Mobile Phones: The Intersection of Technology, Policy and Social Issues

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Abstract

In recent years, we have seen an explosion of mobile phone use, with an estimated 3.3 billion mobile phone subscribers worldwide.[1] Among this number a significant portion of users are children.[2] This is a group that has embraced mobile phone technology more than any other. This obvious appeal of the technology by children could be due to the fact that mobile phones offer privacy, ease of communication, contact with friends and relatives and arguably an exceptionally useful tool that advances personal communication. For instance, the new generation devices are no longer mobile phones only, but have functions which could carry out activities once available only on the Internet. Now, mobile phones offer Third Generation technology, access to a diverse mix of information including, video, camera functions, music, games, Internet browsing, chatting and services such as Short Message Services ("SMS") and Multimedia Message Services, ("MMS") among others. Therefore, every technological advance that provides such dramatic benefits has consequential social costs. It is these consequences of mobile phone usage that warrants more attention especially for the young.

Introduction

According to research carried out, children use mobile phones to demonstrate participation in social network communities and to define the boundaries of their social networks.[3] Particularly, the mobile phone industry has had an impact on children in the following manner.[4] First, children have been the focus of marketing strategies in mobile phone retailing. Second, mobile phones have had an impact on the personal development, including health risks on children. Third, children are exposed to physical dangers through the usage of mobile phones. Therefore, it is crucial that children and parents and those concerned are aware of the safety measures that are available on various services and the tools that are available at their disposal to keep children safe from mobile phone dangers. However, it is not entirely sufficient to rely on self-regulatory measures as the development of mobile technology is occurring at different rates in different countries and self-regulation alone may not prevent a child accessing for example, obscene or illegal content on his or her mobile.[5] Although, different countries have different methods to respond to mobile phone challenges affecting children what must be universal from the outset is a commitment to recognizing that children and young people across the world have a right not only to be empowered by these technologies but also a right to be protected as they seek to make the most of the benefits and

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[1] Mobile phone users worldwide topped 3.3 bil. by end-2007: ITU Retrieved 30 May, 2008 from: http://www.chinapost.com.tw/business/global%20markets/2008/05/26/158188/Mobile-phone.htm

[2] Children Make Valuable Mobile Phone Users: iGR's Tween Teen Market Opportunity Study, 2007 Retrived 30 may, 2008 from: http://news.softpedia.com/news/Children-Make-Valuable-Mobile-Phone-Users-54176.shtml

[3] Taylor, A.S., and R. Harper. Talking 'activity': young people and mobile phones. Paper presented at CHI 2001 Workshop, Mobile communications: understanding users, adoption and design, at Boulder, Colorado, April 1-2. Retrieved 30 May, 2008 from: http://www.cs.colorado.edu/~palen/chi_workshop/papers/taylorharper.pdf

[4] Children and Mobile phones: An Agenda for Action. Retrieved 30 May, 2008 from: http://www.childnet-int.org; Palmer, T & Stacey L, *Just one click: Sexual abuse of children and young people through the Internet and mobile phone technology* (U.K: Barnardo, 2004) pg. 28.

[5] Feldmann, Valerie, *Information Age Economy* (New York: Physica-Verlag, 2005) pp. 87-119.

opportunities which the mobile phone revolution presents. For instance, the development of broadband mobile telephony could have an even greater impact on the global economy than the First Internet Revolution (1995-2000). The next generation of mobile telephony, will not only offer mobility and efficiency benefits to a technologically sophisticated country like, Malaysia, but it also will give billions of people around the world their first direct access to the Internet. In Malaysia, survey results indicate that currently students account for the second highest rate of usage with 16.1% of phone subscriptions.[6] And the penetration rates of cellular phones have increased by 85.1% in 2007 as compared to the rate in 72.3 in the year 2006.[7]

Because current paradigms of electronic commerce may have to be revised or discarded altogether, some observers have already named the emerging new economy "Mobile-Commerce," or simply "M-Commerce." M-Commerce will not come about automatically or free of cost, however. The construction of next generation systems will require massive outlays of capital for infrastructure and, in countries that sell licenses for spectrum frequency, for the rights to use the radio waves themselves. Operators also face technical hurdles: efficient spectrum use, migration from existing networks, protocol standards, and a shortage of handsets for 3G users.

Important mobile phones regulatory policy questions include whether when, and how to distribute radio spectrum licenses to potential mobile carriers and what type of technological standards to mandate or encourage users. These policy decisions will greatly impact who deploys the next generation of mobile systems in the country, what kind of systems they will employ, and when the systems will be constructed. The existing technology and it's level of adoption in the country will affect the manner in which new

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[6] The highest comprising 53.1 percent of hand phone subscribers are employed. Report on *Hand Phone Users Survey 2005: Statistical Brief Number Three* (Cyberjaya: Malaysian Communication and Multimedia Commission, 2005).

[7] Facts and Figures: MCMC Retrieved 30 May 2008 from:

http://www.skmm.gov.my/facts_figures/stats/index.asp

systems are constructed and used. In the United States, for example, the already high levels of personal computers and Internet use make some 3G applications less revolutionary and, therefore, less economically viable. Notably, the three variables-technology, regulatory policy decisions and social issues are neither exogenous, nor independent; rather, they are intertwined.[8] Social issues, namely privacy and security of the user would perhaps be the most serious of this cluster. This paper attempts to examine the regulatory policies in existence in Malaysia and look into the impact of these services on the most vulnerable category of the mobile consumer group, the children.   A country's existing technological infrastructure will have an impact on its social issues, and the impact on social issues will spur new technological developments. Similarly, regulatory policy may be based upon existing social issues and the level of technological development, and vice versa.

The "Third Generation" of Mobile Services: A Brief History

The emergence of 3G cannot be understood without a brief history of mobile telephony. The first commercial mobile systems, the "First Generation," were originally deployed in the early to mid 1980s in Western Europe, the United States, and Japan.[9] These early systems were based on analog technology, relied on large handsets, and offered relatively poor quality voice service over limited coverage areas. The first generation cellular systems (1 G) were the simplest communication networks deployed in the 1980s. As countries experimented with these new systems, they faced one major problem: how to allocate and distribute scarce radio spectrum to mobile service providers. Most countries chose to do this through licensing, largely due to the historical tradition of licensing radio spectrum for other uses such as commercial radio and television. With a license in hand, mobile communications system operators were able to construct their networks confident that the law would protect the right to use the designated spectrum without fear of interference.

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[8] May, Paul, *Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business,* (U.K: Cambridge University Press, 2001) pp. 227-233.

[9] Pagani, Margherita, *Mobile and Wireless Systems Beyond 3G: Managing New Business Opportunities* (London: IRM Press, 2005) pp. 96-97.

These early licenses seldom mandated a technological standard or demanded compatibility between networks; as a result, handsets from one network were not necessarily compatible with other networks. Networks in Europe for instance used the Nordic Mobile Telephone ("NMT") and Total Access Communications System ("TACS") standards, while the United States used mostly variants of the Advanced Mobile Phone System ("AMPS"). The existence of these incompatible standards made roaming difficult within countries and all but impossible for international travelers. Challenges faced by the operators included, inconsistency, frequent loss of signal and low bandwidth. The 1G networks were also expensive to run due to a limited customer base.

The second generation mobile networks (2G) were the first to apply digital transmission technologies such as Time Division Multiple Access for voice and data communication. These networks used digital technology, which solved many of the problems faced by First Generation networks: fraudulent use of accounts, eavesdropping and static-plagued transmission.[10] Moreover, the second generation networks delivered high quality and secure mobile voice and basic data services such as fax and text messaging along with full roaming capabilities across the world.

Looking ahead, the European Community also saw an opportunity; if appropriately regulated, the introduction of Second Generation networks could eliminate the incompatibility problems faced by First Generation systems.[11] Thus, the European Council issued Directive 87/372 in 1987, which set out technological standards, frequency requirements, and a build-out schedule for the introduction of digital networks in Europe.[12] Specifically, the Directive required member states to set up their own rules and regulations that would distribute spectrum in the 890-915 and 935-960 MHz bands as quickly as possible. Networks were to begin service by January 1, 1991, using a technological standard

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[10] Supra n 5
[11] Ibid
[12] Council Directive 87/372 of 25 June 1987 on the Frequency Bands to be Reserved for the Coordinated Introduction of Public Pan-European Cellular Digital Land-Based Mobile Communications in the Community, 1987 O.J. (L 196) 85

known as Groupe Sociale Mobile ("GSM"). By setting a single technological standard for the whole of Europe, Directive 87/372 created a single market that not only permitted roaming, but also allowed mobile handset and equipment manufacturers to capitalize on economies of scale. Countries followed the European Council's lead, and GSM rapidly became a widely accepted standard for Second Generation mobile telephony.[13] One country that did not adopt GSM as a universal standard was the United States. The U.S. Federal Communications Commission ("FCC") avoided technological standards when issuing spectrum licenses for mobile use. As a result, five major technological standards are used in the United States, including two analog and three digital standards-Code Division Multiple Access ("CDMA"), Time Division Multiple Access ("TDMA"), and GSM, which is a specific variant of TDMA technology.

Licensing

Licensing of content modules becomes an important option for digital media as most countries distribute the right to use part of the radio spectrum through "licenses." Licensing is the commercial and communicative use of a recognized name that a third party has created. The licensing contract is the agreement through which the licensor transfers the right to exploit a given product or process to another firm, the licensee, for a certain period of time and under certain conditions.[14]

A license is, at the simplest level, a legally enforceable right to use a part of the radio spectrum for a specified purpose in a limited geographic region. Licenses, in lieu of some other form of property right, are necessary to prevent multiple users from using the same spectrum frequencies. The use of licenses also allows governments to plan for the use of spectrum through spectrum allocation. Allocation refers to the process of establishing which general bands of the radio spectrum will be used for various types of service, such as FM Radio or analog cellular service. Licenses are awarded from within each general band to specific users. Although the licensing schemes of no two countries will be exactly alike, the schemes do fall into three broad categories:

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[13] Supra n 5 at 70
[14] Supra n 5 at 27

(1). Horizontally in different media markets, e.g., the launch of a magazine as complement to a TV programme format; (2). Vertically which is called merchandising, when, e.g., characters are licensed to manufactures in different industries; and (3). Internationally when they are sold into different national markets.[15]

Each of these systems offer its own unique advantages and disadvantages; further, the most appropriate type of licensing may vary depending on the local culture, economic circumstances, and type of service being offered.

Third Generation Mobile Networks

Third Generation (3G) is a generic name for the wireless networks that will supersede those currently in place around the world. The aim of the 3G movement is to bring faster data transmission rates to the wireless population and to introduce multimedia capabilities to wireless services. While enhanced data rates and the potential for video services makes mobile more compatible today than ten years ago much of the world remains incompatible. In order to prevent a similar fragmentation in the future, the International Telecommunications Union ("ITU") decided to take an active role in the development of standards for Third Generation technology. The ITU is an international organization originally founded in 1865 to promote interconnection and standardization between telegraph networks in Europe.[16] The ITU's efforts at promoting technical standards for 3G systems were headed by a working group originally known as the ITU-R Task Group 8/1, whose primary purpose was to "minimize the number of Third Generation terrestrial radio interfaces and maximize their commonalities." In 1999, the Task Group made significant progress and announced the selection of a technological standard for Third Generation systems in March of that year. In the formal world of standards bodies, 3G is synonymous with International Mobile Telecommunications 2000 (IMT-2000) and standardised by regional bodies such as the European Telecommunications Standards Institute in Europe, Telecommunications Industry Association ("TIA") in the United States, and the Association for Radio Industry and Business ("ARIB") in Japan. The IMT-2000 attempts to harmonise the various regional efforts under way to create 3G networks and

provides a technical base for standardised efforts including Code Division Multiple Access ("CDMA"), Time Division Multiple Access ("TDMA"), and combined TDMA/CDMA. Importantly, IMT-2000 does not mandate the use of any one particular technology, but instead works to promote the compatibility of these technologies. The IMT-2000 standard is also significant because it will accommodate countries with differing spectrum allocation strategies. In addition to adopting the standard, ITU members approved the allocation of additional bands of frequency to Third Generation systems during the ITU's World Radio communication Conference meeting held in Istanbul from May 8 to June 2, 2000.

Since the adoption of IMT-2000, the Task Group has conducted further work to specify more of the network specifications and develop techniques for seamless hand-offs between networks. On March 7, 2000, the Task Force was replaced by a new body, Working Party 8F ("WP8F"), to follow-up on the progress made by the Task Force. WP8F will be focused less on technological issues, and more attention will be given to policy questions, including: (1) the issue of "digital divide" and what can be done to encourage IMT-2000 systems in developing countries; (2) the social impact of the mobile information society; and (3) the kinds of content and applications that could be developed to promote successful Third Generation systems. In conjunction with the ITU's efforts, the European Union has also acted to promote 3G development by its member states. On December 14, 1998, the European Parliament and Council issued Decision 128/1999, which directed member states to design and implement licensing schemes for Third Generation Systems by January 1, 2001. The decision actually follows an earlier Council directive designed to harmonize spectrum licensing procedures within the European Union: however, the Decision goes much further. Building on the success of Directive 87/372, which led to the standardization of GSM throughout Europe, the Council hopes that Decision 128/1999 will lead to the development of fully-compatible Third Generation networks throughout Europe. Although the Decision does not mandate any particular technical standard, it does direct members to implement systems that are common, open, and compatible, and specifically calls for standards that are IMT-2000 compliant. The networks introduced service by January 1,

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[15] Ibid
[16] Supra n 8 at 173

2002, and member states were directed to encourage cross-border roaming agreements. Although international institutions have been active in promoting the development of Third Generation systems, the onus of implementation will fall upon individual states. States do not need to mandate technical standards that comply with the IMT-2000 specifications, and they may choose to allocate spectrum differently than the ITU's recommended approach.

The Challenge: Regulating Third Generation Services

Mobile phone usage in the United States, Europe, and Japan remains quite different. In Europe, the mobile phone is ubiquitous, and users are already demanding more and more features, such as the ability to charge other purchases to their mobile accounts. In the United States, mobile phones are popular, but with many more personal computers and the availability of unmetered local telephone access, users are more satisfied with the wire line Internet. Given these basic similarities, categorizing the development of 3G into two categories is useful.[17] In the United States, mobile Internet use augments the existing Internet and will probably not be as popular as in Europe until broadband networks are constructed that offer a more distinct advantage over the existing landline Internet. In the European model, mobile Internet applications are already popular because they offer something not currently available, inexpensive data transmission and the ability to transact business electronically. Ultimately, different countries will implement mobile Internet capabilities differently to best suit their economic needs and cultural desires.

The ability of Third Generation networks to lead to economic growth, more competitive markets, and greater worldwide access to information services will depend upon the actions of regulators. The telecommunications market remains regulated, and the actions taken by these agencies will impact the development of the next generation of services. Third Generation systems will not offer much in the way of innovation and competition if they merely reinforce existing oligopolies or dictate the technologies to be used.

As 3G networks have the potential to generate enormous positive externalities in the form of improved efficiency in other industries and in increased customer utility, 3G networks maintain some qualities of public goods, similar to railroads and highways. Whatever the type of regulation selected, regulators must also be careful not to over-regulate. By setting minimal technical standards that guarantee portability, a regulatory agency can promote competition and help manufacturers capture economies of scale. At the same time, any adoption of strict technical standards necessarily distorts the market and can provide disadvantages to particular technological solutions or advantages to others. Countries should also encourage the harmonization of these minimum standards internationally. With a truly global 3G network, users will find the services much more advantageous. Finding this appropriate regulatory balance between promoting standards and market competition is a challenge by itself.

Mobile Phones and Indecent Content Need For Regulation

The adult entertainment industry is positioned to be a dominant user of mobile technology as it offers the ability for consumers and content providers to interact in a new and innovative way. Mobile content providers include traditional television broadcasters, movie studios, and non-mainstream providers.[18] The adult movie industry has already begun to market content for Mobile phones, a move that has prompted concerns about children gaining access to indecent or other inappropriate material. Hence, many telecommunications service providers have taken the initiative to restrict their customers through customer service agreements from accessing content that is considered indecent. Yet, while these licensing agreements exist, they do not provide the wireless service provider with the means to prevent customers from accessing offensive content. Accordingly, the wireless service providers have extensive exculpatory clauses releasing the carrier from third-party liability should the customer access offensive content. The players in the Mobile phones/ TV arena have varied and often conflicting agendas: the

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[17] Christopher J. Banks, "The Third Generation of Wireless Communications: The Intersection of Policy, Technology, and Popular Culture" (2001) 32 Law & Pol'y Int'l Bus at 585.

[18] Mark Halper, Warner Takes TV, Movies: Plans to launch own Web site to sell cell phone content Mobile, Retrieved 30 May 2008 from: http://www.videobusiness.com/index.asp?layout=article&articleid=CA6308729

consumer wants unbridled access to content of his or her choosing; the content publisher wants to increase its viewing audience; the wireless provider wants the most profitable arrangement; and the regulator wants to ensure the protection of community standards by restricting access to indecent material. Many adult entertainment providers see an opportunity for significant revenue. Larry Flynt, founder of Hustler Entertainment, once remarked, "Hustler Mobile is doing exceedingly well in Europe . . . . I feel that wireless is the wave of the future, the crown jewel in the electronic distribution and delivery of content."[19]

This is largely due to the fact that mobile devices provide an optimum platform for the consumption of adult entertainment with the easy access, privacy, and overall mobility. Xobile.com is one of the first adult Internet firms to offer its customers pornographic video formatted exclusively for mobile devices.[20] Customers can purchase two-minute videos for about forty-four cents with a credit card on Xobile.com, and can elect to stream the video onto a mobile device for immediate viewing or download the video to view at a later time. Xobile.com provides content for Mobile TV applications even though it is not a Mobile TV service provider. This niche has proven successful: as a result of offering mobile content, Xobile.com added six thousand customers. Other adult entertainment industry leaders such as Playboy and Vivid Entertainment are also developing methods to tap into the Mobile phone/TV market. Juniper Research forecasts that there is a "strong market for adult to mobile services . . . and alongside games and infotainment, adult will be one of the leading content types that will drive the initial use of mobile entertainment services." [21]Juniper estimates that the total global market value for mobile adult content will triple to nearly $ 2.1 billion by 2009.[22] These projections are based on

the value of the global adult market, which is estimated between $ 31 billion and $ 75 billion dollars (the latter including everything from strip clubs to magazines, and DVDs to phone sex lines). The proliferation of wireless video-capable devices will enable these predicted expansions of the mobile adult entertainment market. But, as these devices become widely available, the danger exists that children will increasingly gain access to the potentially troublesome content available through Mobile TV. Therefore, it is realistic to anticipate that there will be challenges to adult video-content distribution on such devices.

Regulation of Mobile Content
There is no case law in Malaysia to suggest that protecting children from indecent or harmful content is a legitimate governmental objective. However, assuming that Mobile technology is classified as an information service, case law in other countries, in particular, the U.S have sufficiently demonstrated that this type of service is to operate with minimal government intrusion so as to preserve an open marketplace of ideas.[23] Additionally, pre-emptive legislative action concerning obscenity and indecency on the Internet has been struck down as unconstitutional because the proposed statute is either overly broad, has a chilling effect on speech, or because there are normally less restrictive alternatives on the market that will achieve the same goal of protecting children from harmful content.[24]

Mobile Technology: Policy and Regulation in Malaysia
Malaysia promulgated the Communications and Multimedia Act 1998[25] ("CMA '98") and the Malaysian Communications and Multimedia Commission Act 1998[26] ("CMC '98") which came into effect on 1 April 1999 and 1 November 1998 respectively to promote national policy objectives for the communications industry and to establish a licensing and regulatory framework.

The fundamental principles of the CMA '98 are transparency, technology neutrality, self-regulation, social responsibility and consumer

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[19] Colin Gibbs, CTIA Sets Adult Content Guidelines as Hustler Comes to U.S. Retrieved 30 May, 2008 from: http://www.spyonit.com/lib/img/resourcectr/RCR_03.10.05.pdf.
[20] Xobile, Why Xoble?, Retrieved 30 May 2008 from: http://www.xobile.com/pc/webmaster.cfm
[21] Windsor Holden, Retrieved 30 May 2008 http://www.juniperresearch.com/shop/viewreport.php?id=28
[22] Ibid

[23] Ibid
[24] See Reno, 521 U.S. at 875; Ashcroft, 542 U.S. at 670
[25] [Act 588]
[26] [Act 589]

protection. It is broadly divided into four distinct categories namely:

(i)   Economic Regulation - covering areas of licensing, competition and   Access;[27]

(ii)   Technical Regulation - covering areas of spectrum assignment; Numbering and Electronic Addressing and Technical Standards;[28]

(iii)   Consumer Protection - covering areas of service quality, required application services, resolution of consumer disputes, rate regulation and universal services provisions;[29] and

(iv)   Social Regulation - covering areas of content services that conform to national policy objectives and licensing.[30]

Part IX of the Act which deals with "Social Regulation" seeks to provide a regulatory framework which is designed to promote the growth, development and widespread availability of content applications services reflecting Malaysia's cultural diversity and adherence to community standards provided by content applications service providers.

In order to encourage compliance, the Act provides for the formulation of industry codes in relation to access, consumer protection, technical standards and content regulation. Compliance with the Codes is voluntary. The provision of obscene communication for commercial purposes is prohibited. Any person permitting a network service or applications service under the person's control to be used for such activity commits an offence under sections 211 and 233 of the CMA '98. The Act is also intended to encourage self-regulation by the industry.

As a result of an amendment to the CMA '98 a directive issued by the Malaysian Government required every single prepaid mobile service user in Malaysia to be registered with the respective mobile provider.[31] At present, all users of mobile phones regardless of their nationality are required to register as long as they are subscribers of a Malaysian prepaid public cellular service. This includes Malaysian citizens, foreign workers and tourists. By virtue

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[27]Part VI   ss 126-156 of CMA '98
[28] Part VII   ss 157-186 of CMA '98
[29] Part VIII ss 187-204 of CMA '98
[30] Part IX   ss 205-213 of CMA '98
[31] Section 10 of the CMA '98

of section 10 of the CMA '98 registration is compulsory for every single prepaid mobile number that a user has, with the respective service provider. The main reason for this directive is aimed at curbing misuses of the prepaid public cellular services and at the same time to address security concerns.

Pursuant to the Cabinet's Directive, the Ministry of Energy, Water and Communications ('MEWC') together with the Malaysian Communications and Multimedia Commission ('MCMC') ensured the registration of all licensees providing prepaid public cellular services to register their subscribers. Currently, a regulation to address the duties and obligations of the prepaid public cellular service providers in registering their subscribers is currently being drafted by MEWC and MCMC. The Regulation among others would cover issues in relation to compliance with registration, penalty for non-compliance, verification of information provided during registration, effect of non-registration and other related issues.

The Malaysian Communication and Multimedia Commission recently issued the Guidelines on Registration of End-Users of Prepaid Public Cellular Services (No-2) to regulate the implementation of the registration of the prepaid public cellular services end-users. Objectives and scope of guidelines included the Ministerial Direction on the Registration of Subscribers of Prepaid Public Cellular Services, Direction No. 1 of 2006 dated 20th February 2006. The Commission is directed to undertake necessary steps to ensure that all licensees who provide prepaid public cellular services register their subscribers. Under the Ministerial Declaration on Standard Conditions for Application Service Provider Class Licence, Declaration No. 32 of 2006 dated 9 October 2006: Condition 10.1 requires that licensees who provide public cellular services shall carry out the registration of end-users of public cellular services; and condition 10.2 requires that licensee shall comply with any guidelines issued by the Commission from time to time on matters relating to the registration of end-users of public cellular services. The Commission issued this Guideline on registration of end-users of prepaid public cellular services (MCMC/G/08/07), No. 2 to regulate the implementation of the registration of the prepaid public cellular services end-users. This Guideline No. 2 is in addition to the earlier issued Guideline No. 1. These guidelines should

be read together with the Communications and Multimedia Act 1998 (CMA) and its related subsidiary legislations, instruments, codes and guidelines that have been issued by Commission pursuant to the CMA.

Mobile Content Regulation: Interest vs. Private Industry and Consumer Interest

As mentioned earlier the transmission of obscene and indecent material is prohibited under the CMA '98. Moreover, the guidelines applicable for registering prepaid users might well be an effort to forestall regulation and it is precisely for that reason that they should not be disregarded. The complex convergence of mobile, wireless, other media platforms and established media industries, give rise to some clear policy issues. However, to date, there has been very little policy debate in Malaysia regarding the implications of content delivered via mobile devices. Only very recently, for instance, have consumer issues been discussed, and the debate has tended to focus on issues of regulating inappropriate or undesirable content and does not address dangers posed to children from such content or the safety measures provided to young people. An important first step to understanding the content issues raised with mobile phones is for government regulatory agencies to conduct research into, and monitoring of, mobile services to understand the sorts of content and services they offer; the value chains, business models, and industry structures underlying the services. Depending upon the form of regulation, the channel provider or service provider could conceivably be the subject of regulation and in the case where content is accessed through third party content providers alternative forms of regulation such as positioning and promotion can be utilised.

Conclusion

In less than two decades, the mobile communications market segment advanced from a little-observed niche market into the fastest growing field of the telecommunications industry. Unfortunately, discussions of the development of mobile systems in Malaysia all too often focus on technical issues rather than policy issues. What is needed, therefore, is a truly comprehensive analysis and evaluation of all the factors and entities involved in the complex process of shaping the future of mobile communications. However, as technologies converge and the services offered via mobile

phones develop, regulation too must move forward. Policies should not only focus on technical aspect but of looking into the intersection with social issues.