The State of Deployment and Adoption of Mobile Services in Malaysia: A Comparative Study

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ABSTRACT

Hitherto, there has been little research on the consumption of mobile technologies in Malaysia. A clear definition allows telcos to focus on the most crucial part of their business and prevent them from repeating the costly mistakes of the recent past by entering and subsequently exiting, non-core businesses and markets. This paper seeks to address the current state of telcos in Malaysia by presenting constructive evidence as recent as second quarter of 2004. This paper offers a compilation of mobile services consumption in a number of leading countries in order to map possible future scenarios on the use of mobile technologies locally. It is only recently that industry has begun to broaden its views of the mobile consumers to include deeper understanding of users' behaviour. Predictions of increasing revenue from mobile services in the future depend ultimately on the successful development and the satisfaction of an end-user market rather than technical development. This paper serves as foundation for further studies concerning the factors influencing the adoption of mobile entertainment services.

1.0 INTRODUCTION

A mobile commerce transaction is defined as any type of transaction of an economic value that is conducted through a mobile device that uses a wireless telecommunications network for communication with the electronic commerce infrastructure [1]. According to Andreou et al. [2], mobile commerce differs to some extent from electronic commerce due to the unique characteristics and limitations the mobile devices have. Mobile entertainment is a subset of mobile commerce services.

Travish and Smorodinsky [3] define mobile entertainment as services which offer gaming experiences on-par with those to be had in other mediums such as Xbox and Playstation 2. On the contrary, it is of the authors' opinion that mobile entertainment services are more than merely games.

Hence, for the remainder of the discussion, the authors agree with MGAIN [4] in assuming that mobile entertainment includes any leisure activity undertaken via a personal technology, which is, or has the potential to be, networked and facilitates transfer of data over geographic distance either on the move or at a variety of discrete locations. The authors simply define mobile entertainment as services that utilize the network which incur a cost upon usage. Mobile entertainment comprises of a range of activities including downloading ring tone, logo, music and movie; playing games, instant messaging, accessing location-based entertainment services, viewing sexually explicit material, gambling and Internet browsing.

2.0 CONCEPTS AND MARKET

Porter [5] discusses what he illustrates as industry evolution, fragmented and emerging industries as well as aspects of market development. The Malaysian mobile entertainment value web can be claimed as emerging. Additionally, this market is in its infancy stage in spite of even the most modest future market size forecasts.

More specifically, Porter [5] describes what he calls evolutionary processes that drive industry evolution. He also describes factors that distinguish emerging industries and discuss barriers restricting their development. Drivers and barriers in this study are factors facilitating or constraining development.

Nevertheless, Porter's [5] viewpoints in assuming an industry evolution perspective have not been left entirely without criticism. Baden-Fuller and Stopford [6] debate that the wealth of a company is not as directly tied to its industry as Porter [5] asserts. They further emphasize that only a fraction of differences in profitability between companies can be credited to industry characteristics. Their conclusion is that the industry context is largely insignificant to an individual firm; it is the company's own tactical options that are of importance. Hamel and Prahalad [7] add that it is the perception of the industry rules and structure that leads a company's behaviour and that the influence of this view can be even more powerful than the fundamental economic, technological, political and social aspects.

In accordance with de Wit and Meyer [8], advocates of the industry creation perspective such as Baden-Fuller and Stopford [6] and Hamel and Prahalad [7] does however not contradict that in many industries developments are to a large extent evolutionary. In addition to that, they acknowledge the industry evolution perspective as a powerful explanatory lens for understanding the dynamics in industries. As the analytical level of this study lies on or even above the industry level, Porter's [5] framework can be used as an analytical tool with regards to this study.

Mobile commerce is forecast to be a significant growth market in leading countries. This high growth estimate of mobile phones is leading investors to take

special interest in device manufacturing, provisioning and system management areas.

The world is experiencing fast-growing mobile penetration rates. According to McKinsey [9], mobile phone penetration in Europe is estimated to be 85% in 2005. Recent market research by Datamonitor shows that by 2005 there will be 198 million mobile phone users playing wireless games in Western Europe and the United States [10]. On top of that, Kangas [10] states that revenue in the Asia Pacific region is predicted to hit 39 billion Euros by 2010.

Malaysia being a country with over 24 million in population and 9.1 million mobile subscribers as of end of 2002, there is definitely market opportunity for mobile commerce. But whether mobile commerce will take off in the local marketplace and when will this happen will depend very much on the interaction between cellular operators and other parties. Whether appropriate applications can be developed and whether these are introduced via the appropriate marketing mix become crucial [11].

Low personal computer penetration that hinders access to the Internet via the desktop, together with a high level of interest in new mobile technologies among the Asian youth, combine to create an immense opportunity for mobile services in Malaysia [12].

Celcom has set the Malaysia Book of Records by offering the first SMS-based role playing game locally. DiGi has implemented a number of solutions which are designed to enable DiGi to offer a variety of revolutionary interactive services that are also easy-to-use and highly personalized. This enables DiGi's customers to download a variety of entertainment content such as ring tones and wallpapers. [13] Besides, DiGi made an effort to introduce a new service known as Point which allows subscribers to identify songs played in public. At the moment, Point can tag most international English songs as well as some major Chinese and Malay songs. However, this service is only supported by Nokia mobile phones only. In addition, DiGi launched Mobile Karaoke services where subscribers download full-length songs which come with synchronized lyrics to help subscribers to sing along.

According to msmobile.com [16], the video subscription service known as m-Vision has been introduced by an Australian listed public company, GoConnect Limited. It allows subscribers in Malaysia with an O2 XDA to receive TV quality videos over the public GPRS network supported by mobile operators such as Maxis, Celcom and DiGi. M-Vision provides a range of content including movie trailers, music videos, video horoscope, sports, and business and so on. These interactive services allow subscribers to tap on the content which will link them to designated websites to book a movie ticket, to purchase the music CD or simply, to obtain further information.

Astro, a Malaysia-based multimedia group with established DTH satellite pay TV, radio broadcasting, production and distribution of film and television programming, talent management and magazine publishing operations has formed joint ventures with various mobile service providers to launch mobile entertainment services such as ring tones and logos download, SMS TV chat, SMS TV games as well as SMS TV votes.

Hence, the aforementioned facts show that mobile entertainment is not merely a subset of mobile commerce. Mobile entertainment is in fact an integrated component of mobile commerce. Entertainment-based services, especially pornographic materials have been the drivers of fixed-line Internet growth. Therefore, it is in no doubt that mobile entertainment services determine the success of mobile commerce.

Green et al. [17] state that "…until recently there has been little social science research on the consumption and use of mobile technologies and it is only recently that industry has begun to broaden its views of the mobile consumer to include deeper understanding of user' behaviour."

MGAIN [4] suggests that the predictions of increasing revenue from mobile entertainment services in the future depend ultimately on the successful development and the satisfaction of an end-user market rather than technical development. Matskin and Tveit [18], Nohria and Leestma [19] as well as Vrechopoulos, Simokos and Doukidis [20] claim that with the rising number of mobile commerce services, understanding of consumer behaviour will allow mobile operators to offer effective customer services and secure competitive advantages. This statement is supported by Vellido et al. [21] as understanding the full potential of the consumer market calls for careful recognition of consumer needs and expectations.

Therefore, it is only based on the in-depth understanding of end-user market that the deployment of mobile entertainment services will then be successful.

3.0 THE EVOLUTION TOWARDS MOBILE ENTERTAINMENT ADOPTION

Porter [5] asserts that it is possible to generalize about the processes that drive industry evolution, even though their speed and direction will vary depending on the industry. According to Ollilia et al. [14], these processes are of dissimilar types and are associated to:

- market behaviour
- industry innovation

- increase in know how
- cost changes
- uncertainty reduction and
- external forces, such as government policy and structural change in adjacent industries

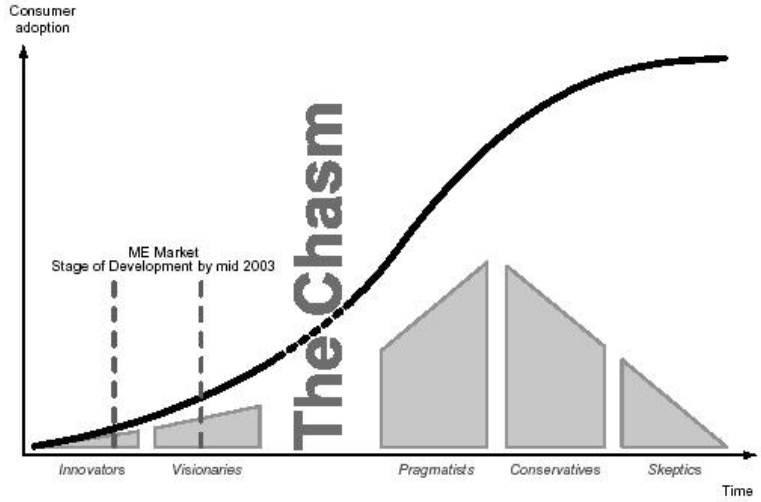

Figure 1: Mobile Entertainment Market Stage of Development and Different Consumer Groups [14]

Each evolutionary process recognizes strategic key issues for the companies within the industry and their effects are usually illustrated as either positive or negative from an industry development perspective. For example, uncertainty reduction is an evolutionary process that leads to increased adoption of successful strategies among companies and the entry of new types of companies into the industry. Both of these effects are considered to contribute to industry development with regards to the mobile entertainment value web. This evolutionary process is hence seen as a significant portion of a framework that aims to identify barriers and drivers [14].

Referring to Figure 2, it is predicted by BWCS [15] that the total number of mobile subscribers worldwide will increase to more than 1.72 billion by the end of 2007, compared to 950 in 2001, with Asia Pacific likely to retain its dominance pertaining to global market share.

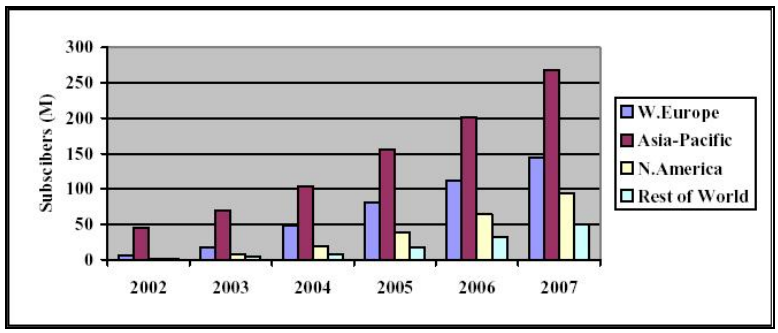

Figure 2: Worldwide Mobile Subscribers by Region [15]

Women and Family Development Minister Datuk Seri Shahrizat Abdul Jalil said that the 25th million Malaysian was expected to be born in early June 2003 but the national population growth rate is dropping due to lower fertility rates [22]. Malaysia's population was estimated at 24.53 million in 2002 with an average annual increase of 2.4 per cent since 1995 [22].

According to studies conducted by Malaysian Communications and Multimedia Commission (MCMC) in second quarter of 2004 as shown in Figure 3, there are 12,398,000 mobile subscribers in Malaysia. This makes up penetration rate of 48.5% [23].

The history of mobile carriers in Malaysia started in 1994 where 7 licenses have been issued [24]. However, 5 licenses remained in September, 2002. According to Mammal [24], these 5 mobile carriers (ranked by market share) include Maxis Communications (32%), Celcom (29%), DiGi (19%), TM Touch (10%), as well as TimeCel (10%). Hitherto, 3 licenses remained after mergers. The new figures are Maxis Communications with 42% of market share, which is a total of more than 5 million subscribers after taking over TimeCel; followed by Celcom with 39% of market share after merger with TM Touch; as well as DiGi clinging to 19% of market share.

As of August 2004, out of 12,398,000 mobile subscribers in Malaysia, 77.49% are prepaid customers. However, not even the cellular operators know how many among these subscribers are duplicates holding multiple prepaid SIM cards from different telcos [25].

According to a news article in The Star [26], of the 4.878 million mobile subscribers Maxis has to date, some 3,660,000 are prepaid customers while the balances of 1,218,000 are post-paid subscribers. This gives Maxis a 80:20 spread for the prepaid/ post-paid ratio. Its ARPU (Average Revenue Per User) has dropped to RM61 as at March, 2004 compared to RM180 – RM210 in 2001.

In comparison, Celcom maintains a 70:30 spread. Of the 4.4 million subscribers it has, some 3.08 million are prepaid with the balance of 1.32 million on post-paid, meaning it commands a stronger support line from post-paid customers compared to Maxis [25].

Telefon selular
Cellular phones

Tahun	Suku	Telefon selular				% daripada jumlah telefon	Perkhidmatan pesanan pendek	
		Jumlah ('000)	Kadar pertumbuhan (%)	Kadar penembusan	% digital		Jumlah (juta)	Per langganan
1998		2,150	-12.6	9.7	74.5	33.0		
1999		2,717	26.4	12.0	83.7	38.1		
2000		5,122	88.5	21.8	91.8	52.5		
2001		7,385	44.2	30.8	95.6	61.1		
2002		9,053	22.6	36.9	97.9	66.0	3,605.9	398
2003		11,124	22.9	43.9	98.9	70.9	6,163.5	554
2003	1	9,543	5.4	38.3	98.3	67.2	1,433.0	150
	2	9,931	4.1	39.6	98.5	68.2	1,437.8	145
	3	10,344	4.2	41.1	98.7	69.2	1,635.0	158
	4	11,124	7.5	43.9	99.0	70.9	1,657.7	149
2004	1	11,762	5.7	46.2	99.1	72.1	1,996.7	170
	2	12,398	5.4	48.5	99.2	73.2	2,087.7	168

Year	*Qtr*	*Cellular phones*				*As % of all telephones*	*Short message services (SMS)*	
		Total ('000)	*Growth rate (%)*	*Penetration rate*	*% digital*		*Total (million)*	*Per subscriptions*

Figure 3: Mobile Phones Subscribers in Malaysia [23]

Niche player DiGi has been a prepaid innovator since 1998 and it now has 94:6 spread and absolutely skewed towards prepaid. Of the 2,585,000 subscribers it has to date, some 2.453 million are pre-paid leaving some 132,000 subscribers on post-paid. Its ARPU for the second quarter of 2004 remains at RM54 registered last year [25].

In 2001, Malaysia is to allocate three 3G licenses using a "beauty contest" to select the winners. The licenses will be for 15 years. The other mobile carriers all failed to meet the regulators minimum limits for the license. Malaysia's third largest network, DiGi, did not bid for a license [27].

In August 2002, Maxis and TM Touch issued 3G licenses with the adult population (more than 15 years' old) of 14,561,082 and cost per head of adult population of US$1.80. The price paid is equivalent to US$13.165 million each for both of the telcos. It is estimated at that point of time that the start date should be in late 2003. According to Cellular News [27], the announcement of the successful bidders does not mean that the process is over as they have to submit a detailed business plan within six months or run the risk of not getting spectrum at all. Due to first mover's advantage, service providers have been competing among themselves to offer various new services in bulk, in which some appear undesired by consumers. However, hitherto, 3G is still on trial and has not been made available to the consumers in Malaysia.

Figure 4 shows that the penetration rate gradually increases at a much slower rate. This indicates that the mobile phones market is slowly reaching maturity. Referring to Figure 1, the major challenge for the players in the Mobile Entertainment value web is to take the services to mass market by attracting the first mass market consumer group of the pragmatists, thereby crossing what is called the chasm [14]. According to Ollilia et al. [14], there are three main obstacles related to discontinuity, quality of services, and pricing that need to be addressed.

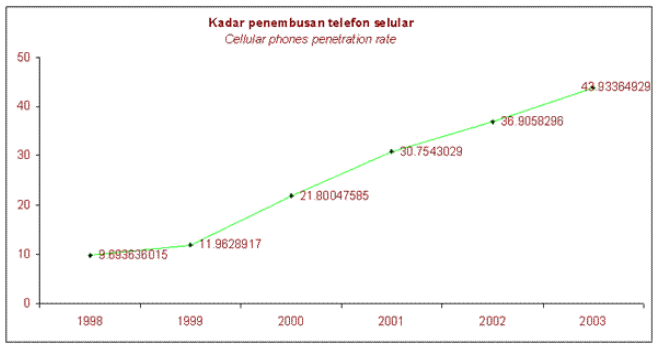

Figure 4: Mobile Phones Penetration Rate in Malaysia [23]

Unlike the lead segments, pragmatists display higher price sensitivity. The major telcos in Malaysia have recently adjusted pricing of their services offered in order to minimize the discontinuity with old consumption patterns. For example, when MMS was introduced by Maxis in early 2004, the initial charge was 1.5 sen per kilobyte. However, this pricing scheme failed to attract enough consumers to send MMS. Hence, the new pricing scheme has been adjusted to a flat rate of 50 sen per MMS (as long as the file size does not exceed 100 kilobytes).

Figure 5 indicates that Maxis turns in highest ever quarterly profit [28]. The news article reports that Maxis announced net profit of RM462 million for the second quarter ended June 30, 2004, up 102% from the first quarter. For the first six months of 2004, the group made a net profit of RM788 million, an increase of 52% on the comparable 2003 figure. Maxis chief executive officer Datuk Jamaludin Ibrahim states that the revenue from mobile data in the first half rose to RM354 million, accounting for 14% of total mobile revenue. According to the report, the increase was driven primarily by an 80% growth in the volume of billable SMS to 2 billion messages from 1.13 billion. Jamaludin said mobile data revenue increased significantly with a sizeable share garnered not just from SMS, but also from news and information alerts, participative TV shows and other GPRS applications that included downloads, enhanced games and picture messaging. In fact, GPRS subscribers grew 17-fold within a year from 23,000 to 393,000 users at the end of June 2004 [28]. This shows that mobile entertainment services are gradually being adopted by the subscribers in Malaysia.

Figure 5: Maxis Pre-tax Profit [28]

4.0 DRIVERS AND BARRIERS OBSERVED IN OTHER MARKETS

Europe is considered as the second area in accepting mobile phones due to the extent of the GSM network which is established as a single standard across Europe. Estimated in 2001, five large countries in Western Europe generate over 70% of the mobile entertainment revenue [29].

North America is one of the largest markets in mobile entertainment due to high growth rates and fast adoption of the 2.5G networks. However, the general diversity of network standards cause unreliability of the networks and the varying payment models has been challenging and slowed down the maturity of mobile communication [10]. To support this fact, Xu, Teo and Wang [30] states that in the United States, the wireless market has long been characterized by a puzzling array of carriers, tight competition, and incompatible standards across a patchwork of service areas. There are more than 350 mobile communication service companies in the United States. Conversely, there is only a single GSM standard in Malaysia, which makes interoperability not an issue in the deployment of mobile services.

In Asia Pacific region, Japan and South Korea lead in the adoption and uptake of mobile entertainment [31]. According to Kangas [10], the main reasons for this are the long history of handheld games and the rapid escalation of mobile phones.

Relating to the success of i-mode[1] in Japan, NTT DoCoMo created an advantage in content through its choice of c-HTML, its large share of Japanese mobile phone market (57%) which eases standardization across nation, and its faster introduction of handsets, packet services and clearinghouse services. [32] The high penetration of mobile phones is due to communicating bottlenecks, cost of mobile services which is much lower compared to that of the wired Internet, and the Japanese generally spend more time on public transport which encourages them to access mobile services to kill time while travelling or

[1] i-mode is the dominant mobile service provider in Japan.

waiting in a queue [30, 32]. According to Funk [32], entertainment is the most successful i-mode category.

Mobile entertainment services have been neglected in Malaysia until recently. In Malaysia, According to IDC [11], i-wap [33] and Vrechopoulou et al. [20], mobile commerce is still in its infancy stage. Mobile subscribers double every 18 months in Malaysia. [34]

5.0 THE FUTURE OF MOBILE SERVICES IN MALAYSIA

The leading telco in Malaysia – Maxis announced that their strategies for future growth are already showing results. The growth in mobile data revenue in 2002 and 2003 has been phenomenal. Year on year, revenue for mobile data is up 57% for the first half of 2004 compared to the corresponding period last year [26]. Maxis recognizes mobile data as a growth driver for the future and are focused on developing and promoting new products to drive usage.

The mobile market in Malaysia continues to grow increasingly competitive. Falling ARPUs are pressuring the operators to source for other means of revenue. Value-added mobile data services were expected to make the industry grow, after the wireless industry started to feel the pinch of stagnant, if not for the falling voice ARPUs. This has resulted in the urgency to introduce mobile data services to increase ARPU [11].

Asian markets are very diverse so it is not possible to generalise. Japan and Korea profit from consumers who are receptive to latest technologies. They have strong relationships amongst operators and handset manufacturers. Introduction to wide variety of content and applications is rapid due to domination of market shares [35].

The significant difference of the scenario in Malaysia compared to other countries is that the number of service providers actually decreased through mergers. The remaining three telcos in Malaysia currently creates a scenario of healthy competition and cooperation. The decrease in number of telcos enables standards to be set easier in order to ensure interoperability.

It is believed that the killer application is variety. To succeed local operators must enable subscribers to access the widest possible variety of applications. There are over 75,000 independent applications developers for the DoCoMo network alone [35]. Operators should make it easy for third party developers to deploy their content and must make it easy for consumers to access it. As more consumers join 3G, more firms will develop applications for them, making the 3G proposition more attractive [35]. However, content and applications in Malaysia need to abide to strict rules and regulations.

The most valuable lesson from Japan and Korea is the vital role played by third-party developers of content and applications. In such large markets, it was relatively easy to kick-start a thriving applications development industry but this is a much slower process in smaller markets [35].

Additional information across a number of countries is being compiled and the authors expect by the camera ready date, a full analysis and comparative study is available that position Malaysia against several leading countries on the same basis using the models provided.

6.0 CONCLUSION

This paper and the corresponding research currently being undertaken analyse service scenarios in Malaysia and a number of leading countries. The paper rehashed the factual information and presented the position of mobile entertainment services adoption in Malaysia in Figure 1 Mobile Entertainment Market Stage of Development and Different Consumer Groups. Based on available statistics, in order for telcos to be successful, a substantial end-user market needs to be created. For this to occur, current (and potential) users of mobile devices need to be persuaded that the new applications and services on offer are useful and relevant to their lives. The success of mobile services deployment in the future depends ultimately on the successful development and the satisfaction of an end-user market rather than technical development.

REFERENCES

[1] Tsalgatidou, A., Veijalainen, J. and Pitoura, E. (2000) 'Challenges in Mobile Electronic Commerce', In *Proceedings of IeC 2000, 3rd International Conference on Innovation through E-Commerce*. 2000. Manchester, UK.

[2] Andreou, A.S., et al. (2002), "Mobile Commerce Applications and Services: A Design and Development Approach"

[3] Travish, L. & Smorodinsky, R. (2002), "The Ingredients of (Mobile) Entertainment", Mobile Entertainment Forum

[4] MGAIN (2003), "Mobile Entertainment in Europe: Current State of the Art", European Commission User-friendly Information Society

[5] Porter, M. (1980), *Competitive Strategy*. The Free Press, Macmillan Inc., New York

[6] Baden-Fuller, C.W.F. & Stopford, J.M. (1992), *Rejuvenating the Mature Business*, Routledge, London, pp. 13-34.

[7] Hamel, G. & Prahalad, C. K. (1994), *Competing for the Future*, Harvard Business School Press, Boston

[8] de Wit, B. & Meyer (1998), *Strategy: Process, Content, Context*, 2nd ed, International Thomson Business Press, London

[9] McKinsey, Available: http://www.epaynews.com/statistics/mcommstats.html #24 (Accessed: 2004, April 18).

[10] Kangas, S. (2003), "Benchmarking Literature Review", European Commission User-friendly Information Society
[11] IDC, "mCommerce: Where Are We Today?", Available: http://www.idc.com.my/Research/mcommerce.htm (Accessed: 2004, April 2)
[12] Lee, T.T. (2002), *Stirring Up A Hive of Mobile Activity*, Computerworld Malaysia, Kuala Lumpur, pp. 1-3.
[13] Openwave (2002), *DiGi Offers Customers Openwave Solutions to Incite Fun with Mobile Phones*, Openwave System Inc., Kuala Lumpur.
[14] Ollila, M., et al. (2003), "Mobile Entertainment Industry and Culture: Barriers and Drive", European Commission User-friendly Information Society
[15] BWCS (2002), *Play Away: The Future of Mobile Entertainment*
[16] msmobiles.com (2003), *O2 XDA Supports Video Service in Malaysia*, msmobiles.com, Kuala Lumpur
[17] Green, N. et al. (2001), "Configuring the Mobile User: Sociological and Industry Views", *Special Issue on Mobile Communication and the Reformulation of the Social Order, Personal and Ubiquitous Computing*, vol. 5, pp. 146-156
[18] Matskin, M. & Tveit, A. (2001), "Mobile Commerce Agents in WAP-Based Services", *Journal of Database Management*, vol. 12, no. 3, pp. 26-35
[19] Nohria, N. & Leestma, M. (2001), "A Moving Target: The Mobile-Commerce Customer", *MIT Sloan Management Review*, vol. 42, no. 3, pp. 104
[20] Vrechopoulos, A.P., Siomkos, G. J. and Doukidis, G.I. (2001), "Internet Shopping Adoption by Greek Consumers", *European Journal of Innovation Management*, vol. 4, no. 3, pp. 142-152
[21] Vellido, A., Lisboa, P. and Meehan, K. (2000), "Quantitative Characterization and Prediction of On-Line Purchasing Behaviour: A Latent Variable Approach", *International Journal of Electronic Commerce,* vol. 4, no. 4, pp. 83
[22] Poosparajah, S. (2003), *Population Growth Rate Dropping*, News Straits Times, Kuala Lumpur.
[23] MCMC (2004), *Cellular Phone Subscribers*, Malaysian Communications and Multimedia Commission, Kuala Lumpur.
[24] Mammal, M.S.B. (2002), "Organising Mobile Phone Workers in Malaysia", World Telecom Multinational & Organising Meeting.
[25] Ooi, J. (2004), "OPM Disciples Residing in Malaysian Telcos", Available: http://www.jeffooi.com/archives/2004/08/trueblood_opm_d.php (Accessed: 2004, September 20)
[26] The_Star (2002), *Maxis Profit Jumps 52pc to RM788m in First Half*, The Star, Kuala Lumpur.
[27] Cellular_News (2002), *3G Wireless in Malaysia*, Cellular News.
[28] Hong, B.H. (2004), *Maxis Turns In Highest Ever Quarterly Profit*, The Star, Kuala Lumpur.
[29] Partanen, J. P. (2001), *Mobile Gaming: A Framework for Evaluating the Industry 2000-2005*, Gaptime Century.
[30] Xu, H., Teo, H. H. and Wang, H. 'Foundations of SMS Commerce Success: Lessons from SMS Messaging and Co-opetition', In: *Proceedings of the 36th Hawaii International Conference on System Sciences*, Hawaii.
[31] Booz, Allen, and Hamilton (2003), "Future Mobile Entertainment Scenarios", Mobile Entertainment Forum
[32] Funk, J.L. (2000), 'Mobile Internet Market: Lessons from Japan's i-mode System', In: *The E-Business Transformation: Sector Developments and Policy Implications*, Washington D.C.
[33] i-wap, "Playing on a Handphone Near You", Available: http://www.i-wapsystems.com/news20020425tplus.html (Accessed: 2004, March 16).
[34] Gilbert, A.L. & Kendall, J. D. (2003), 'A Marketing Model for Mobile Wireless Services', In: *Proceedings of the 36th Hawaii International Conference on System Sciences*, Hawaii.
[35] PA_Consulting (2002), "The Rise of Business Mobile Data Services - What the Industry Really Thinks", PA Consulting Group