art. 2 § 1(a).

information telecommunications services[192] via information telecommunications networks,[193] broadly evaluating economic, regional, physical, or social conditions.[194] The ADDS contains two significant provisions: tax incentives and a mandatory IT education program.[195] In an effort to narrow the digital gap among the social classes, the ADDS provides special tax exemptions to companies that provide free telecommunications equipment or services to those who otherwise might not have access to them.[196] The ADDS also mandates that both national and local governments provide IT education and facilities to those who are either disabled, low-income, over the age of 60 or fulltime homemakers.[197] Furthermore, the National Assembly passed Bill No. 161659 to lift value-added taxes on IT devices, including mobile phones, and software for the disabled, all of which will reduce the retail price of IT products by 10%.[198] In sum, these policies create more digital opportunities, expand the mobile demand base, and externalize the overall mobile network.

IV. RECOMMENDATIONS TO U.S. POLICYMAKERS

Due to cultural and regulatory differences, it is difficult to predict the applicability of the S. Korean telecommunications policy to the current U.S. situation. However, historical studies indicate that wireless platforms popular in S. Korea inevitably will enter the U.S. market.[199] Nonetheless, this Article focuses on how various U.S. policymakers can improve the current

192. Jeongbokyukcha Haesoeh Kwonhan Bupyul [Act on Digital Divide Solution], Law No. 6356, art. 2 § 1(b) (S. Korea) [hereinafter Korean Digital Divide Act].

193. Korean Telecomm. Bus. Act, *supra* note 66, art. 2, § 1(a).

194. Korean Digital Divide Act, *supra* note 193, art. 2 § 1(b).

195. *See* generally Korean Digital Divide Act, *supra* note 193. *See also* The Commonwealth Network of Information Technology for Development, *Korea's Action Plan for Electronic Government*, *at* http://www.comnet.mt/Unesco/Country%20Profiles%20Project/south_korea.htm (last visited Sept. 25, 2003) [hereinafter *Korea's Action Plan*].

196. Korean Digital Divide Act, *supra* note 193, art. 14.

197. *Id.* art. 11.

198. Hyun-Kun Ko, *Jangaeinyong Jeongbotongshingeegee Naeyeonbuteo Bugasae Maenjae* [*VAT–Free for Special Telecom Devices*], JOINS NEWS, July 26, 2002, *at* http://www.joins.com/it/200207/26/20020726231939757150005100 5113.html.

199. ITU INTERNET REPORT, *supra* note 1, at 103.

regulatory framework so that it promotes further supply and demand in the mobile industry.

In January 2003, the General Accounting Office ("GAO") released its second spectrum report entitled "Comprehensive Review of U.S. Spectrum Management with Broad Stakeholder Involvement Is Needed."[200] In its report, the GAO explicitly recommends that the FCC Chairman and the Assistant Secretary of the NTIA, in consultation with other agencies and congressional committees, make a plan to establish an independent commission with wide representation from a variety of stakeholders in determining whether spectrum management reform is necessary.[201]

Under the current bifurcated structure between the FCC and the NTIA, with each spectrum manager serving different constituencies, it is difficult to resolve conflicts among spectrum users.[202] Technical difficulties have been exacerbated in several respects. First, wireless competition has grown dramatically nationwide, with 94% of the U.S population currently living in counties with three or more mobile service providers.[203] However, with 90% of current frequencies concentrated in 1% of the available spectrum, there is severe overcrowding and inefficient use of available space.[204] Moreover, despite the recent recommendations that the 90 MHz spectrum be allocated for 3G wireless service,[205] the FCC forecasts that additional spectrum allocation would be necessary to implement 3G services fully.[206]

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200. GAO TELECOMM. REPORT, *supra* note 12, at 17.

201. *See id.* at 44–45. The GAO suggests several areas that potentially require reform, including the current lack of coordinated national spectrum strategy, lack of comprehensive reviews of frequency assignments, and the potential need to implement incentive programs to encourage conservation of the spectrum. *See* U.S. GEN. ACCOUNTING OFFICE, REPORT TO CONGRESSIONAL REQUESTERS, BETTER COORDINATION AND ENHANCED ACCOUNTABILITY NEEDED TO IMPROVE SPECTRUM MANAGEMENT, at 34–35, GAO–02–906, (Sept. 2002), *available at* http://www.gao.gov/new.items/d0296.pdf (last visited Oct. 4, 2002) [hereinafter GAO COORDINATION & ACCOUNTABILITY REPORT].

202. GAO COORDINATION & ACCOUNTABILITY REPORT, *supra* note 201, at 5.

203. *Id.* at 11.

204. *See* GAO TELECOMM. REPORT, *supra* note 12, at 6.

205. *See* GAO COORDINATION & ACCOUNTABILITY REPORT, *supra* note 201, at 13–14. Spectrum allocation is

> a means of apportioning frequencies among various types of wireless services and uses to prevent radio interference…[S]pectrum alloca-

The following discussion considers how to reform the current U.S. regulatory structure to achieve allocative efficiency, and makes recommendations to the three respective policymakers: Congress, the FCC and the NTIA.

A. Legislature

1. Spectrum Allocation

One of the most important mobile communications policy issues in the U.S. is the 3G licensing process.[207] Licensing plays a fundamental role in the mobile market since the radio spectrum is a limited natural resource.[208] Ironically, while licensing procedures may facilitate mobile business development, they also can become an absolute barrier to market entry.[209] This is exemplified by licensees' technical ability to prevent others from entering and competing within the spectrum ranges under the color of their licenses.[210]

According to the ITU, the three major types of spectrum allocation systems are auction, comparative selection and hybrid selection.[211] While 3G deployment in the U.S. is still at the embryonic stage, now is the appropriate time for Congress to create legislation designating the appropriate spectrum allocation method. Perhaps the hybrid allocation model, similar to that used in Hong Kong, is the best alternative for the current U.S. market. Hong Kong has adopted only the auction method for allocation in the commercial sector. Hong Kong also is unique in that it uses a royalty-based auction that allows bidders to make an offer based on the percentage of future revenues (i.e. a

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> tion involves segmenting the radio spectrum into bands of frequencies that are designated for use by particular types of radio services or classes of users, such as broadcast television and satellites.

Id. at 5.

206. *See* GAO TELECOMM. REPORT, *supra* note 12, at 13–14.

207. ITU INTERNET REPORT, *supra* note 1, at 70.

208. *Id*.

209. *Id*.

210. *See generally* GAO TELECOMM. REPORT, *supra* note 12.

211. Comparative selection provides competing applicants a quasi-judicial (i.e., hearing) in which to argue why their request for licensing should be granted rather than other applicants' requests. *Id.* at 8.

royalty rate, rather than a total fixed cash price).[212] While the government can generate additional revenues for the 3G spectrum from an auction, it also can avoid increasing administrative burdens on policymakers, including the FCC and the NTIA, during the initial comparative selection process.[213] Such legislative clarity can help foster a killer environment for future mobile applications.

2. Structural Reform — Joint Committee on Information Service

Moreover, procedurally, Congress should reorganize its subcommittees with respect to the Internet and communications. Unlike the House of Representatives, where telecommunications and the Internet are managed under the same subcommittee,[214] there is ambiguity regarding the Senate's jurisdiction over wireless Internet applications. While the Senate's Communications Subcommittee ("Communications Subcommittee") has jurisdiction over spectrum allocations, the FCC Science, Technology, and Space Subcommittee ("Science Subcommittee") has jurisdiction over the Internet.[215] Although both subcommittees are under the Commerce, Science and Transportation Commit-

212. JEFFREY L. DUNOFF ET AL., INTERNATIONAL LAW: NORMS, ACTORS, PROCESS 239 (2002). *Id.* at 26, 28. Hong Kong, People's Republic of China, is a semi-autonomous region of southern China. In 1997, the territory that makes up Hong Kong was returned to China after almost one hundred years of British rule. Hong Kong, PRC has a free-market economy and is the financial and banking center of East Asia. *Id.*

213. ITU INTERNET REPORT, *supra* note 1, at 71–71.

214. In the House of Representatives, telecommunications and the Internet are under the jurisdiction of the Subcommittee on Telecommunications and the Internet, which is a subcommittee within the House Committee on Energy and Commerce. *See* Subcommittee on Telecommunications and the Internet, House Committee on Energy and Commerce, *at* http://energy comerce.house.gov/108/subcommittees/Telecommunications_and_the_Internet.htm (last visited Oct. 2, 2003). The Subcommittee on Telecommunications and the Internet has jurisdiction over "[i]nterstate and foreign telecommunications, including, but not limited to all telecommunication and information transmission by broadcast, radio, wire, microwave, satellite, or other mode." *Id.*

215. *See* Rules Governing Procedure for the Committee on Science (108th Cong.), Rule 3 under Structure and Jurisdiction. *See also* House Committee on Science, Committee on Science Membership – 108th Cong., *available at* http://www.house.gov/science.commiteeinfo/members.index.htm (last visited Oct. 2, 2003).

tee, jurisdiction over the Internet is split into two different subcommittees, which may have different policies on the same issue. Such structural inconsistency makes the legislative process less efficient.

Congress also could improve its structural form. First, the Senate should transfer exclusive legislative power over the Internet from its Science Subcommittee to its Communications Subcommittee. Second, Congress should create a joint committee on information services, covering multi-platform Internet, which supervises and oversees[216] the overall spectrum policy of the NTIA and the FCC.[217]

Congress' procedural ambiguity also makes it difficult for the FCC to implement communications policies on the Internet. The FCC has classified the Internet as information services[218] under Title I to avoid any regulatory inconsistency.[219] In the absence of any further legislative guidance, the FCC can deregulate wireless Internet as "information service" under its ancillary jurisdiction.[220]

B. Federal Communications Commission

1. Ancillary Jurisdiction

The FCC was established by the Communications Act of 1934 ("1934 Act"), which expressly delegates regulatory powers to the

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216. *See generally* About the Senate Committee System, U.S. Senate, *at* http://www.senate.gov/general/common/generic/about_committees.htm (last visited Oct. 2, 2003).

217. *See* GAO TELECOMM. REPORT, *supra* note 12, at 40.

218. Information service is defined in the U.S. Code as:

> the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service.

The Communications Act of 1934, 47 U.S.C. § 153(20) (2001).

219. *Id.*

220. *See* Philadelphia Television Broad. Co., v. Fed. Communications Comm'n, 259 F.2d 282, 284 (D.C. Cir. 1996).

FCC under the Commerce Clause of the U.S. Constitution.[221] The 1934 Act provides two different legal bases for FCC jurisdiction: general jurisdiction and ancillary jurisdiction.[222] The FCC's general jurisdiction to regulate communications is derived from Section 2(a) of the 1934 Act, which explicitly applies to all interstate and foreign communications by wire or radio.[223] The 1934 Act also gives discretion to the FCC in choosing jurisdictional bases and regulatory tools, including ancillary jurisdiction.[224] Most notably, Section 4(i) gives the FCC the ancillary authority to make any consistent rules and regulations so long as such changes are necessary for the FCC's regulatory functions, including Title III Radio communication.[225]

In the mobile service context,[226] the definition of radio communication[227] includes communications incidental thereto.[228] Therefore, another legal basis for the FCC's ancillary jurisdiction over mobile Internet services could be the FCC's classification of mobile Internet usage as incidental transmissions.[229] In so doing, the FCC can deregulate multi-platform communications uniformly via the Internet.

Even if the FCC cannot classify mobile Internet statutorily as an unregulated information service, the FCC can exercise its ancillary jurisdiction to define mobile Internet communications as an "advanced telecommunications capability,"[230] enabling it to

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221. *See* U.S. CONST. art. I, § 8, cl. 3. (Congress shall have the power "[t]o regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes").

222. *Philadelphia Television Broad. Co.*, 359 F.2d at 284.

223. *See* U.S. v. Southwestern Cable Co., 392 U.S. 157, 167 (1968); *see also* Fed. Communications Comm'n v. Midwest Video Corp., 440 U.S. 689, 696 (1979).

224. *Philadelphia Television Broad. Co.*, 359 F.2d at 284.

225. *See* The Communications Act of 1934, 47 U.S.C. § 154 (i). Title III Radio communication refers to the special provisions relating to the licensing of the radio spectrum. These provisions begin at 47 U.S.C. § 301.

226. *See Id.* at § 153(27) (describing mobile service, *inter alia*, as "a radio service carried on between mobile stations or receivers and land stations, and by mobile stations communicating among themselves").

227. *Id.* at § 153(33) (describing radio communication, *inter alia*, as "the transmission by radio of writing, signs, signals, pictures, and sounds of all kinds").

228. *Id.*

229. *Id.*

230. Telecommunications Act of 1996, Pub. L. No. 104–104, § 706(a).

promote efficient deployment of mobile technologies throughout the U.S.[231] Furthermore, considering the rapid technological convergence of wireline and wireless technologies, the FCC should take proactive measures to prepare a comprehensive guideline for Internet access in the multi-platform broadband context to expedite the creation of its wireless Internet infrastructure.

2. Interoperability Requirement

Like the FCC's multi-platform approach to its broadband policy, the FCC should implement a technology-neutral policy for 3G development and deployment because such policy would foster competition in the mobile market. Absent further legislative clarity, the FCC should interpret the 1934 Act to promote interoperability[232] among current wireless technologies, including CDMA and Global System for Mobile Communications ("GSM"),[233] to maximize the development and deployment of the overall wireless infrastructure.

Section 157, entitled "New Technologies and Services," places the burden on challenging parties to prove that the new technology or service is not consistent with public interest.[234] Since interoperability would further international cooperation among different 3G platforms and would afford the general public greater spillover benefits,[235] the FCC should promote the multi-platform approach and recommend the private telecommunications sector adopt a universal mobile platform with higher interoperability among different mobile providers. The FCC also

231. *Id.*

232. Interoperability is the capability of multiple "hardware devices or…software routines to work together" as a single unit. Interoperability, *TechEncyclopedia*, The Computer Language Company, *at* http://www.techweb.com/encyclopedia/defineterm?term=interoperability (last visited Aug. 8, 2003).

233. GSM is "a digital cellular phone technology based on [time division multiple access, or] TDMA….Developed in the 1980s, GSM was first deployed in seven European countries in 1992." Currently, it is used worldwide but has different spectrum: while it is operating in the 900MHz and 1.8GHz bands in Europe, the U.S. GSM providers use the 1.9GHz PCS band. GSM, *TechEncyclopedia*, The Computer Language Company, *at* http://www.techweb.com/encyclopedia/defineterm?term=GSM&x=10&y=8 (last visited Oct. 7, 2003).

234. *See* 47 U.S.C. § 157(a) (2003).

235. *See generally* ROHLFS, *supra* note 6, at 13–18.

should publish a white paper[236] on the significance of market feasibility tests on the aforementioned interoperability requirement.

C. The NTIA

Since the enactment of the Radio Act of 1927, the U.S. has retained its seventy-six-year-old "command and control"[237] approach to spectrum allocation, but with a spectrum management system divided between the NTIA and the FCC.[238] While the NTIA is responsible for spectrum use by the federal government, the FCC is responsible for nonfederal use.[239] Under the current divided authority approach, there are two inherent difficulties in effectively managing spectrum use.[240] First, there is no single governmental entity that has ultimate decision-making power with regard to spectrum use. Thus implementing the divided spectrum management system depends significantly upon the coordination and cooperation between the FCC and the NTIA.[241] Second, Section 305 of Title 47 is unclear because it does not show explicitly how to delineate boundaries between the two agencies' respective jurisdictions.[242]

As new "spectrum-dependent technologies"[243] create more demand for the limited spectrum, the NTIA continues to face the

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236. A white paper is an authoritative report written by vendors, research firms and consultants in a particular topic area, such as telecommunications. White Paper, *TechEncylcopedia*, The Computer Language Company, *at* http://www.techweb.com/encyclopedia/defineterm?term=Whitepaper (last visited Sept. 2, 2003).

237. *See* GAO TELECOMM. REPORT, *supra* note 12, at 9. Under this policy, the government primarily dictates how the spectrum is used. *Id.*

238. GAO COORDINATION & ACCOUNTABILITY REPORT, *supra* note 201, at 2–3.

239. *Id.*

240. *Id.*

241. *Id*. at 3.

242. *See* 47 U.S.C. § 305(a) (2003). Title 47 is entitled Government Owned Stations, Telegraphs, Telephones and Radiotelegraphs. Section 305 covers government owned stations. *See A Brief Profile of The National Telecommunications And Information Administration,* UTC JOURNAL, June/July 2002, at 20, *available at* http://www.journal.utc.org/file_depot/0-10000000/0-10000/3389/conman/NTIA.pdf (last visited Aug. 6, 2003).

243. GAO COORDINATION & ACCOUNTABILITY REPORT, *supra* note 201, at 1 ("The radio frequency spectrum is the medium that enables wireless communications of all kinds, such as mobile phone and paging services, radio and television broadcasting, radar, and satellite-based services").

two main problems of accountability and efficient use of spectrum.[244] To improve these problems, the Office of Science and Technology Policy ("OSTP")[245] should assume limited jurisdiction over spectrum allocation and formulate a national spectrum strategy.[246] Additionally, the NTIA, which conducts oversight activities to encourage accountability and spectrum efficiency,[247] should continue performing such functions.

1. Redemption of Spectrum Authority

In September 2002, the GAO released its first spectrum report, entitled "Telecommunications: Better Coordination and Enhanced Accountability Needed to Improve Spectrum Management."[248] In its report, the GAO suggested that the NTIA faced two main administrative problems: staffing and resource shortages.[249] In order to alleviate the administrative burden on the NTIA, spectrum decisions should be transferred to another government agency that can serve as a neutral third party.[250]

Among several suggested agencies,[251] the OSTP is the best alternative. Because the Office of Telecommunications Policy ("OTP"), a predecessor to the OSTP, originally had jurisdiction over spectrum allocation prior to the formation of the NTIA in 1978,[252] the shifting of authority should be considered as a mere redemption of spectrum allocation power to the OSTP. Moreover, the OSTP is in a better position to manage spectrum allocation than either of the NTIA, which is an umbrella agency under the Commerce Department, or the FCC, which is an independent regulatory agency. This is so because the OSTP's

244. *See generally id*. at 4.

245. *See generally* Official Site for the Office of Science and Technology, *at* http://www.ostp.gov (last visited Aug. 6, 2003).

246. For a definition of national spectrum strategy, see *id.* at 3.

247. *Id*. at 4.

248. GAO COORDINATION & ACCOUNTABILITY REPORT, *supra* note 201, at 2–3.

249. *Id.* at 4.

250. *See id.* at 14.

251. *Id.*

252. *A Short History of NTIA*, National Telecommunications and Information Agency, *at* http://www.ntia.doc.gov/opadhome/history.html (last visited Aug. 6, 2003). The OTP derived its authority from Executive Order 11556, entitled "Relating to the Transfer of Telecommunications Functions." *See* Nat'l Archives and Res. Admin., *at* http://www.archives.gov/federal_register/codification/executive_order/12046.html (last visited Oct. 4, 2003).

status under the Executive branch can coordinate interagency disputes more effectively and unify the current federal-nonfederal dichotomy system. However, such a power shift should not affect current interagency efforts between the NTIA and the FCC, like the "One Spectrum Team" approach,[253] because this proposal is limited to spectrum allocation authority.

2. Frequency Assignment Review Programs

Unlike the FCC, the NTIA, as a federal spectrum manager, must maximize the promotion of efficient and cost-effective use of the federal spectrum.[254] Due to the shortage of staff and resources,[255] the NTIA is not in a position to make an exhaustive assessment of frequency requests[256] or frequency reviews.[257]

To alleviate excessive burdens on the NTIA, the OSTP should assume limited jurisdiction over spectrum allocation. After removing the administrative burden on spectrum allocations, the NTIA should refocus its frequency assignment review[258] on narrowbanding[259] and trunking.[260] First, the NTIA should enforce more spectrum efficient technologies such as narrowbanding, which is significant because its reduction frees up spectrum availability for future mobile uses, like 3G services.[261] Likewise, the NTIA should continue to require all federal users to

253. For a description of the One Spectrum Team Approach, see GAO COORDINATION & ACCOUNTABILITY REPORT, *supra* note 201, at 18.

254. *Id*. at 25. *See* 47 U.S.C. § 903(d)(1).

255. GAO COORDINATION & ACCOUNTABILITY REPORT, *supra* note 201, at 25.

256. *Id*. at 26. A frequency request is a federal agency's application to the NTIA requesting a frequency assignment. *Id.*

257. *Id*. at 29. Frequency review is the NTIA's monitoring program over the federal agencies' respective needs for frequency assignments. The NTIA performs one review every five years. *Id.* at 27.

258. A frequency assignment review is used to assess whether an agency's frequency assignments are necessary to meet the agency's needs. *Id.* at 27–28.

259. Narrowbanding "is a technique for reducing the amount of spectrum (bandwidth) needed to transmit a radio signal, thereby freeing up spectrum to meet future growth." *Id.* at 31.

260. *Id.* at 32. Trunking allows conservation of spectrum, but does so "by enabling users to share a common set of voice radio channels rather than have their own dedicated channels that may not be heavily used at all times." *Id.* at 32.

261. *Id*. at 31.

upgrade their existing mobile system by 2008.[262] Moreover, responsibilities resulting from harmful interference should be placed with those agencies that fail to meet the narrowbanding deadline.[263] In the meantime, the NTIA should provide trunking as an interim solution for the aforementioned federal agencies prior to a *de jure* narrowbanding regime.

V. CONCLUSION

S. Korea is a market leader in broadband and mobile applications.[264] The country's success is the result of two important factors: effective development and deployment of killer applications and favorable socio-cultural norms. Despite the fact that the U.S. cannot mirror S. Korea's unique cultural conditions, the country's success, nonetheless, may predict imminent market growth in the U.S.[265]

However, in anticipation of this potential influx, U.S. policymakers should improve telecommunications infrastructure in order to take full advantage of this potential boon. First, Congress should designate only one spectrum allocation method. Specifically, Congress should consider the hybrid allocation model because it will enable the government to generate extra revenues for the 3G spectrum from an auction, while avoiding increasing administrative burdens on policymakers like the FCC and the NTIA. Second, Congress should structurally reform its Internet and Communications subcommittees. Transferring legislative power over the Internet from its Science Subcommittee to its Communications Subcommittee, and creating a joint committee on information services to oversee NTIA and FCC spectrum policy would improve legislative policy.

Third, the FCC should exercise its ancillary jurisdiction to promote efficient deployment of mobile technologies throughout the country. The FCC also should prepare a comprehensive guideline for Internet access to expedite the creation of its wireless Internet infrastructure.

Finally, to improve accountability and efficient spectrum use, the OSTP should assume limited jurisdiction over spectrum

262. *Id*.
263. *Id*.
264. ITU INTERNET REPORT, *supra* note 1, at 103.
265. *See generally id.* at 135.

allocation and formulate a national spectrum strategy. The OSTP also should assume limited jurisdiction over spectrum allocation from the NTIA. In turn, this would free the NTIA to refocus its frequency assignment review on narrowbanding and trunking. By enacting these reforms, the U.S. will be better positioned to take advantage of the impending mobile Internet expansion.

APPENDIX I

Table 1. Online Gift Certificate Services in S. Korea

Names	Service Areas	URLs	Target	Pricing
Happy Money Cultural Gift Certificate	movie tickets, books, music	www.happymoney.co.kr	teenagers	$3.35 $7.70
Happy 21	restaurants	www.happiandc.co.kr	diners	$3.30 – $77.70
Hair Gift Certificate	400 hair salons	www.dohari.co.kr	Women	N/A
Sports Gift Certificate	340 sports shops: skiing, swimming, golfing, and bowling tickets	www.ssbb.co.kr	sports fans	N/A
Arrange Marriage	set up meetings for singles	www.darksclub.com	singles	3 times: $269 6 times: $423 Internet chatting: $23
Insurance	ski, golf, new baby, marriage, PC, couple	www.insdream.com	everyone	$33: ski & golf $77: baby, marriage, PC, & couple
Tutor	40,000 nationwide tutor database	www.jinsoledu.com	students	N/A
Health Care	354 pharmacies, glasses shops	www.healthticket.co.kr	everyone	N/A
On/off	Online/offline shopping mall	www.gift.daum.net www.cj39.com www.lgeshop.com	everyone	N/A

Source: Hankook Daily[266] (Apr. 30, 2002).

266. *Online Gift Certificate*, *supra* note 20.

Table 2. Ring-Back Tone Service Comparison

	SKT	LGT	KTF
Start Date:	4/14/2002	7/1/2002	10/1/2002
Delay:	0	6 weeks	22 weeks
Service Names:	Color Ring	Feel Ring, R2U	2Ring, MP3 Ring Tone
User Base :	3 Million	400,000	N/A
Content Providers:	Witt Com (www.iplusm.com)	N/A	N/A
Revenues:	1.5 Billion Won	N/A	N/A

Source: Joins News (Aug. 21, 2002).

Table 3. S. Korean Mobile & 3G Service Providers

	SKT	**KTF**	**LGT**	**Total**
Total Subscribers	16,996,539	10,378,238	4,705,467	32,080,244
Market Shares	53%	32.3%	14.7%	100%
Monthly Growth Rates	1.2%	2.5%	6.8%	2.4%
CDMA 2000 1x	8,517,000	4,084,000	1,425,000	14,026,000
CDMA 2000 1x monthly growth	6.9%	15.2%	21.1%	100%
CDMA 2000 1x %	50.11%	39.35%	30.28%	39.91%

Source: MIC (Sept. 2002).[267]

267. *See generally* Jeongchakjaryo, [MIC Policy Data], *at* http://www.mic.go.kr/jsp/mic_d/d700-0002-1.jsp?code=H&m_code=c100-0635-1.

Table 4. Subscriber Membership Chart

	SKT	KTF	LGT
Prefix	011, 017	019	016, 018
Age	TTL Ting (13–17) TTL (18–23) UTO (25–35)	Bikie (13–18) Main (25–35) Na (early 20s) Angel Eye (kids/seniors)	Khai Holeman (10's) Khai (20's)
All	Leaders Club	KTF Members Club	LG Family Club
Others		Biz (business) Drama (women) K.merce (wireless/wired) Fimm (IMT-2000)	M-Plus Card (LG card, BC card, Kookmin card)

Source: Donga.com.

Table 5. Pro-Female Membership Plan Chart

	SKT	KTF	LGT	
Service Plans	CARA	Drama	I-Woman	Khai Girl
Beginning Dates	Aug. 2002	Feb. 2000		Sept. 2002
Discount Benefits	Family discount	10-20% off Skin care Restaurant Cultural classes	Discounted flat rate Free 30 minutes Family member discount 45% for three lines	N/A
Off-line Benefits	Global Elite Service (free English conversation w/ foreigners)	Drama House (free Internet café)	N/A	Hairstyle, Makeup & Clothing
Goals	Upgrade women's family lifestyle	Create a comfortable rest area for females	N/A	20's w/ interest in beauty

Source: Joins News (Sept. 24 2002).[268]

268. Byun, *supra* note 130.

Table 6. 65K Color Phone Market Share

	Market Shares	
LG Electronics	50%	550,000
Samsung Electronics	45%	N/A
Motorola	5%	60,000

Source: Digital Chosun (Apr. 2002).

APPENDIX II

CARRIER-SPECIFIC FREQUENCY ALLOCATION IN S. KOREA

Table 1. Mobile Frequency Allocation

a. Analog

Ch	Frequency (MHz)		Emission Type	Power	Coverage	Operators
	Mobile	Base				
	824–835 MHz Band 366 CHs	869–880 MHz Band 366CHs	40K0F9X	Below 20W	Nationwide	SK Telecom

Source: Central Radio Monitoring Office (CRMO), MIC

b. Digital

Ch	Frequency (MHz)		Emission Type	Power	Coverage	Operators
	Mobile	Base				
1	824.640	869.640	1M32G7W	Below 20W	Nationwide	SK Telecom
2	825.870	870.870				
3	827.100	872.100				
4	828.330	873.330				
5	829.560	874.560				
6	830.790	875.790				
7	832.020	877.020				
8	833.250	878.250				
9	834.480	879.480				
10	835.890	880.890	1M32G7W	Below 20W		
11	837.120	882.120				
12	838.350	883.350				
13	839.580	884.580				
14	840.810	885.810				
15	842.040	887.040				
16	843.270	888.270				
17	844.500	889.500				
18	845.910	890.910	1M32G7W	Below 20W		
19	847.140	892.140				
20	848.370	893.370				

Source: Central Radio Monitoring Office (CRMO), MIC

Table 2. PCS Frequency Allocation

Ch	Frequency (MHz)		Emission Type	Power	Coverage	Operators
	Mobile	Base				
1 2 3 4 5 6 7	1751.25 1752.50 1753.75 1755.00 1756.25 1757.50 1758.75	1841.25 1842.50 1843.75 1845.00 1846.25 1847.50 1848.75	1M32G7W	Below 20W	Nationwide	KTF
8 9 10 11 12 13 14	1761.25 1762.50 1763.75 1765.00 1766.25 1767.50 1768.75	1851.25 1852.50 1853.75 1855.00 1856.25 1857.50 1858.75	1M32G7W	Below 20W	Nationwide	KT.COM
15 16 17 18 19 20 21	1771.25 1772.50 1773.75 1775.00 1776.25 1777.50 1778.75	1861.25 1862.50 1863.75 1865.00 1866.25 1867.50 1868.75	1M32G7W	Below 20W	Nationwide	LG Telecom

Source: Central Radio Monitoring Office (CRMO), MIC

Table 3. IMT-2000 Frequency Allocation

Band	Frequency (MHz)	Types	Carriers	Homepages
1	1920-1940 MHz/ 2110-2130MHz	CDMA 2000	LG Telecom (IMT-2000 Grand Consortium)	www.lgtelecom.co.kr
2	1940-1960MHz / 2130-2150MHz	W-CDMA	SK-IMT	www.sktelecom.com
3	1960-1980MHz / 2150-2170MHz	W-CDMA	KTICOM	www.kticom.com

Source: Central Radio Monitoring Office (CRMO), MIC

Table 4. Telecom Service Frequency Allocation

Service Types	Frequency (MHz)	Emission Type	Power	Channels
Mobile Phone	Base: 869–894 Mobile: 824–849	40KOF9X 1M32G7W	20W	832ch/20ch
TRS	Base: 851–899 Mobile: 806–821	16KOF(G)	75W	Personal :200ch Business :400ch
	Base: 389.5–399.5 Mobile: 371.5–381.5	16KOF(G) OR 8K5OF(G)	75W	Personal :400ch (25 kHz:200ch) Business :400ch (25 kHz:200ch)
Wireless Date	Base: 938–940 Mobile: 898–900	8K50G7W	3W	Business :160ch
PCS	Base: 1840–1870 Mobile: 1750–1780	1M32G7W	Below 20W	30ch
Radio Paging	162.43–164.33 (26) 167.25–169.15 (27) 322-328.6 (264)	16KOF(G)	Below 70W Below 150W	317ch
WACS	910–914	8OKOF9X	Below 10mW	40ch

Source: Central Radio Monitoring Office (CRMO), MIC