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MGD424 - Assignment 2

**The Impacts of Convergence  
on the Mobile Telecommunications Industry**

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Convergence has been a buzzword in the information technology industry for years. According to Wikipedia, convergence is defined as ‘approaching a definite value, as time goes on; or approaching a definite point, or a common view or opinion, or a fixed state of affairs.’ (Wikipedia.com) More specifically, Wikipedia defines technological convergence as “the modern presence of a vast array of different types of technology to perform very similar tasks.” (Wikipedia.com) On the other hand, Straubhaar and LaRose define convergence as “the integration of mass media, computers and telecommunications.” (Straubhaar & LaRose, 2002) Since the meaning of convergence differs depending on the advocates, industries and popular culture, for the purposes of this paper, the definition of convergence that will be used is a meeting ground for various technologies or the process of coming together. (CSTB, 1995) Once media content is translated into binary code, different forms can be blended together or converged and the material is now defined by what it does (i.e. video stream or digital phone call) rather than the convergence of media (i.e. mobile telephones, television). In the mobile telecommunications industry, convergence consists of converging materials into one channel (e.g. video and photo capture ability in a cell phone) and the converging standards that facilitate further convergences in mobile telecommunications technology.

Mobile telephones, in the past, used to be operated from a single antenna and handled 46 conversations in one area where the 47<sup>th</sup> would not receive a dial tone. (Straubhaar and LaRose, 2002) Mobile telephones did not become popular until the launch of the second generation (2G) phones where the phones decreased in size and increased in network coverage. 2G services offered Global System for Mobile Communication (GSM) providing digital speech and signaling channels, differing from its analog predecessors. (Answers.com) In 2003, the advanced third generation (3G) services were introduced where industry focus is on building reliable and

sustainable networks. According to the International Telecommunications Union (ITU), 3G is defined as having data throughput rates of 144 kbps in mobile mode (vehicular speed), 384 kbps in pedestrian mode (walking speed) and 2Mbps in indoor stationary mode. (Brownlee, 2002) 3G wireless technologies were envisioned by industries in the late 1990s, as a result of declining 2G mobile technology sales, as being a wireless mobile technology that utilized broadband channels. 3G would enable increased bandwidth, greater data transfer, and features like video conferencing and accessing advanced websites. (Schilling, 2005) Changes in technology and convergence facilitated the advancement of the mobile telephone from one generation to another.

Currently, there are several mobile network technologies that exist depending on the mobile carriers to support mobile voice and data applications. Convergence exists not only in the capabilities of technology, for instance, a phone with camera, voice recording and video recording capabilities. Convergence also exists in the standards within the mobile communications industry. For instance, combined GSM-GPRS next-generation mobile services are now available. Global System for Mobile Communications (GSM) is one of the leaders in cellular systems. GSM uses a narrowband technology for delivering digital wireless service called Time Division Multiple Access (TDMA), allowing eight simultaneous calls using the same radio frequency. GSM is now the standard in Europe and Asia. (Webopedia.com) General Packet Radio Service (GPRS) on the other hand, is a standard for wireless communications running up to 115 kbps and supports different ranges of bandwidths that is particularly efficient when bandwidth is limited and for data transfers that occur in bursts such as e-mail and web surfing. (Webopedia.com) The 2G mobile technology enabled voice and text transmission over

digital networks. In 2002, more than 70% of mobile subscribers in the world use GSM-GPRS based mobile services. (Brownlee, 2002)

The next level is mobile technologies based on CDMA (Code Division Multiple Access). CDMA is a cellular technology that does not assign specific frequency to a user and utilizes spread spectrum techniques. The individual conversations are encoded with pseudo-random digital sequence and the technology uses the full spectrum. (Webopedia.com) CDMA 1xRTT is forecasted by Forrester Research to be the most commonly deployed next generation CDMA-based technology. (Brownlee, 2002) 1xRTT is short term for 'single carrier (1x) radio transmission technology'. 1xRTT is a 3G wireless technology based on CDMA and has the capability of providing throughput speeds of up to 144 kbps. (Webopedia.com) According to Forrester research, 3G CDMA 3xRTT will enable all IP carriage of voice and data traffic, much like how traditional telephone carriers are starting to provide voice over IP options. The popularity of CDMA-based services are expected to grow while in 2002, about 15% of mobile subscriptions are CDMA-based services and in particular, CDMA is predominant in the United States and provided by Verizon Wireless and Sprint PCS. (Brownlee, 2002)

Other mobile technology standards employed by mobile technology carriers currently are TDMA-services, which are predicted to gradually exit the market. TDMA services are similar to the GSM standard; however, it also functions as an overlay in addition to GSM-GPRS services. Motorola currently uses Integrated Digital Enhanced Network (iDEN). This wireless technology converges digital cellular phone, two-way radio, alphanumeric pager, mobile Internet, and data/fax modem into a single network. iDEN is based on TDMA and GSM architecture and other Motorola technologies such as the Vector Sum Excited Linear Predictors (VSELP) for voice compression and Quadrature Amplitude Modulation (QAM). The difference with the iDEN

technology is that it provides quick access to information for the user without having to carry several devices. (Motorola.com, 2004) According to Forrester Research, at the end of 2001, there were than 11.5 million users of iDEN in 14 countries. Some carriers of iDEN are Nextel and Clearnet in the US and Telus in Canada. (Brownlee, 2002)

The future of the mobile technology industry will be facing a few obstacles for both customers and mobile technology service providers as a result of convergence of standards and technology. First, changes in technology and standards means changes in enabling systems. Users will be required to switch mobile handsets to accommodate the convergence. As more capabilities and features become available, for instance, video capture and data transfer, the handsets also become increasingly more expensive. The switching cost may be too great for some customers unless phone manufacturers mitigate this possibility. Second, there are also issues of infrastructure. There are some places in North America, albeit a few, that do not have good quality service coverage. These coverage gaps must be bridged in order to proceed to the next level. For example, the mobile telecommunications company, Ericsson appeared in the market in 2001 as a leader in 3G. Ericsson was a pioneer forging the way to building infrastructure to support 3G technologies by winning 70% of infrastructure contracts in the world. (Schilling, 2005) The transition to 3G is an expensive and risky venture as the infrastructure must be set before one can hope that other carriers will adopt this model. Third, the ownership of home computers and subscription to home Internet access may deter users from adopting mobile Internet access. Fourth, mobile service carriers have the problem of pricing the next generation services. Pricing plans such as flat-rate plans that are not based on minute usages and time constraints may be an option to mobile service providers. In addition, there is a lack of radio spectrum for 3G mobile technologies in many large Asian and US cities. (Brownlee, 2002)

Convergence in technology has affected the mobile telecommunications industry in an important way, changing the landscape of telecommunications completely from its analog years. Convergence enabled the physical changes of the physical mobile technologies, making them smaller or attaching features such as cameras, internal antennae and some adding full QWERTY keyboards. However, convergence also impacted the standards landscape of the mobile telecommunications industry. Even though standards started to stabilize with 2G technologies, the introduction and upgrade to 3G have introduced new standards from different carriers that again shift the competitive landscape of the industry. The cycle begins again of uncertainty and perhaps in the future, the eventual agreement of standards between carriers as more users adopt the 3G technologies. Convergence brought in interesting mobile telecommunications gadgets and capabilities but industries will have to overcome future obstacles. In time, these obstacles, much like standards will taper off and the cycle will start over again, as the new generation is envisioned and enters the industry consciousness.

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