.my CONVERGENCE

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THE IMPACT OF SPECTRUM
On The Malaysian Economy

Features

MALAYSIA BROADBAND: A LEVERAGE TO NATIONAL GROWTH
GROWTH AND CHALLENGES IN THE SATELLITE INDUSTRY
THE IMPACT OF SOCIAL NETWORKING
ALE RADIO TECHNOLOGY
SPECTRUM COST VS NETWORK COST
UBIQUITOUS LIBRARY
RADIO FREQUENCY RADIATION STUDY

SKMM MCMC

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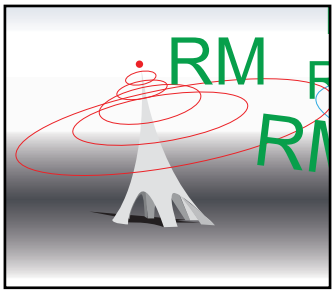

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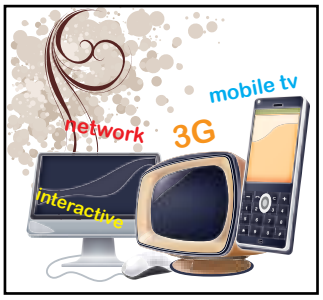

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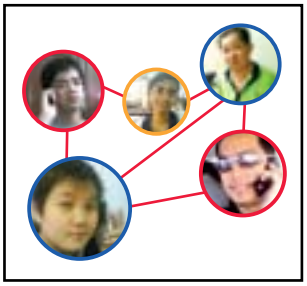

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In this wireless age, many essential services are delivered over wireless spectrum. Television, mobile phones, broadband and radio are among the most prominent of the many services that depend on the wireless space to operate. The wireless spectrum, like any of a nation's resources is finite in its capacity. The efficient allocation and use of the spectrum are thus imperative for any nation. This is especially important as the economic impact of wireless services is great in these times of technology and knowledge that we live in. Our cover story in this issue examines the importance of the wireless spectrum. The article is both timely and enlightening and I am certain that it will benefit the readers. The related issue of spectrum cost vs network cost which is covered in another article in this issue adds more information on this subject.

This issue also examines, in two different articles, the impact and the history of online social networks. These articles are interesting reads on a major trend that is shaping the lives of people today.

This edition also features informative articles on the challenges facing satellite operators, an overview of the projects that have received funding under our Networked Content Development Grant (NCDG) programme, a report on the ongoing Ubiquitous Library Project which aims to set up an ecosystem that will bring the nation's knowledge resources within easy reach of all citizens and an interesting feature story of how physically challenged people as well as people living in rural areas are being introduced to the Internet through SKMM's USP projects.

There are also two technical essays in this issue. The first presents the results of a study on the use of High Frequency (HF) adaptive radio technology in this country. HF adaptive radio is valuable during times of emergencies and disasters and this study adds important data to its use in this part of the world. The other article takes on the subject of radio frequency radiation.

Features on the Network Security Centre portal, DAB-DRM-HD Digital radio and the Malaysian broadband experience round off this issue's varied mix of articles. I trust you will enjoy reading this edition of the magazine.

Thank you,

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2010 ITU World Telecommunication And Information Society Award
In Recognition Of His Commitment To Promoting ICTs
As A Means Of Providing A Better Future For Humanity.

Partners in ICT Progress:

UNDERSTANDING SPECTRUM AND ITS IMPORTANCE TO THE MALAYSIAN ECONOMY

It may not be visible to the human eye but the wireless spectrum has become vital to a nation's economic progress. Rafeeza Rahim, Haji Ahmad Nasruddin and Fiona Lim from SKMM examine its impact on Malaysia.

Although it may be an invisible commodity, spectrum has always been considered a prized asset with its value often analogically associated and measured akin to real estate. Just like the rush for land resources at the beginning of 20th century, conversely, the 21st century now sees the rush for spectrum. Today, this unique property is understood to have become a necessity and prerequisite; instrumental in driving the nation's economic and social development forward.

National Impact: Driving Competitiveness and Fulfilling Aspirations

The wireless industry driven by the efficient use of spectrum will play a remarkably central role in maintaining and improving the nation's competitiveness in the next 10 years. Today, the wireless industry in Malaysia is already estimated to be RM90 billion in value. With household broadband penetration expected to reach 50% by the end of 2010, the opportunity and possibility for the wireless industry to grow in parallel with it are also high. As of 3rd quarter 2009, 37.3% broadband subscribers in Malaysia are already using wireless broadband services, paving the way to more adoption in the next few years.

Broadly speaking, this will make spectrum the backbone for a wide range of industrial and economic activities of the nation when previously, it only provided a channel to communicate and used by a few public sectors. Spectrum is therefore, of considerable economic importance especially now to the new economy in Malaysia, both in terms of market value and providing key readiness attributes such as competitiveness, sustained innovativeness, growth, and ultimately high employment rates for all. In essence, spectrum is a valuable and strategic resource which must be utilised to its full economic potential and managed well for both public and national interest.

Such readiness is also the fervent hope of the Malaysian Government in its attempt to put forth the new initiative of the 1Malaysia concept – "People First, Performance Now". Here, it is the creation of a national well being by conferring greater benefits to all, notably in terms of the delivery of services and "reaching out" to the *rakyat* (citizen), to improve their quality of lives is of utmost importance as we head into the era of the New Economic Model.

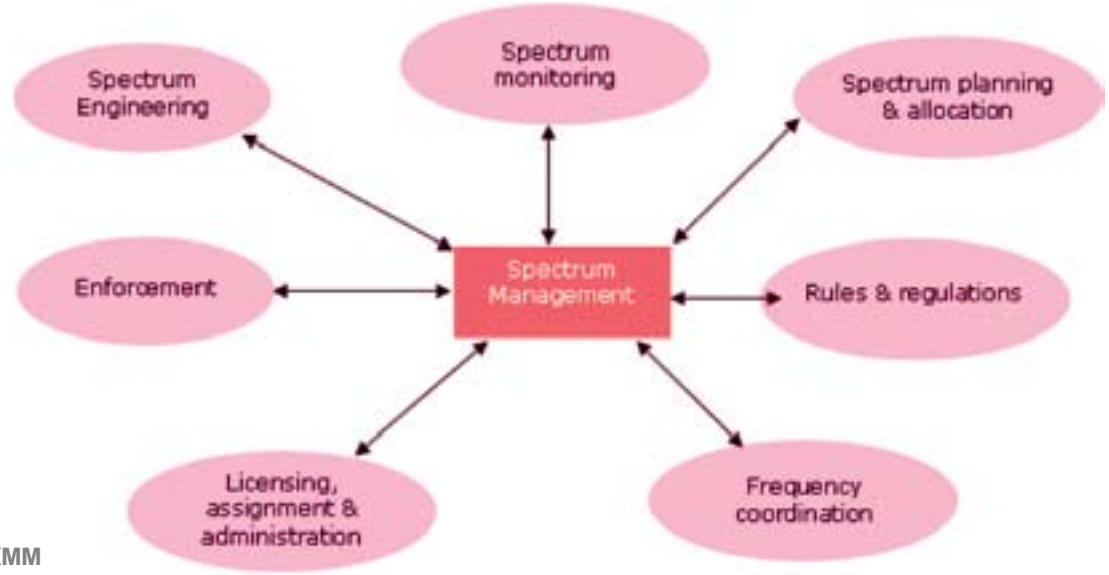
So what role can spectrum play in providing development opportunities to the national competitiveness and aspirations? To understand this we have to look at the socio-economic attributes that it brings. One view is that spectrum is an asset that has increasing potential to generate further economic growth of a nation. Thus, contributions to the economy include adding towards the Gross Domestic Product (GDP), infrastructure development and better commercial practices.

But there are also other views of it contributing to social benefits, simultaneously enhancing outreach and delivery of connectivity to the *rakyat* especially those in the rural areas. More so, in the space of a decade, we have seen that wireless networks and services have become a significant part of the nation's infrastructure. Latest figures in third quarter 2009, shows that Malaysia already has a mobile phone penetration rate of 106.1% where the number of subscriptions has outnumbered the total population. Truly, this makes spectrum availability such an integral part of Malaysian lives. A promising avenue for sure is that the dynamic gains and opportunities of optimally used spectrum will come in the form of increased speed, reach, data richness and economic efficiencies that is required as Malaysia embarks on being a high income economy and innovative society.

Understanding Spectrum

Anyone familiar with the broadcasting and telecommunications industry would have encountered 'spectrum'. Spectrum is the entire range of frequencies of electromagnetic waves ranging from gamma rays to the longest radio waves including visible light while radio spectrum is a subset of the electromagnetic waves ranging up to 300 GigaHertz. A valuable national resource, spectrum is defined as electromagnetic waves up to 420 TeraHertz in the Communications and Multimedia Act 1998 and must be managed efficiently to balance its increasing demand to achieve the national policy objectives. The increasing demand is mainly due to the development of wireless applications and services serving and changing the way we live, work and play when we are at sea, on land, in airspace or even in outer space. Due to its importance to the nation and limited resource, spectrum has to be managed well to ensure maximum utility to all parties.

The use of spectrum is regulated by the governments in most countries. Since Malaysia gained its independence in 1957, spectrum was managed based on Telecommunications



Source: SKMM

Acts 1950 (AT 1950). This was superseded by the Communications and Multimedia Act 1998 (CMA 1998) which empowers SKMM to regulate spectrum up to 420 TeraHertz for the benefit of the nation.

The spectrum management process is somewhat complex as nations cannot act unilaterally. Radio wave propagation does not recognise geographical borders as they travel as far as a particular frequency wave can. To ensure minimal interference and enhance quality of services and taking cognisance of economic demands, governments have sought to harmonise the allocation of spectrum and their standardisation. Continuous coordination for globally harmonised spectrum allocation is done through a World Radio Conference (WRC) organised by the International Telecommunication Union (ITU). This meeting convenes every 3 to 4 years to harmonise spectrum usage so that spectrum users could benefit from the economies of scale through lower cost in radiocommunication devices and ability to use it anywhere.

Managing Spectrum

In managing spectrum, the Government takes into consideration of planning the use of spectrum, allocating and prioritising the spectrum to services, assigning spectrum to spectrum users, spectrum engineering, enforcing assignment conditions, and coordinating and harmonising with regional and international organisations.

Decisions on the use of a particular frequency band are made at the international and national levels, where this is known as spectrum allocation. The international spectrum allocation is set out in a treaty called the ITU Radio Regulations which is ratified by Malaysia. This international framework is used as a basis for Malaysia to develop its Spectrum Plan.

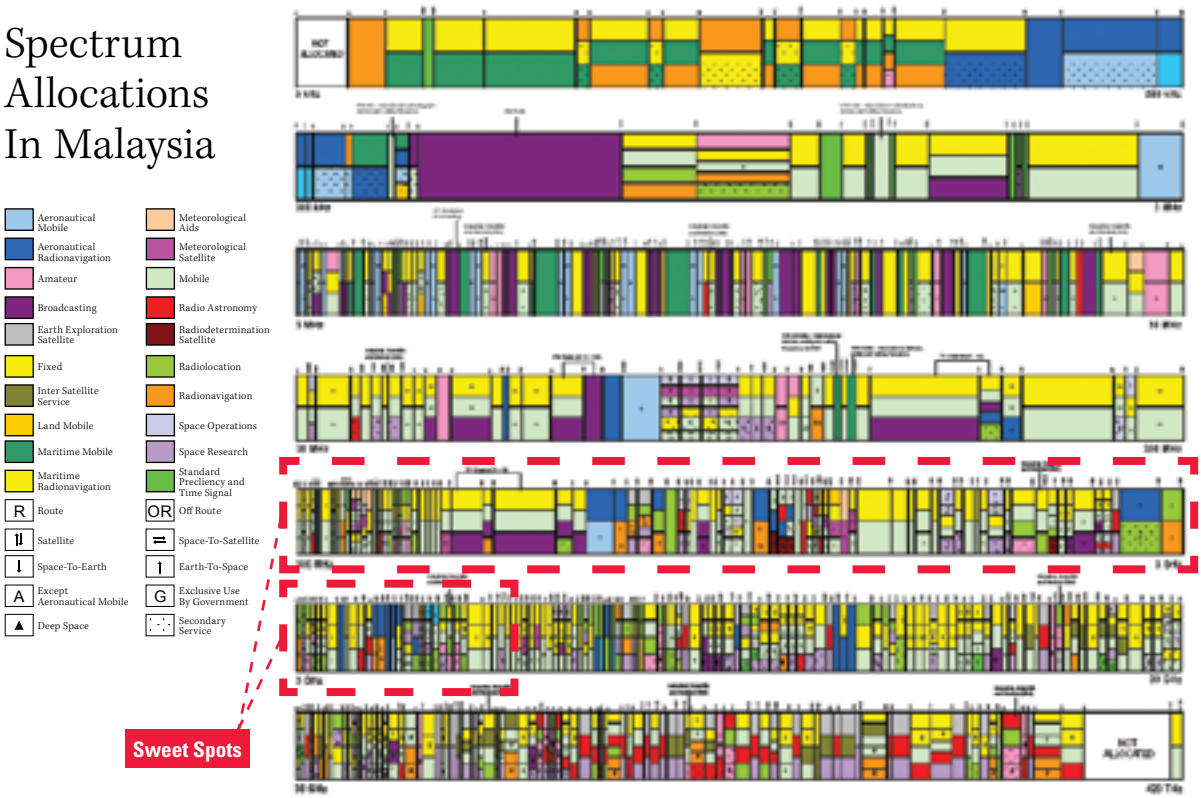
The Spectrum Plan contains information among others on the allocation of spectrum to which services, priority of one service over the other in the same spectrum band as well as information on current use of spectrum. The decisions on the allocation of spectrum are reflected in the Table of Frequency Allocation of the Spectrum Plan.

The next stage in putting spectrum into use is by assigning particular frequencies to specific users. Frequently, administrative methods such as first come first served basis and tenders have been applied to assign spectrum. For example, in a situation when there is sufficient supply of spectrum to meet demand, first come first served basis is used whereas when there is competition to obtain the spectrum, a tender, auction or beauty contest process is exercised.

In the past, the 3G and WiMAX spectrum were assigned through 'beauty contest' . In this tender process, bidders are required to submit proposals which consist of their business plan, service roll-out plan, coverage area, roaming criteria, financial considerations, industry development and experience in management and technical. Proposals submitted are assessed and spectrum is assigned to the best proposal that meets the criteria specified for the assignment. The disadvantage of this method is that bidders tend to overstate in their proposals to ensure of winning the tender. Consequently, tender winner may possibly, at the later stage of implementation, face problems in meeting the target stated in their tender proposal which will further result in facing penalties for non-performance and denying the public of promised service.

The demand of spectrum is increasing as the need for mobile communications and mobile Internet access increases. Ensuring proper management of spectrum so that the nation is not denied of its rights for good mobile communications, mobile Internet services and many other spectrum-based services is crucial. As spectrum is a naturally limited resource, congestion may occur on the "sweetspot" spectrum band which, due to its propagation characteristics, is a favourite to many services for deployment. To address this high demand of the "sweetspot" spectrum band, many countries have abandoned tender processes and have begun using spectrum auctions which

Malaysia Spectrum Allocation Table



Source: SKMM

are market-based methods to award spectrum to the highest bidder.

Spectrum auction has been widely used to award spectrum. This is despite the adverse experience of the 3G auction in some countries like the UK where it has resulted in high bid amounts that effects business roll out in the end due to lack of capital investment afterwards. Countries like Australia, UK, New Zealand, Singapore and Indonesia have held spectrum auctions. The design of the auction is an important criteria which ensures the success of the assignment of spectrum. Through many years of experience of spectrum auctions in various countries, the design aspect of spectrum auction has improved and it could be observed that spectrum auction has turned into a widely accepted method to award spectrum for commercial use.

Spectrum is also an essential input to non-commercial uses. For example, the use of spectrum is crucial in maintaining the national security and safety of the people where it is being widely used by Government agencies like Ministry of Defence, Royal Malaysia Police, Department of Civil Aviation, National Security Council, National Space Agency (ANGKASA), Malaysia Fire and Rescue Department and Malaysian Meteorological Department.

Other than for communications, spectrum is also an essential enabler for non-communications applications such civil aviation radars and radio astronomy. Spectrum used for commercial purposes is usually assigned to benefit the country's economic and social growth and national policy objectives while at the same time ensuring that sufficient spectrum is available to meet the needs for public safety, defence and emergency services.

Economic Impact

In Malaysia, the economic benefits generated by the wireless industry through the proliferation of wireless communications have significantly enhanced the Malaysian economy and commerce. Much of the economic sectors in the country are either directly or indirectly involved with the use of spectrum resources hence benefit from its development. Interestingly too, that over years of technology advances, many related industries and businesses have been generated in an almost domino-like effect, originating from the wireless industry itself, creating what is now an emerging multi-billion dollar industry in Malaysia.

Valuing the Industry and the Market

At present, it is difficult to derive a realistic general estimate of the value of the wireless industry in Malaysia. Limitations such as the sensitivity and lack of data available have made estimation or quantifying the value of the overall wireless industry even more complicated. But according to the European Commission, in economic terms, the value of radio spectrum is determined by the value of the services which can be provided over it.

It is roughly estimated that in Malaysia, the commercial value of the wireless industry to the national economy is about RM90 billion (or USD26.5 billion), representing 17% of total GDP in 2008. This figure is not inclusive of the Government's use of spectrum resource in Malaysia, such as for defence and security purposes. Comparatively, estimates placed the value of US spectrum at USD771 billion. Other European countries have also estimated the value of spectrum use per year for their economies which

totalled to around £24 billion (or USD 39.9 billion) in UK, €2 billion (or USD3 billion) in Ireland and 16 billion Kroner (USD3.2 billion) in Denmark.

In general, the impact of wireless industry to the Malaysian economy can be analysed from two angles - the supply side and demand side; where both contribute to the growth of employment and Malaysia's trade balance. In addition to this, the wireless industry driven mostly by the telecommunications and broadcasting sectors, promotes infrastructure development and redevelopment that allows the Malaysian economy to develop potential leads to attract even more foreign direct investments (FDI) in the future.

Contribution to the Economy

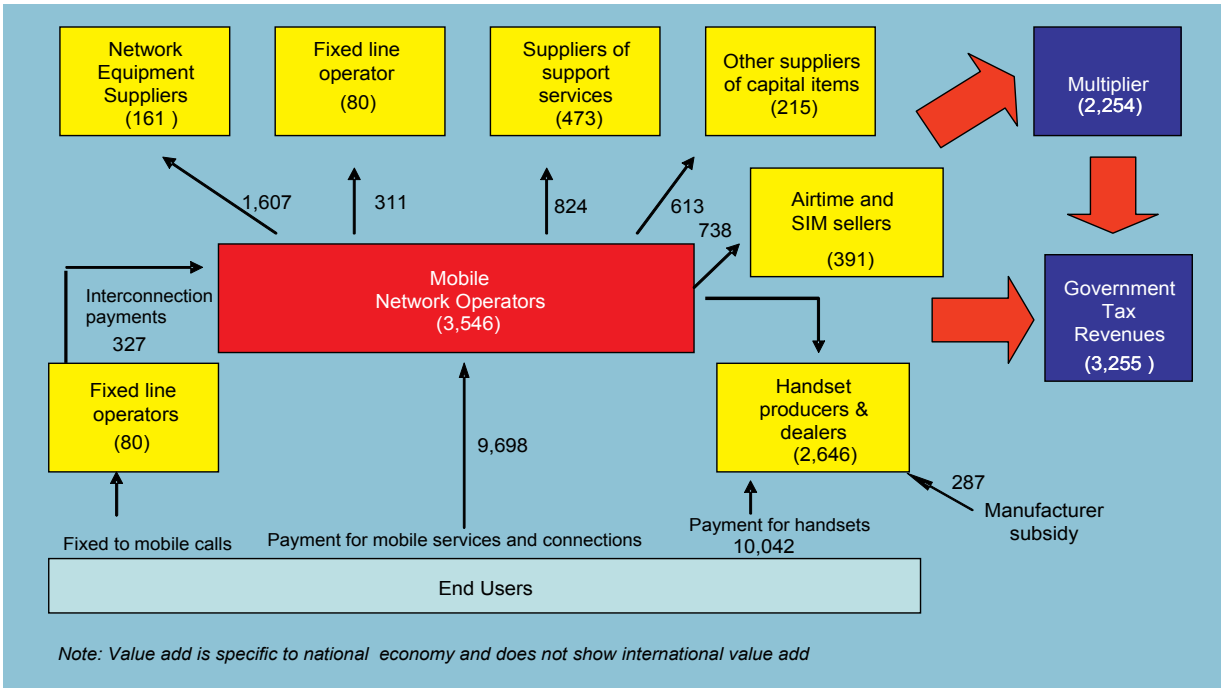
Looking at the wireless industry landscape in Malaysia, the direct suppliers are those who are directly involved in providing the wireless connectivity through the usage of spectrum to end-users. The direct suppliers in this case would predominantly be the telecommunications service providers, television and radio broadcasters of the industry.

The cellular services industry, as one of the drivers of wireless industry in Malaysia, had generated RM25.9 billion revenue in 2008 for their domestic and overseas operations. This is a 9.28% increase as compared to the revenues generated in 2007 (RM23.7 billion). By comparison, the industry contributes to more than half of the overall communications and multimedia (C&M) industry revenues in 2008 at 63.5%. Additionally, on the supply side, the cellular services industry represents about 3.48% to Malaysia's GDP and 5.22% to the GNP in 2008. In contrast, the broadcasters themselves contributed total revenue of RM3.81 billion in 2008. Together, the total revenue that is generated from the direct supplier of the wireless industry is now worth approximately RM29.71 billion. Meanwhile, it represents 4.18% and 5.99% of Malaysia's GDP and GNP respectively.

However, we also have to note that the industry is actually bigger and wider than it seems. To quantify the value, we also have to look at other possible revenue contributors that value add to the value chain of the industry and will have an impact to the economic and social growth of the nation. These contributors are those from the upstream and downstream suppliers within the spillover industries that are generated and created through the demands of the direct suppliers of the wireless industry. Additionally, the value contributed by end-users or subscribers will also need to be included to reflect the overall value of the wireless industry in Malaysia. Thus, it can be deduced that the variables that are required to be taken into account when deriving the value of wireless industry should also include the following:

a. The value of subscribers' payment to wireless telecom service providers. This can either be the facility-based wireless service providers or resellers such as mobile virtual network operators (MVNO)
b. The value of payment for terminals and accessories purchased by subscribers to facility-based wireless service providers.

Mobile Value Chain in Malaysia in 2007 (RM millions)



Notes: *Numbers next to arrows represents flows of revenues*
Numbers in brackets represents the value-adds

Source: Deloitte analysis based on data provided by key industry players in interviews, analysis of company accounts and industry reports and data provided by DiGi

c. The value of payment to wireless telecom service providers by subscribers to terminate fixed line in order to shift/move to wireless calls
d. The value of resellers' (MVNOs) payment to facility-based service providers
e. The value of subscribers' purchase of wireless services, handsets and accessories from independent retailers or dealers
f. The wireless telecom service providers revenues from sale of handsets and accessories
g. The value of wireless telecom service providers and independent retailers/dealers
h. The total costs that handsets suppliers paid to component suppliers
i. The value of facility-based service providers' capital investment (Capex) – payments made to network equipment suppliers and other suppliers of capital equipment.
j. The value paid by facility-based service providers to fixed-line service providers for leased lines.

Each and every variable in the value chain will represent a value that contributes to estimating the overall worth of the wireless industry in Malaysia and this is expected to have a positive impact on the GDP of the nation.

For example, a study conducted by Deloitte for Telenor in January 2008 reported that the total economic impact of the cellular services industry itself was RM21.3 billion to the national economy in 2007, representing an economic value that is equivalent to 3.7% of GDP in Malaysia. Following this, Deloitte also further estimated the flows of revenues and value-adds between the cellular service providers to other parties in the value chain based on its findings.

The table below provides further breakdown of revenue flows and value-adds of the variables in the value chain.

Deloitte also found that from the mobile communications industry value chain, mobile network operators (MNOs) are the largest contributor to the value-add in the value chain. This is then followed by handset dealers and producers which are partly due to Malaysians replacing their handsets more frequently (average of every 9 months) compared to their counterparts, resulting in high revenues for these firms.

Increase Government Revenues through Wireless Industry

Additionally, spectrum is also a resource that helps generate revenue to fund operations for the Malaysian Government. These revenues can be in the form of payments for spectrum fees. Countries have tenders or auction to award spectrum resources and the Malaysian Government has a number of occasions use tender as a process. Such process has generated revenues on top of tax sources such as income taxes from employee wages, sales taxes and company taxes from direct and indirect businesses within the industry and licensing fees.

Boosting Employment and Knowledge Capital Growth

The wireless industry is also a main contributor to creating employment opportunities in the economy of the nation. Through direct employment from the industry, jobs are created within the telecommunications and broadcasting sectors. Furthermore, there are also jobs that are being created indirectly from other related industries such as the supporting service providers that will induce further employment opportunities within the country.

As an example, the mobile communications industry as a contributor to the wireless industry has a substantial impact on the nation's degree of employment. Deloitte estimated that the mobile communications industry itself in 2007 has created 51,000 jobs in Malaysia either through direct employment or indirect employment of related industries such as distributors of handsets, network

Total Revenue and Value-Add within the Mobile Communications Industry Value Chain

	Total Revenue	Total Cost	Total value-add	Value-add that is tax	Value-add with multiplier
MNOs	10,025	6,479	3,546	1,839	4,610
Fixed network operators	311	231	80	23	104
Network equipment suppliers	1,607	1,446	161	41	209
Other suppliers of capital items	613	399	215	54	279
Support services	824	351	473	113	615
Handset importers and sellers	10,329	7,683	2,646	379	3,440
Airtime and SIM distributors and sellers	738	347	391	74	508
Total	**24,449**	**16,937**	**7,512**	**2,524**	**9,766**

Source: Deloitte analysis based on data provided by key industry players in interviews, analysis of company accounts and industry reports and data provided by DiGi

Direct and Indirect Employment of Mobile Communications Industry in Malaysia in 2007

Contribution to Employment	FTEs
Direct (MNOs)	7,000
Indirect (related industries)	32,000
Multiplier effect	12,000
Total employment (FTEs)	**51,000**

Source: Deloitte analysis based on data provided by key industry players in interviews, analysis of company accounts and industry reports and data provided by DiGi.

equipment suppliers, retailers of mobile products and services and even advertising service providers.

Inevitably, the overall increase of job creation by the sectors within the wireless industry will help spur the development of an IT savvy society. This in turn will also bring value to the Malaysian economy through knowledge capital development that will help bridge the digital divide. Today, a country that is rich in knowledge capital will experience significant economic growth in the future and enhance its nation competitiveness.

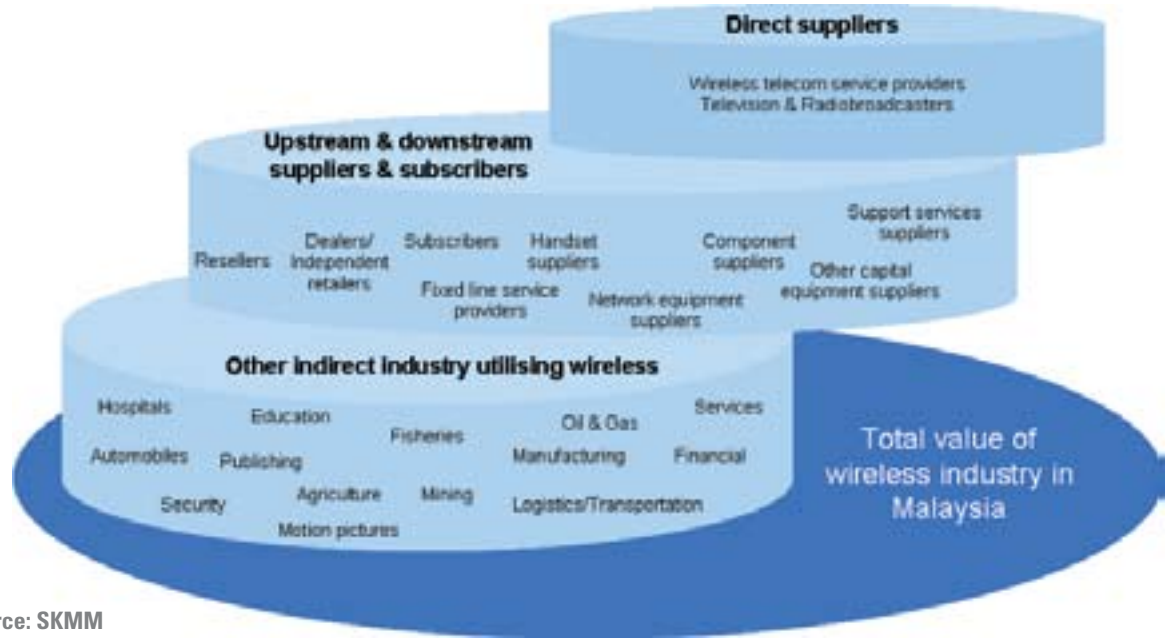
Increase the Productivity of the Malaysian Businesses

The value of wireless industry is not restricted to only the value generated from the direct, upstream and downstream suppliers. As spectrum is a valuable and natural resource, it is required to be used in everyday communications in many ways and provides significant benefits to various other industries. Hence, we have to take into account of the value adds generated from the demand side as spectrum is a resource that is seen to be able to increase the productivity of the Malaysian business and economy.

Today, the wireless telecommunications have become an essential component in generating productivity gains for Malaysian businesses. Businesses are taking advantage of the use of wireless communications, both wireless voice and data, that is enabled by spectrum allocation. Through wireless voice, productivity in businesses has gained significant growth and cost savings. Meanwhile, with the launch of technologies such as 3G and WiMAX and recently, the High Speed Broadband (HSBB) in Malaysia that have higher data handling capacity, the use of wireless data, especially mobile broadband to handle businesses on-the-go is gaining momentum, further improving productivity growth of commerce in Malaysia. For example, WiNet in May 2009, had inked a deal with Telekom Malaysia, the provider of HSBB network, to invest RM1 billion over the coming five years to deploy wireless broadband services. This will certainly ease the access to new markets in the future with potential opportunities for greater foreign direct investments boosting the nation's global competitiveness as well as GDP and GNP growth.

On the back of this, the effective use of wireless enabled communication technologies, products and services also have an impact on human capital productivity growth. For example in EU and US, the impact of Information Technology, Computers and Telecommunications, contributes 42% and 80% of labour productivity growth respectively, that will translate to economic productivity gains that enhance GDP growth. Similarly, the use of wireless communications technology in Malaysia is also expected to boost human capital productivity that translates to cost and time savings. While this may not be an exhaustive list, the possibilities of productivity gains in the economy brought about by the use of spectrum are:

Factors Affecting the Total Value of Wireless Industry in Malaysia



Source: SKMM

- teleworking that uses wireless communications which helps reduce unproductive traveling time, whereby data and information can be forwarded while on the move and meetings conducted remotely;
- faster and efficient decision making through real-time communication devices such as netbooks, smartbooks and smartphones that increases employees' mobility or medical telemetry that improves response time in emergency situation;
- empowering and enabling smaller enterprises to thrive in their businesses such as the nation's own home-grown Jen-ii PC, a lightweight (about 800gms) low-cost PC (priced between RM500 – RM550) equipped with WiFi capabilities developed by MIMOS specially for the rural and elderly communities to encourage them to be more IT literate and bridge the digital divide. Additionally, farmers in rural areas would also be able to access the "agribazaar" application, an online marketplace, to sell their products through this device. Overall, this also helps to promote businesses in underserved rural areas; and
- efficient logistics such as tracking system for goods using Radio Frequency Identification (RFID), communicating with field employees using remote wireless devices, information on traffic condition using satellites; and coordinating fleet management and deliveries using Global Positioning System (GPS).

Social Impact

To understand the social impact that the wireless industry and technology bring about, we have to first understand that the foundation of human culture and society has always revolved around communication. Thus for our nation to develop and shape its human culture and society, the social infrastructure for all rakyat through the various means of communications must be in place.

Social Connectedness

While we have seen the wireless industry spell economic boon to the nation, additionally, it has also ushered in a whole new spectrum of conveniences to the rakyat. With wireless services taking hold in developed and developing countries alike, one of its most pronounced impacts is on social connectedness contributing to the goal of an all inclusive Malaysian society. Today, everywhere we go or look, there seems to be someone talking on the mobile phone; people are becoming closely interconnected in their daily lives, work and play. There is so much connectedness that even young age groups are a pivotal segment of wireless users and are found to be adopting the use of various mobile communication devices. As innovativeness drives wireless technology, societies everywhere have adopted a new lifestyle becoming a "wireless-gadget society".

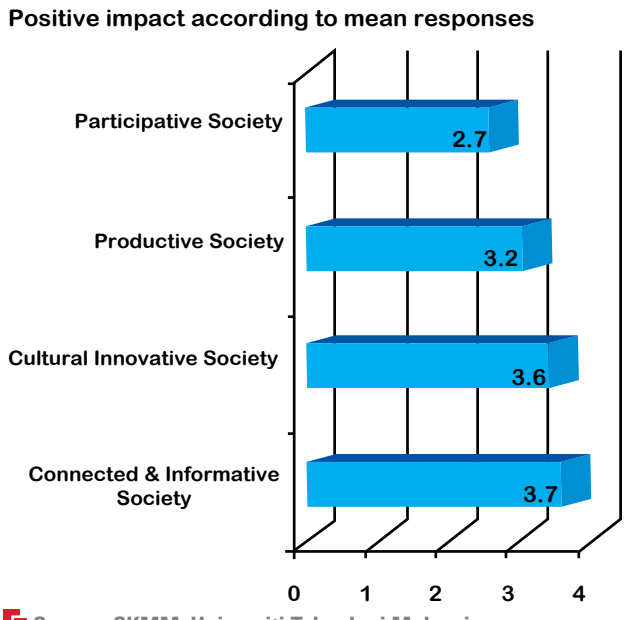
In developed countries like Japan and Korea, mobility which requires wireless is already an integral part of their society's lifestyles. In Malaysia, we can see that this is slowly being embraced by the society evidenced by high mobile penetration rates as well as increased take up of mobile broadband.

Even in remote areas of Malaysia, where some villagers remain isolated from the electrical power grid and decent roads, wireless technologies that provide connectivity are being deployed by the Government to bypass the costs in time and money spent on installing more expansive land lines. In terms of social benefits, this is a path that will enhance rural livelihood especially in a predominantly oral cultured and low literacy rate population. Here, people simply want to talk and be connected to friends and relatives, and wireless technologies through the use of mobile phones have enabled them to do so, dispensing with travel required to regional towns in order to make a call. Eventually, it will eventually help eliminate the digital divide and cultural barriers.

Delving deeper, the social benefit brought about by the use of wireless is also supported in the findings of a study commissioned by SKMM in collaboration with Universiti Teknologi Malaysia under the SKMM Spectrum Collaborative Research Programme. The study found that the use and adoption of mobile phones by the rakyat has significant positive impacts. The study concludes that firstly, the greatest impact it has is towards building a more connected and informative society (72.2%), secondly by building a more culturally innovative society (68.3%), followed by a more productive society (47.5%) and finally a more participative society (27.0%) .

The conclusion of the study is that using wireless technologies has become the society's bread and butter, with its social impact proved to be unparalleled by any other technology, sector or industry.

Positive Impacts of Mobile Phones



Source: SKMM, Universiti Teknologi Malaysia

Challenges In The Current Economic Situation

At a time when the world is struggling to recover from the recent economic meltdown, the wireless industry together with its other related industries has been seen to be resilient and ride the waves of challenges. In balancing the nation's economic and social growth, spectrum usage developments have seen to exceed expectations.

However, while some analysts may even see the industry to be able to play a significant role in the economic recovery, such suggestion and fundamental belief may have to be mirrored with precaution. Its adoption in many applications has actually faced many challenges especially in trying times now. Looking closer, regardless of the economic conditions, there will always be continuous changes in the wireless industry landscape due to market forces, with demand for this commodity fast outstripping its supply. Facing this challenge, the Government and regulator must effectively determine and restrict types of spectrum that can be accessed, but at the same time allowing market forces to shape the allocation of spectrum to technologies and services.

For example, there comes a time when a given technology will outlive its usefulness, prompting a phase-out of that technology. This sometimes happens naturally. In other cases, a choice is made because it would lead to more spectrum-efficient technology being able to operate in Malaysia. When spectrum is freed by eliminating obsolete technologies, it gives an opportunity for introducing similar and more services to meet the market demand.

Phasing out technologies requires careful and detailed analysis on the determined spectrum band and consultation with affected parties will be carried out as it will involve economics and social impact to the nation. Phasing out existing technologies to make way for new technologies will make existing equipment currently using the spectrum band completely unusable in Malaysia. In fact, current equipment that is used in the whole ecosystem of that spectrum band will have to be replaced. However, migrating to newer technology will come at a cost to the Government, consumers and industry but the benefits it will bring to the nation will far exceed the cost.

For change to happen in a blink of an eye is quite impossible. A process which involves phasing out current technology will be a long and complex process especially when it involves nationwide service. One such process that we will face not so far in the future is the switchover from analogue terrestrial television service to digital terrestrial television (DTT) service by the year 2015. The switchover will involve the rolling-out of new transmission and distribution network, upgrade of studio equipment to support digital technology and consumers will have to purchase new digital receivers. The switchover will involve cost to the Government, industry and consumers but as mentioned earlier, the benefit of digital terrestrial television will exceed the cost.

Having said that, some of the wireless services providers are also facing some difficulties in terms of delivery of new services. As subscribers are more prudent in their spending, the eagerness in the demand for new services has lessened. This does have an impact on their overall competitive position in the country. Although wireless communications service providers are faring better, other related industries such as component manufacturers are suffering setbacks such as laying off workers and shutting down production facilities due to the economic downturn. For example, companies such as those manufacturing wireless equipment components are facing financial difficulties due to the increasing prices of imported raw materials from overseas.

Additionally, the impact of the economic crisis has also caused investment capital within the industry and other related industries to dissipate. If not careful, this can put to risk the economic and social benefits that the nation can reap from the industry to be in jeopardy. Therefore, precautions such as careful spectrum management and use, and the inevitable switch to digital needs to be executed well as nowadays, it is also observed that the well-being of the nation's socio-economic balance does depend on the continual success of the wireless industry.

Conclusion

Despite the wireless industry being in times of great challenge, on the whole, it is also a time of hope. By looking outward and positively, there is always an opportunity for the wireless industry to support the nation's key economic and social priorities. Thus based on this, the wireless industry through initiatives such as developing a modern communications infrastructure and forward-looking spectrum management framework, can escalate socio-economic growth of the nation for the benefit of all 1Malaysians. .my

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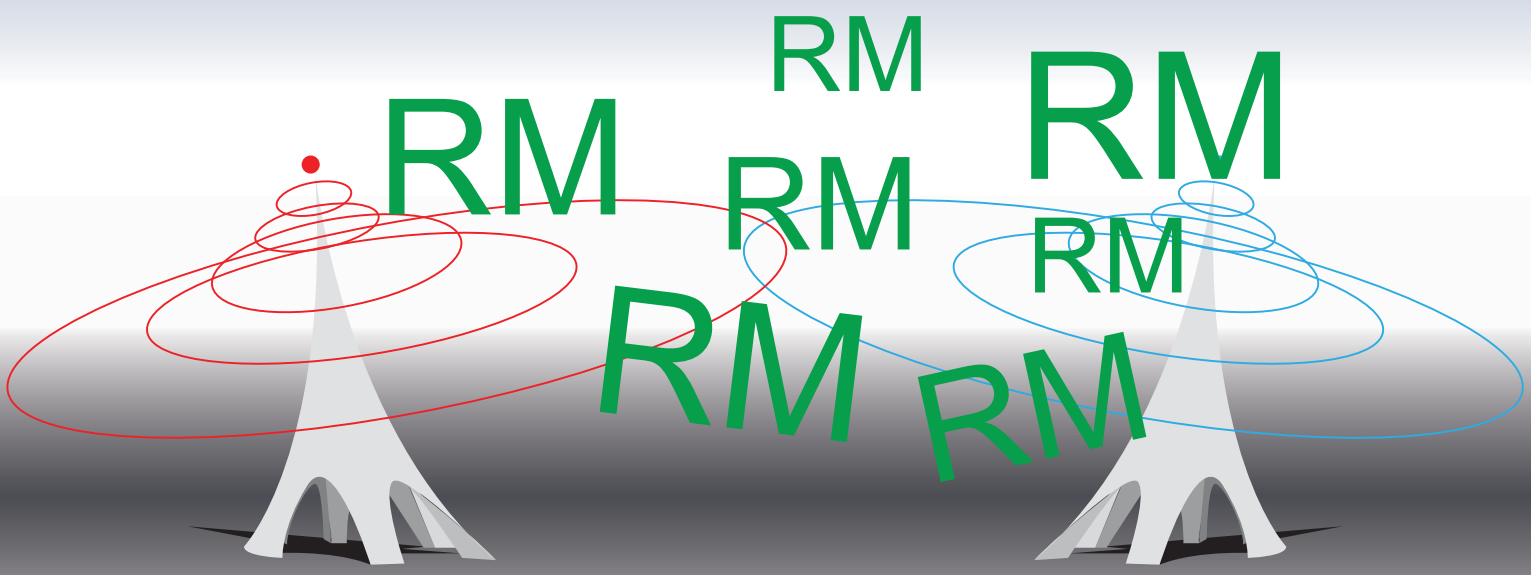

Spectrum Cost versus Network Cost

Dr. Cassey Lee from University of Nottingham Malaysia Campus shares his study on the economic side of radio spectrum under a spectrum research collaboration project with SKMM.

The space surrounding us permeates with electromagnetic waves at a wide range of frequencies, spanning nearly 300 billion frequencies. Of these, only a small range of frequencies (between 400-790 terahertz) is visible to us. Other ranges of frequencies, while not visible to humans, have been harnessed for wireless communications (e.g. mobile telephony), broadcasting and satellite communications. These frequencies account for only one percent of frequencies below 3.1 GHz (Maitra (2004), p.1). The range of frequencies that has been used for these purposes is generally known as radio spectrum. The radio spectrum ranges from about 3 kHz to 300 GHz.

In analysing radio spectrum, and going beyond technical definitions, it is important to consider the economic nature of radio spectrum. In this respect, the radio spectrum should be considered as a form of scarce natural resource that is infinitely renewable (Maitra (2004), p.12). The scarcity of the radio spectrum implies that it has an economic value. Multiple uses to which the radio spectrum can be put to use implies the importance of its opportunity costs. While the radio spectrum is infinitely renewable, it is finite at a

given point in time. The implication of this is that the radio spectrum is also susceptible to congestion in the form of interference involving multiple users and resulting in deterioration and disruption in the transmission and receipt of radio spectrum signals.

These economic issues are at the core of spectrum management, the main objective of which is clearly stated by Cave et al. (2007) (p.2):

"The key purpose of spectrum management is to maximize the society gains from the radio spectrum by allowing as many efficient users as possible while ensuring that the interference between different users remains manageable."

Spectrum Cost versus Network Cost

One important issue in spectrum management is the trade-off between spectrum cost and network cost. The trade-off exists due to the physical characteristics of radio spectrum as well as communications technology. Within the spectrum that has already been allotted, a regulatory authority has to choose the size of the bandwidth in terms of the number of channels to be assigned to operators. According to a consultation report from OFCOM, there are at least two benefits from a larger spectrum:

"The wider bandwidth has two main advantages. It gives operators the flexibility to co-ordinate use with each other in order to avoid interference. This enables best use to be made of spectrum that might otherwise be sterilised unnecessarily for interoperator protection, thereby encouraging more efficient spectrum use. There is also an advantage in terms of service provision put simply, the wider the channel the more customers can be served and/or faster data rates provided."

The higher transmission capacity associated with larger spectrum size also implies that operators that are assigned with such spectrum size need to invest in less network infrastructure (base transceiver stations and sites) in order to achieve the same transmission quality, coverage and capacity.

However, since the spectrum itself is a scarce good, operators ought to pay a higher price (spectrum fee) for the right of using these larger sized spectrums. Thus, the regulatory agency faces a tradeoff between spectrum cost and network cost. An additional issue that complicates the trade-off between spectrum size and network cost is efficiency and the degree of competition between operators. The assignment of larger sized spectrum licences may limit the number of operating firms in the market, thus reducing competition. Regulators need also consider the possibility and impact of offering different spectrum sizes on competition. A broader issue is the relationship between spectrum cost and the mechanism used to assign spectrum (i.e. spectrum governance mechanism). It is obvious that licence fees under administrative licensing and auction are likely to differ.

How should one go about analysing such issues? It may be useful to examine the issue of the trade-off between spectrum cost and network cost with a series of simple analytical models given the complexity of issues involved. Given the importance of social welfare considerations in spectrum management, such models need to incorporate two basic elements, namely:

- Firms - This requires the specifications of competing operators within a market.
- Consumers - This requires the specifications of a representative consumer's demand function.

The specification of firms (or suppliers) entails setting out the firms' cost structures and pricing strategies. The former is to some extent determined by the actual type of telephony services offered. The simplest representation of a pricing strategy is a linear one. More complicated pricing strategies may depend on how demand is specified e.g. whether there is room for price discrimination. Demand specification usually begins with making some assumptions on consumers' utility function. The solution method adopted for a model would depend on all the above assumptions. The optimisation solution for a monopoly operator is relative straight forward while those involving two or more firms will require a game-theoretic approach, presumably involving a Nash solution. With regards to the spectrum cost vs. network cost issue, a starting point would be to assume that the spectrum or licence cost to operators can be considered to be fixed costs that are independent of traffic and the number of consumers served. Further simulations can be carried out to examine the impact of larger spectrum cost in terms of a reduction in traffic-independent fixed cost in the form of lower network cost. This can be represented by postulating an inverse relationship between fixed cost and spectrum cost (it can be further assumed that higher spectrum cost is not accompanied by higher cost in the form of higher fees paid for the spectrum). In other words, an operator which has obtained a right to use a specific portion of the ratio spectrum will have to pay the cost of acquiring the right irrespective of whether it uses it. Yet another scenario would be to take into account the fact that the spectrum itself is a scarce commodity – which can be reflected in the assumption that higher spectrum cost may imply that the operators pay a higher fees for the spectrum. Finally, it can also be assumed that consumer benefits from larger spectrum cost. This is to take into

account the assertion that larger spectrum cost could imply better quality services enjoyed by the consumers. These effects can be modelled incorporating them into the utility functions of consumers. All these models can be solved either symbolically or numerically to provide insights into the spectrum cost vs. network cost issue.

The simulations based on such models suggest that any increase in fixed network whether it is due to higher network cost or spectrum fee will result in a deterioration in society's welfare. The allocation of higher spectrum size, if not accompanied by a higher spectrum fee will have a positive impact on society in so far as it reduces network cost. Thus, any gains from larger spectrum size (via its impact on lowering network cost) can be neutralized by higher spectrum fees. However, if the use of larger spectrum improves service quality and such improvements are sufficiently valued by consumers, the overall impact on society can be positive.

Are Institutions Important in Spectrum Management?

Even though simulations can be useful to understand spectrum management decisions, further considerations need to be given to the role of institutions in spectrum management. Institutions can be defined as follows:

"Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction." North (2000) (p.3)

Institutions play an important role in society, namely in structuring incentives in society which include incentives for physical and human capital accumulation as well as organisation of production and exchange. Thus, institutions influence factor accumulation, innovation and the efficiency of resource allocation - all of which affects economic growth and development, and hence, competitiveness.

Where should we begin in the formulation of a new institutional economics inspired framework for spectrum management? The starting point should be perhaps a reflection on the nature of spectrum management vis-a-vis the literature on transaction costs (this being the most basic version of institutional economics in the modern 'Coasian' sense). This is to be followed by the institutional framework within which spectrum management operates - incorporating political economy issues.

Despite the burgeoning literature on the role of institutions and economics, there have relatively few applications in the area of regulatory studies and none specific to spectrum management. However, the above discussions on the role of institutions in "structuring incentives in society" certainly have bearing on regulation in general and spectrum management, more specifically. Regulatory institutions and mechanisms including those pertaining to spectrum management are clearly related to North's definition of institutions as they set the "rules of the game". In fact, one aspect of debates on methods of spectrum management is their impact on investment incentives on the part of operators. The adoption of an institutional perspective of problems such as spectrum management is also important for another reason. Much of the debate in institutional economics relate to flexibility of institutions with respect to technological changes. In this context, considering spectrum management from an institutional perspective is crucial given the rapid technological changes experienced by the telecommunications and multimedia sector.

What can we learn from the existing literature? As noted earlier, the existing literature is very sparse. We first explore the findings from these contributions and go on to draw some implications for spectrum management. Levy and Spiller (1996) argues that institutional economics is relevant to an analysis of utilities industry (such as telecommunications) because of several characteristics:

- The presence of economies of scale and scope - resulting in small number of operators.
- The use of assets that are specific and sunk (non-redeployable) - making the operators susceptible to the hold-up problem whereby quasi-rents are administratively expropriated.
- The presence of a broad range of domestic users - which brings about contending political interests.

Given the above characteristics, Levy and Spiller (1996) argues that the risk of administrative expropriation can have adverse effects on investments in the sector. How then should regulatory institutions be designed in light of these problems? They begin by suggesting that regulation should be conceptualised as a design problem comprising two elements:

- Regulatory governance - comprising the mechanisms that a society uses to restraint discretionary scope of regulators and resolve conflicts to which these restraints give rise to; and
- Regulatory incentives - comprising rules governing pricing, subsidies, competition and entry etc.

Choices about both regulatory governance and regulatory incentives are constrained by a country's institutional endowments. These institutional endowments include:

- legislative and executive institutions
- judicial institutions
- custom or norms that restraints the actions of individuals and institutions
- character of contending social interests (redistributive politics)
- a country's administrative capabilities

Levy and Spiller (1996) provides a decision tree to assist policymakers in designing the appropriate regulatory systems given their institutional endowments. Generally, the availability of greater restraints on discretionary state-led actions provides for a more credible and flexible regulatory process. Whether the rules adopted are simple or complex would depend on the nature and capability of the bureaucracy (read, regulatory agencies or ministries). In the

end, the available and optimal options for each country may not be first-best or even second-best.

Saleth and Dinar (2005) provides an even more ambitious institutional framework for analysing regulatory institutions. The authors conceive institutions as essentially complex entities. Describing water institutions, they noted the following:

"Water institutions can be defined as rules that together describe action situations, delineate action sets, provide incentives and determine outcomes both in individual and collective decisions related to water development, allocation, use and management. Like all institutions, water institutions are also subjective, path dependent, hierarchical and nested both structurally and spatially and embedded within the cultural, social, economic and political context."

Their emphasis is on the implications from the different institutional linkages and interactions within a sector (endogenous factors) and with its external environment (exogenous factors). These take the form of either transaction costs or opportunity cost of institutional change (p.5). Saleth and Dinar (2005) also extend their framework to link different theories in an effort to presumably better explain the change process. This framework, which they called 'stage-based conception of the change process' provides a richer set of factors that drive the process of change in institutions, a process that can be sudden. Unlike the work of Levy and Spiller (1996) which provides a guide to regulatory system design, Saleth and Dinar (2005)'s contributions lie in providing a framework of analysis to think about designing the reform process. This is achieved through, for example, prioritisation, sequencing and packaging of the reforms in a way that can reduce transaction costs and relaxing political constraints.

Where should we begin in the formulation of a new institutional economics inspired framework for spectrum management? The starting point should be perhaps a reflection on the nature of spectrum management vis-a-vis the literature on transaction costs (this being the most basic version of institutional economics in the modern 'Coasian' sense). This is to be followed by the institutional framework within which spectrum management operates - incorporating both elements from Levy and Spiller (1996) as well as Saleth and Dinar (2005). Once this is achieved, an attempt should be made to graft a decision-tree for spectrum management (ala Levy and Spiller (1996)) within this hybrid framework.

An interesting empirical analysis can be undertaken to shed some light on the proposed decision tree. This entails the collection of institutional data for a cross-country analysis of the influence of institutions on choice of spectrum management approach. This approach would be similar in spirit to some of the existing empirical literature on the role of institutions in economic growth. Such an empirical analysis can be carried out using 3G assignment data across a number of countries to identify institutional variables affecting choice of spectrum assignment method i.e. auction vs. beauty contest.

Results from preliminary studies suggest that institutions matter in the choice of spectrum assignment method. Countries with lower level of corruption tend to use auctions to assign spectrum. The legal tradition of countries also matter. However, only market potential affects the revenue obtained from spectrum assignment. This suggests that while institutional factors may explain why countries choose a given spectrum assignment method, such decisions do not affect the revenues obtained from such an exercise. These results provide a broader perspective within which spectrum management decisions are taken.

Concluding Remarks

The issue of spectrum cost versus network cost is an important aspect of spectrum management. The assignment of larger spectrum size to operators implies that operators could reduce their fixed investment cost in network e.g. number of base stations. The overall impact on society would depend on the specific nature of this trade-off. A lower network cost could be beneficial to society provided it is not off-set by higher spectrum fees. Excessive spectrum fees could negate any welfare gains from lower network cost achieved via the assignment of a larger spectrum. This is a dilemma that regulators need to take into account. Given that larger spectrum may enhance the quality of services, consumer gains could be substantial. This is likely to depend on the nature of network effects from consumption i.e. larger user base provides more benefit to each user within a society. This suggests that in setting spectrum fees, regulators need to take into account not only the network cost and spectrum cost trade-off but also the impact of network effects. This finding also supports the use of a more dynamic and adaptive spectrum fee structure where a portion of the spectrum fee collected is variable i.e. being larger when the user base is larger. As long as the initial spectrum fee is not too high and an adaptive fee is subsequently charges - the overall impact on society is likely to be better.

Going beyond the technical aspects relating to issue of spectrum cost vs. network cost, there is a need to consider institutional factors in spectrum management. Preliminary empirical results supporting the influence of institutional factors in the choice of spectrum assignment method seem to suggest that this may be out of the sphere of influence of regulators. However, regulators may be able to determine the value of the spectrum fee based on market potential irrespective of the spectrum assignment method used. Such findings provide a useful dimension to the debate on spectrum cost vs. network cost. .my

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Growth and challenges in the Satellite Industry

Paul Brown-Kenyon reflects on technical and business issues facing the satellite industry.

The world's first communication satellite providing two way communication services was the United States' Project SCORE ("Signal Communications Orbital relay Equipment"). Carried aloft atop an Atlas-B rocket in December 1958, the launch of Project SCORE heralded the beginning of the communication satellite industry.

Initially used to provide basic communication links between continents – something now provided by undersea cables -- satellites soon developed into an integral part of the world's telecommunication infrastructure. With unique characteristics as a communications technology – such as wide service areas (a single satellite is able to provide communications services to over one third of the earth's surface); a communication cost irrespective of distance; and, instantaneous coverage on launch – satellites were soon supporting a unique set of satellite specific applications.

Over the following 50 years, thousands of communications satellites were launched creating a multi-billion dollar global industry which, through their support of telecommunication and broadcasting services, today impacts many aspects of our lives.

MEASAT's entry into the space club...

Malaysia joined the space club with the launch of the MEASAT (or Malaysia East Asia Satellite) satellite system in the mid 1990s. Conceived in 1992 as part of the 2020 Vision laid out by YA.Bhg Tun Dr Mahathir Mohamed, and pioneered by Binariang as a private venture, the first of the MEASAT satellites was launched in January 1996 atop an Ariane 44L rocket from Kourou in French Guyana.

A Boeing Satellite Systems 376 HP "spin stabilised" satellite, MEASAT-1 provided a total of 16 transponders (each transponder a unit of capacity of between 36 and 72MHz bandwidth) for telecommunication or broadcasting services. Located in geostationary orbit- a unique orbit 36,000 km above the earth at which the speed of the satellite matches that of the earth to give users the impression of a "stationary" satellite –MEASAT-1 provided state of the art communication services across Malaysia and South East Asia. MEASAT-1 was joined shortly after by MEASAT-2, launched in November, 1996 to provide an additional 12 transponders to the MEASAT fleet.

MEASAT-1 and MEASAT-2, and the subsequent MEASAT-3 series of satellites, were designed to support both corporate and consumer communication services through separate C and Ku-Band communication payloads:

- C-Band Payload: Operating in the 4 GHz and 6 GHz frequency bands, C-Band payloads provide communication services to larger antennas (of at least 1.8m or 2.4m in diameter). While the use of large antennas is a clear disadvantage for some applications, C-Band communication provides a very reliable communication link for corporate networks where close to 100% availability is needed and space for the antenna is not a constraint.
- Ku-Band Payload: Operating in the 11 GHz and 14 GHz frequency bands, Ku-Band payloads provide communication services to antennas of as small as 0.6m. While having the key advantage of operating with smaller, more cost effective dishes, Ku-Band communication are impacted by heavy rain (as one tends to get in Malaysia). As such, Ku-Band services tend to be used for consumer applications, such as direct to-home ("DTH") PayTV or Broadband, where a small amount of outage, while not welcome, can be tolerated.

The launch of the first of the MEASAT satellites was a catalyst for the development of satellite communications in Malaysia. Initially used to provide a link between East and West Malaysia, and provide a platform for the distribution of the RTM broadcast nationally, MEASAT satellites were soon supporting the rapid development of the local GSM network which at the time covered less than 10% of the population. Fundamentally a USP technology providing ubiquitous coverage over the country, satellites were soon used to expand other networks out across the country, linking remote communities, hospitals and universities to the main population centers.

The launch of the MEASAT-1 satellite also led to the launch of the regions first digital DTH television service. Initially argued as impossible in the heavy rain fall region of South East Asia by many 'global' experts, by using higher powered satellites and newly developed digital transmission technologies, the MEASAT fleet supported the launch by Astro of its DTH TV service in 1996 which is now such an important part of our lives.

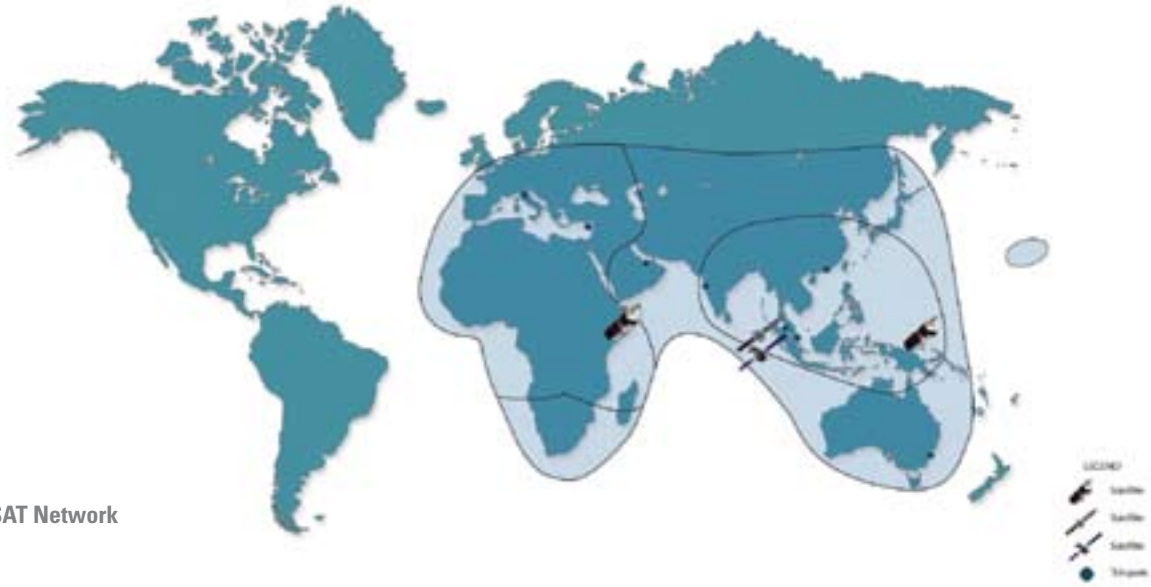
Growth and expansion

While the MEASAT-1 and MEASAT-2 satellites have been very successful, supporting our local satellite requirements and allowing the company to expand into adjacent markets of Indonesia, Philippines and Vietnam, operating a network of 2 medium sized satellites was never going to be viable in the heavy capital intensive satellite communications industry.

At the start of the new Millennium, therefore, MEASAT clarified its vision clarifying two separate targets of 1) Providing a state-of-the-art satellite system for Malaysia's ICT companies; while, 2) Developing one of the top three video distribution satellites serving the Asia-Pacific region. This led to Binariang Satellite Systems Sdn. Bhd. (renamed in 2003 to MEASAT Satellite Systems Sdn. Bhd.) to invest in the significantly larger MEASAT-3 and MEASAT-3a satellites to increase capacity on the MEASAT fleet by some 200% to 100 transponders:

	MEASAT-1 / 2	MEASAT-3	MEASAT-3a
Manufacturer	Boeing Satellite Systems International, Inc.	Boeing Satellite Systems International, Inc.	Orbital Sciences Corporation
Launch Vehicle	Ariane 44L	Proton Breeze M	Land Launch Zenit – 3SLB
Satellite Dimensions (HWL)	Spin Stabilized 2m diameter / 8m height	Tri-Axis Stabilized 7 x 7 x 28m	Tri-Axis Stabilized 7 x 4 x 21m
Launch Mass (Kg)	1395 Kg	4,757 Kg	2,440 kg
Power (watts)	1580	9370	3840.8
C-Band Transponders	M1: 12 / M2: 6	24	12
Ku-Band Transponders	M1: 4 / M2: 6	24	12

The MEASAT Fleet



MEASAT Network

Investments in the MEASAT-3 and MEASAT-3a satellites, which were launched in December 2006 and June 2009 respectively, allowed MEASAT to continue to meet the rapidly developing requirements of the local ICT industry. In particular, supporting:

- The distribution of the RTM and TV3 television channels from South East Asia (as provided by MEASAT-1) to a region which now includes embassies and broadcasters across 110 countries;
- The growth of the local telecommunications network including the GSM network (where our fleet today carries the communication links of almost 2000 base stations located too far away from the existing fibre network); corporate networks (connecting for example every gas station in the country to ensure supplies and reduce cost); and, broadband communication network to remote communities; and,
- The development of the Astro DTH platform which over the last few years has almost doubled its content; launched of a wide range of pay per view channels; and recently introduced its first High Definition (HD) bouquet of channels.

Able to reach over 110 countries, MEASAT-3 and MEASAT-3a have also allowed the continued expansion of MEASAT's regional business. The new satellites have allowed the company to support the launch of the Reliance DTH platform in India, making MEASAT the second foreign satellite operator to support PayTV operators in this vibrant new media market; and, expand the company's regional video distribution business which now distributes over 40 channels and 10 HD channels from international broadcasters such as Fox, National Geographic and AETN.

The challenges

During its journey from the initial idea in the early 1990's, to a fleet of four satellites across three orbital slots today, MEASAT has faced, and overcome, many challenges:

- Building required technical expertise: Operating in the harsh environment of space for periods of 12 or 15 years, the design, manufacture and operation of a satellite is, well, literally rocket science. At the same time, with our satellites supporting the core operations of most of our local ICT companies, including the nation's GSM networks, the distribution of RTM and TV3; and, the Astro DTH platform, ensuring error free operation is critical to our mission. This requires significant technical expertise and knowledge.

  The MEASAT technical team responsible for overseeing the MEASAT fleet was set up in the mid 1990's by Dr Ali Ebadi, our Senior Vice President of Space Systems Development, and has been managed ever since by En Azih Md Zin, Head of Satellite Engineering and Operations. With our entire engineering team recruited from local universities and companies, they have spent many years building knowledge and experience such that today they can rival any other group of satellite engineers in the region. In a rapidly developing industry, however, this investment in the technical expertise never stops.

- Ensuring a long term view: To launch a new satellite requires significant upfront investment – the launch of MEASAT-3, for example, cost almost RM1bn. Having launched, the satellite, it can take seven to eight years to pay back the money invested, and up to 12 to 15 years to earn a return on the shareholders investment. During this period, the environment – defined in terms of technology, market requirements and regulation – is likely to change, impacting the original business case laid out for the investment. While operating within Malaysia -- with a world class regulatory regime that understands the need for stable and well planned regulatory environment that can be factored into our long term business plans – provides a degree of comfort on the regulatory side, MEASAT still faces significant technical and market risks.

The company has addressed these inherent industry risks through a continual focus on market diversification and satellite flexibility:

- Operating now across four continents and over 145 markets, and serving customers in the media, telecommunications and IP segments, MEASAT has been able to spread its market risk. As an example, while today the telecommunications markets across some South East

Asia countries is quite challenging, we are seeing – and tapping into -- significant growth in video services and in the African telecommunication markets.

- In addition to diversifying across customer segments and geographic markets, the company has been focused on making our satellites as flexible as possible so that they can continue to provide tailored communication services as the market adjusts. This has been done by providing clean communication links - with all processing, that will change over time, being done in the ground equipment – and by designing satellite capacity to be switched betweens beams (and hence markets) as the market develops.

- Highly Competitive Industry: While the industry globally is dominated by 3 or 4 major operators, the Asian market has over 20 different satellite operators competing for business. This has led to a highly competitive market, with some operators prepared to use predatory pricing at rates below the cost to secure revenue.

To address this intense competitive environment, MEASAT has focused on customer segments where it believes that it can offer a more competitive solution than our competitors. In addition to focusing on the Malaysian market, where we believe we can better understand and better support customer's requirements, the company has focused on the international broadcast market where the power and reach of the new MEASAT-3 and MEASAT-3a satellites have been able to develop distinctive market positions.

While seeing the value of competition is important for innovation and customer value, the company also lobbies to ensure that operators in a market are allowed to compete on a level playing field. This includes asking regulators to ensure that all operators face the same taxation regime, and that MEASAT has the same access to the home markets as they do to our market.

The Next Chapter

With four operational satellites, the MEASAT fleet now reaches customers in 145 countries - representing some 80% of the world's population -- across Asia, Africa, Eastern Europe and Australia. While a significant growth compared to the two satellites operated during the 1990's, in an industry where scale is important, the company needs to continue to build its fleet to be able to compete with many of the regional or international operators. We are looking at growth both locally and internationally:

- While core part of the Malaysian ICT industry, MEASAT is continuing to work with our customers and partners to see how we can better support local communication requirements. Of particular focus at this time is the country's broadband requirement. While MEASAT today is already is a key component of the local broadband network, through our support of 3G GSM and Broadband VSAT networks, the company is exploring ways in which our satellites (or others available in orbit) can more directly support the government targets through the use of DTH Broadband services.
- With the launch of MEASAT-3, and the de-commissioning of the MEASAT-1 satellite from operational service at 91.5E, MEASAT was able to relocate the MEASAT-1 spacecraft to the 46.0E orbital slot. Renamed AFRICASAT-1 the satellite now provides satellite coverage into the African region. While AFRICASAT-1 is a small part of the MEASAT fleet, it provides an initial foothold into a vibrant and rapidly expanding market which provides significant opportunity for future growth. This focus on international expansion, essential for the strength of the company, is also in line with government encouragement to create a breed of "Malaysian Champions": strong local companies expanding internationally to raise the profile of the country.

Given the heavy investment made over the last few years to launch MEASAT-3 and MEASAT-3a – a total of over RM1.6bn -- MEASAT is limited in its ability to finance new satellites by itself for the next few years. As a result, MEASAT is in discussions with a number of partners to allow the company to continue to expand the network. While requiring a different mindset, and providing certain challenges, working with partners to develop new satellites provide significant advantages in allowing the company to more rapidly expand the fleet in support of our local and international customers.

In addition to commercial activities looking to build the size and reach of the satellite fleet, MEASAT is also seeking ways to reach out more effectively in Malaysia to raise awareness and knowledge of satellite communications. While having always undertaken activities in this area -- hosting student tours of our operations and teleport facility in Cyberjaya; organising open days for the facility; and, supporting students through post graduate programmes -- the company is looking for ways to better support the Government and Local University education initiatives. With our industry requiring a long term perspective, focusing today on building the knowledge and expertise of the next generation of Malaysia's satellite leaders is essential to ensure the continued development of a critically important sector of the Malaysian telecommunications industry. .my

Paul Brown-Kenyon is
Chief Operating Officer,
MEASAT

Andrew Ooi
of Inspidea

Andrew Ooi, managing director of home-grown animation company Inspidea Sdn Bhd has seen his company's animated cartoons bought by TV stations and websites around the world. Along the way, the company's products have received awards too.

Given his background, this unassuming man thankfully did not end up in the world of more serious technical business. Instead he ended up passionately producing world-class standard animation which would be welcomed, loved and respected worldwide.

Born in Klang, Selangor in 1971, Ooi studied science in school until Form Six, after which he proceeded to Universiti Sains Malaysia to pursue a Bachelor of Science degree in Housing, Building and Planning - majoring in Town Planning. Upon graduation in 1995, he continued his postgraduate study, leading to a Masters of Science in Planning in 1996 majoring in geographic information systems (GIS). Ooi then joined an architectural and town planning firm in Penang.

Animation artists at work

GIS comprises software which can handle, interpret and manipulate active maps embedded with details such as the elevation of points on a terrain, the presence of roads, railways, as well as facilities and utilities underground. This can include water mains, drains and sewers, electrical and telecommunications cabling or almost any utility, facility or feature relevant to its user's industry.

This led to an opportunity for Ooi to work for Bentley Systems, the developers of MicroStation, a GIS software. The company offered him a regional role as an evangelist of its GIS and architectural software across South East Asia.

"Through my role, I had the opportunity to meet with lots of professionals and our U.S. counterparts, which helped open my eyes. This contributed much to my personal development beyond pure technical skills and I acquired valuable interpersonal skills such as public speaking," said Ooi.

In 1999, Ooi left to start his own company Tourific in his home, together with his partner CJ See. They conducted seminars, held roadshows, bid for tenders and became more enterprising overall.

Ooi had a passionate belief in the potential of Flash animation, then by Macromedia (since acquired by Adobe), which led him to approach 2D animation software company Toon Boom Technologies (now Toon Boom Animation) as a beta tester of Flash on Toon Boom's software. This led to Tourific being appointed a local Toon Boom distributor. However, they found little interest among local users for animation software.

"Malaysia's animation industry was very small in 2000 and most productions were for local consumption, mostly for Radio Television Malaysia," said Ooi. "Animation was my childhood fantasy, as I like to watch documentaries of animators working and of course I enjoyed watching cartoons as well."

"However, I saw a gap between the potential of the software and its use. Few people knew about animation software, there were few animation courses and whatever animators there were here at the time did not produce world class animation with the software," he added. Their problems included an inability to tell a story which is relevant to people overseas, which appeals to their sensitivities, and a lack of animation talent.

DIY and going places

So Ooi realised that they had to create world class animation on their own and in 2002, they established Inspidea. Despite there not being many good local animations, there was a lot of piecemeal talent, such as Web designers, graphic designers, drama and sitcom producers and animators all over the place. Ooi decided to bring them all together to produce a show to raise the standard of animation in Malaysia.

In 2002, Inspidea did much development work to determine that show. He decided to go with Johan, The Young Scientist. Production work began in 2003 with a team of four and it was completed in 2004. Inspidea's first customer was the eJunior children's channel in the United Arab Emirates.

"We chose the name Johan for its universal appeal, so that the product would be acceptable overseas; since Johan is a name in many countries and cultures," said Ooi.

Basically edutainment for pre-school students, Johan, The Young Scientist was created with fun and vibrant ideas to stimulate the minds of children to develop their love for science. The series is about a child whose inquisitive nature leads him to often bumpy but successful adventures and discoveries.

The story follows Johan, an enthusiastic six year old as he explores Sciencescape, a wildly colourful and futuristic reality contained only in The Amazing Book of Science. It teaches mostly physics by blending its principles into the story.

"Al-Jazeera Children's Channel took it and dubbed it in Arabic, whilst it was taken by three school libraries in the United States as part their kindergarten-to-Grade 9 (K9) programme," said Ooi. "Narration was also added for the visually impaired, whilst subtitles were added for hearing impaired children."

The language in Johan, The Young Scientist was English. A bi-lingual Malay-English version was later created but it was not used. The English version was aired on Malaysia's

Animation artists at work

NTV7 TV station. It was also broadcast in Estonia and Portugal. In Singapore, it was dubbed into Tamil and renamed Mohan, The Young Scientist.

"However, our most successful franchise is Mustang Mama Football Fever, a comedy about a grandmother, who despite being old, is young at heart and can still have fun," said Ooi.

Mustang Mama Football Fever is an outrageous comedy staring Mama, the ambiguously old yet zesty woman, who has more wrinkles than all eleven members of a football team combined. Mama gets up to all sorts of trouble as she celebrates the greatest sport on Earth – Football!

"Mustang Mama Football Fever was released in 2006 in conjunction with the World Cup in Germany and it was on the Cartoon Network in Japan, Nickelodean in Italy, NTV7 in Malaysia, TF1 in France and in Canada," said Ooi. The series comes in 26 two-minute episodes.

Mustang Mama Football Fever won Inspidea the MSC Malaysia Asia Pacific Information and Communications Technology Alliance 2006 (APICTA 2006) award in the Best of Media Entertainment category.

In 2008, Inspidea came out with a sequel, Mustang Mama Diehard Sports Fan and SKMM provided funds to develop this second series through its Networked Content Development Grant.

"Diehard Sports Fan was shown on NTV7, The Cartoon Network in Japan and in other countries. Yahoo! licensed the Mustang Mama character and featured it on their South-East Asian regional websites for users to interact with their logo," said Ooi.

This year, Inspidea launched X3: X-treme, X-tion, X-traordinaire which takes Mustang Mama and the other characters to new heights as they jump ahead into the crazy world of extreme sports. In this brand new series, Mama shows the younger crowd how she does it as she rock climbs, snow boards and hang-glides her way to victory.

"X3 also comes in 26 two-minute episodes which are mostly used as fillers with no dialogue," said Ooi. "It most probably was the very first home-grown programme to be shown on Astro Ceria." Astro Ceria is a Kid's TV channel which is broadcast by local pay-TV operator, Astro.

This year, Inspidea will also release Mat Kacau (Mat Nuisance) for Astro Ceria. Mat Kacau is a character from its game show Gerak Geri Gasing turned into an animated series. Inspidea also created Happy Together, a story about the adventures of a mud skipper and a catfish in a mangrove swamp. It comes in 52, one-minute episodes and is created for older children and young adults.

Inspidea did its part to help spread the word about caring for the environment with Boo & Me, which shows that everyone can be green, including Boo, a baby Orang Utan living in Sepilok, near Sandakan in Sabah. The series was co-produced with KidsCo, a children's TV channel in the UK.

"Boo & Me was launched worldwide in October 2009 and it will very much be a Malaysian show featuring the Malaysian jungle, musical instruments such as the anklung and gamelan. Aiman will narrate the story in 13 different languages," said Ooi.

Success factors and challenges

Among Inspidea's success factors - and by default, Ooi's achievements - are its good team of talented animators. The challenges facing the animation industry overall are to find enough suitable talent, to retain them and to train them to be world-class.

"Malaysia does not train enough scriptwriters for animation and most do live action shows and drama. They also lack experience in animation and lack exposure to handle big projects," said Ooi. "Content is the driver and if we can tell good stories, it will be a cultural export. Most of our shows are shown overseas and people who see them get to appreciate Malaysian productions," he added. .my

Andrew Ooi is
Managing Director,
Inspidea Sdn Bhd

Radio Frequency Radiation Study

Norashidah Md Din from the Centre for Communications Service Convergence Technologies, College of Engineering, Universiti Tenaga Nasional led a team that researched radiation levels emitted by radio frequencies under a spectrum research collaboration project with SKMM.

The use of sophisticated wireless communications devices has been increasing exponentially over the past decades in line with the needs of high speed communication. These include the use of mobile phones as well as the unregulated installation of WLAN access points (AP) at home and public places. Figure 1.1 shows the cellular phones penetration rate in Malaysia from year 2000 until third quarter of year 2008. The penetration rate of cellular phones user has exceeded 100% by the end of 2009.

Other than the mobility offered by mobile phones, the plans and packages offered by the telecommunication companies (telcos) also play a major role in contributing to this growth. Telcos tend to lower the tariffs with respect to the competition pressure amongst them. This makes mobile phone services cheaper and affordable even for low-income groups, and hence increases the demand for the service.

In ensuring the quality of services to their customers and competitions from other service provider, the telcos have to build more base stations at very strategic locations. These locations, most of the times were located in highly populated areas such as on the roof top of the shop lots,

Telefon Selular di Malaysia
Cellular Phones in Malaysia

Tahun	Suku	Pasca bayar (000)	Pra bayar (000)	Jumlah langganan (000)	Kadar Penembusan (%)
2000		2,599	2,523	5,122	21.8
2001		3,069	4,316	7,385	30.8
2002		2,961	6,092	9,053	36.9
2003		2,566	8,558	11,124	43.9
2004		2,555	12,057	14,611	56.5
2005		2,925	16,620	19,545	74.1
2006		3,368	16,096	19,464	72.3
2007	1	3,392	17,427	20,819	77.0
	2	3,485	17,734	21,219	78.2
	3	3,689	18,380	22,069	80.8
	4	3,905	19,442	23,347	85.1
2008	1	4,137	20,116	24,253	87.9
	2	4,451	20,635	25,086	90.6
	3	4,926	21,236	26,162	93.9
Year	*Quarter*	*Postpaid ('000)*	*Prepaid ('000)*	*Total subscriptions ('000)*	*Penetration Rate (%)*

Figure 1.1: Mobile Phone Penetration Rate in Malaysia (Source: SKMM)

apartments or the telcos would build their own base station towers at the edge of the open space such as playing field or parking lots of the shopping complexes. The number of base stations built by telcos in residential areas has raised concerns from the residents about possible radio wave effects caused by these base stations to them.

The communication between mobile phones and base stations involves the exchange of radio signals. The radio link from the phone to the base station is known as uplink, while the radio link from the base station to the phone is known as downlink. The level of these signals is carefully optimised for the network to perform satisfactorily. The areas covered by base stations are usually referred to as cells. However, transmitted signal strength falls off with distance from base stations, and mobile phones require certain minimum signal strength to ensure adequate reception. Due to this, the telcos install more mobile phone base stations to meet the rapidly increasing demand of mobile phone users. Along with the increment in the number of base stations is the public concern on health issues from it.

Several bodies were established internationally to address these issues. These bodies came out with guidelines and standards aiming to allay public fear on the effect of radio frequency radiation. These bodies include International Commission on Non-Ionizing Radiation Protection (ICNIRP), Institute of Electrical and Electronics Engineers (IEEE), the National Radiological Protection Board (NRPB) in the United Kingdom, Industrial Technology Research Institute (ITRI) of Taiwan, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and many more.

Standardisation And Exposure Guideline

Different institutions have different standards in assessing the exposure levels. These institutions include ICNIRP and IEEE. Normally, countries will adopt the standards advised by these bodies. Figure 1.2 shows standards adopted by countries around the world. Most European and Asian countries adopt the standard set by ICNIRP. The International Telecommunications Union (ITU) recommends the adoption of ICNIRP standards for countries without such regulations.

ICNIRP Standards

ICNIRP standard is explained in "Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)", published in 1998 [5]. The document aims to establish guidelines for limiting electromagnetic field exposure that will provide protection against known adverse health effects. Figure 1.3 shows the graph of ICNIRP standard for both occupational environment and general public exposure. The maximum exposure limit (MPE) varies according to the frequency.

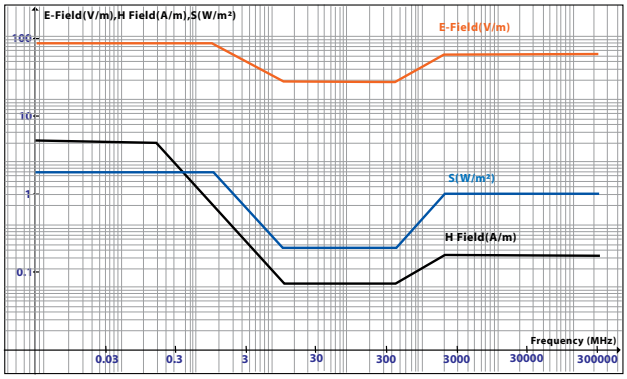
The black coloured line illustrates magnetic field limit in ampere per metre (A/m) and the red coloured line illustrates electric field limit in volt per metre (V/m). The blue coloured line illustrates the power density in milliwatts per square centimetre (mW/cm^2).

IEEE Standards

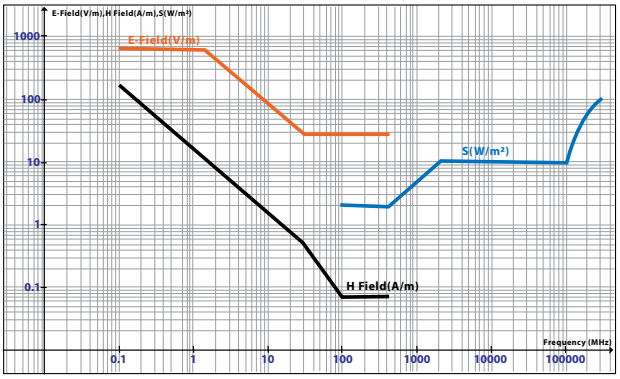
IEEE standards is explained in "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", C95.1-2005 document. The document provides the recommendations to protect against harmful effects in human beings exposed to electromagnetic fields in the frequency range from 3 kHz to 300 GHz, for both the general public and occupational exposure. Figure 1.4 shows the graph of IEEE C95.1-2005 standard for general public exposure. The maximum exposure limit (MPE) also varies according to the frequency.

The black coloured line illustrates the magnetic field limit in Ampere per metre (A/m), while the red coloured line illustrates the electric field limit in Volt per metre (V/m); and where applicable, the power density limits in watts per square metre (W/m^2) is illustrated in blue line.

IEEE C95.1-2005 standard is a revised version of IEEE C95.1-1991. Both ICNIRP and the new IEEE standards have



ICNIRP Standards for Occupational and General Public



IEEE C95.1-2005 Standards for General Public

relatively small difference, and are identical at frequencies used in mobile telecommunications systems. The revised C95.1 standard was harmonised with the ICNIRP standard in 2005. The process of global harmonisation of RF standards was supported by the Mobile Manufacturers Forum (MMF) which will benefit both the consumers and manufacturers of wireless devices and regulators.

RFR Study In Other Countries

A number of studies have been carried out to study the amount of Radio Frequency Radiation (RFR) emission from the Wireless Local Area Network (WLAN) and mobile phone base stations and to identify potential health risk caused by RFR from WLAN and mobile phone base stations. Result of the study carried out by the NRPB at 20 mobile phone base station sites selected in random from a group of 3000 that has a low antenna height and radiated low power in United Kingdom concluded that the members of public would not be exposed in excess of the ICNIRP guidelines whilst standing on the ground at any of the sites.

A study carried out by the ARPANSA on the RF electromagnetic emission (EME) levels in the vicinity of mobile phone base stations in 14 sites in Australia concluded that the average RF exposure level from mobile phone base station was considerably less at 0.0016μW/cm^2 as the limit of power flux density is 200μW/cm^2. In Poland, where the maximum permissible power density value is 0.01 mW/cm^2 at relevant base station frequencies, measurement of electromagnetic field (EMF) in the surrounds of 20 mobile phone base stations showed that admissible EMF intensities at the level of people's presence, in existing buildings, in surroundings of base stations and inside the buildings with antennas, were not exceeded.

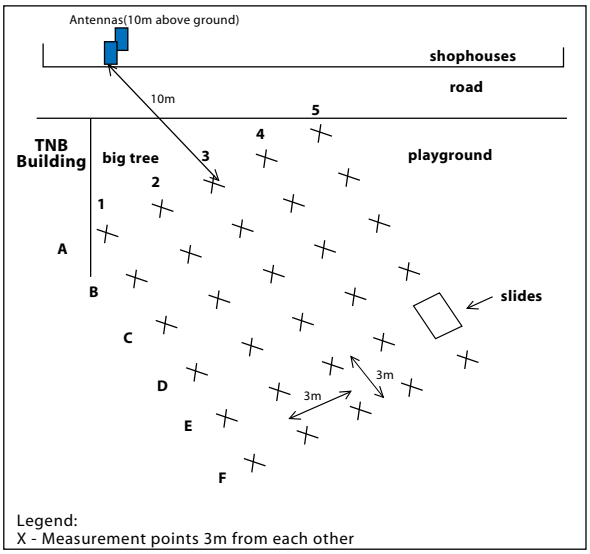
A study carried out by the Somerset Scientific Services to assess the RF exposure level from two WLAN in use at county schools in the UK indicates that the exposures are well within the ICNIRP standard. The Office of the Telecommunications Authority (OFTA) of Hong Kong had carried out measurements to assess the RF exposure level emitted by WLAN Access Points (APs) from September 2007 until October 2008. The report states that the exposure level at measured locations range from 0.03% to 0.3% of the limits recommended by ICNIRP.

RFR Study In Malaysia

In Malaysia, several measurements had been carried out for base stations by the Malaysian Insitute of Nuclear Technology (MINT) and Universiti Islam Antarabangsa Malaysia (UIAM). This research complements the measurements with updated findings for the base station based on the measurements carried out in year 2008. The RFR emission for WLAN however, has not been investigated in Malaysia and our attempt will be the first of its kind.

WLAN Measurements in Kuala Lumpur and Johor Bahru

The methodology for measuring the RFR from WLAN was developed based on best practices in ICNIRP and IEEE. Field measurements were instrumented using broadband isotropic RF metres positioned at approximate heights of 1 metre and 1.5 metre. RF metre positioning is adjusted within the location to get the optimum reading. At the maximum reading spot, Wireless LAN spectrum analyser (WLAN SA) with antenna was used to span the frequency for WLAN, i.e. 2.4GHz – 2.5GHz and measurements were recorded for every 6 minutes up to 24 minutes. Generally, popular locations, whereby the concentration of Wi-Fi hotspots and users are high, were selected for RFR measurements. In Kuala Lumpur's Golden Triangle, the measurement sites identified were Suria, KLCC; SOGO, Kuala Lumpur; and Low Yat Plaza. Measurement sites selected at Johor Bahru were City Square Johor Bahru, McDonald's Jalan Skudai, Danga City Mall, Jaya Jusco Taman Universiti and also The Zon. Based on the broadband measurements made at the 8 sites, SOGO was found to have the highest recorded WLAN radiation in the area with electric field strength of 0.00303 μW/cm2 in Kuala Lumpur. Whereas, McDonald's Jalan Skudai was found to have the highest recorded WLAN radiation in the area with electric field strength of 1.015 μW/cm2 at Johor Bahru. When compared, the highest recorded reading made during the study was far below the MPE standard set by the international bodies like ICNIRP, i.e. 0.2mW/cm2.



One of the sites and measurement grid points made of the site

Base Station Measurements in Kuala Lumpur and Johor Bahru

RFR from base stations measurement methodology was also developed based on best practices from other countries and institutions such as ICNIRP and IEEE. Measurements were conducted using broadband isotropic RF metre at height of 1.5 m above ground level, which is about the height of an average human and the electric field strength metre was set to max-hold mode for six minutes. The results were then compared to the lowest maximum permissible exposure set by ICNIRP (0.2 mW/cm2) to emulate worst case scenario. Narrowband measurements were carried using Advantest U3741 spectrum analyser when the reading at a point exceeds 0.2 mW/cm2 or at the point that gives the highest reading at the each site.

A total of ten sites, five located in Kuala Lumpur and another five in Johor Bahru, were selected for measurement. Base stations identified at Kuala Lumpur were at Wisma Lim Foo Yong, Lorong Datuk Sulaiman, Jalan Pandan Indah, Jalan Wangsa Murni and Jalan Pandan Ilmu. Base sations identified at Johor Bahru were at Jalan Kuching, Restoran Taat, Johor Tourist Information Center, Jalan Wong Ah Fook and Hotel A. The highest recorded reading using the broadband measurement was at Hotel A, which is 0.004331 mW/cm^2. The results show that the radiation levels for all 10 sites are below the maximum permissible exposure set by ICNIRP of 0.2mW/cm2.

Health Concerns

New telecommunications technologies have been introduced without full provision of information about their nature and without prior discussion within the scientific community about possible consequences for health. The average output power from the antennas of digital mobile phones is lower than that from earlier analogue models, but the maximum powers are greater, the exact patterns of radiation are different and these differences might influence their effects on people. As the costs of mobile phone technology have fallen, their use has increased dramatically and the overall levels of exposure of the population as a whole have therefore increased.

Radiofrequency radiation from wireless communications facilities has become a large public health concern in many countries of the world. People are not only concerned about the growing weight of scientific evidence linking health effects to mobile phone use, they are increasingly worried about chronic, low-level exposure to base stations or cell sites.

In the last 40 years, there are numerous studies on health effects caused by electromagnetic energy (EME) radiated by mobile phones, base stations and other RF transmitters. These health effects can be divided into two: thermal and non-thermal effects. Several factors have been taken into account in the studies on health effects by EME sources such as the level of exposure (i.e. power density), frequency and the duration of exposure (short and long term exposure).

Lab tests were carried out on animals such as rats, rabbits, dogs, guinea pigs, etc. The animals were exposed to various factors as stated above. Among the effects studied were hyperthermia and gross thermal effects, effects on the eyes, endocrine and nervous system, effects on reproduction and development and so forth.

As for the effects on human, studies were carried out on personnel involved in installing, maintaining and repairing RF devices. Among the effects studied were possible effects on the eyes, effects on reproduction and development and cardiovascular effects. Weak non-ionizing radiation, such as that from mobile phones, mobile phone base stations and Wi-Fi has been shown to have biological effects, ranging from changes in brain function to the exacerbation of allergies and the induction and promotion of cancer.

A number of scientific studies have investigated possible health effects of mobile phone radiations. These studies are collected and reviewed by scientific committees at the World Health Organisation (WHO), ICNIRP and other

similar bodies to assess the overall risks. Most of the assessments conclude that, from the available research, there are no significant health effects that have been demonstrated from mobile phone radiation at normal exposure levels. However, there are scientific evidence for mobile phone, mobile base stations and WLAN causing biological effects and potentially can become health hazards for the public.

In the year 2000, World Health Organization (WHO) recommended that the precautionary principle could be voluntarily adopted in this case. It follows the recommendations of the European Community for environmental risks. Precautionary principle is a risk management policy applied in circumstances with a high degree of scientific uncertainty, reflecting the need to take action for a potentially serious risk without awaiting the results of scientific research. Other less stringent recommended approaches are prudent avoidance principle and ALARA (As Low as Reasonably Achievable). Although all of these are problematic in application, due to the widespread use and economic importance of wireless telecommunication systems in modern civilisation, there is an increased popularity of such measures in the general public, though also evidence that such approaches may increase concern. Recommendations include minimisation of cellphone usage, the limitation of use by at-risk population (children), the adoption of cellphones and microcells with ALARA levels of radiation, the wider use of hands-free and earphone technologies such as Bluetooth headsets, the adoption of maximal standards of exposure, RF field intensity and distance of base stations antennas from human habitations.

After 10 years of surveillance and study, in May 2006, the World Health Organization (WHO) issued Fact Sheet No. 304 under the Electromagnetic Fields and Public Health, entitled Base Stations and Wireless Technologies. Among others, the fact sheet stated that:

- Recent surveys indicate that RF exposures from base stations are between 0.002% to 2% of the international standards.
- RF exposures from base stations are lower or comparable to RF exposures from radio and television broadcast transmitters.
- Because of the low frequency of radio (around 100 MHz) and television (300-400 MHz), human body absorbs up to 5 times more of these signal than from base stations. In addition, radio and television broadcast have been in operation for the past 50 or more years without any adverse health consequence being established.
- A common concern about base stations and local wireless network relates to the possible long-term health effects that whole body exposure may have.

As for the link to cancer, the fact sheet stated that geographically, cancers are unevenly distributed among any population. Given the widespread presence of base stations in the environment, it is expected that possible cancer clusters will occur near base stations by chance. Moreover, cancers cases reported in these clusters are often a collection of different type of cancer with no common characteristics and hence are unlikely to have a common cause. Studies examining a potential relationship between RF transmitters and cancer published over the past 15 years have not provided evidence that RF exposures increase the risk of cancer. Likewise, long term animal studies have not established an increase risk of cancer from exposure to RF fields, even at values higher than those produced by base stations and wireless networks.

Studies have also been conducted on Electromagnetic Hypersensitivity (EHS) individuals as described in WHO Fact Sheet No 296 which was published in December 2005. EHS individuals are individuals who experience non-specific symptoms upon exposure to RF Fields emitted by base station and other wireless transmitters. The aim of these studies was to bring forth symptoms under controlled laboratory conditions. For example, a study involving fifteen EHS individuals and normal controls exposed to electric and magnetic fields in their homes or workplaces was conducted. The result shows that EHS individuals were no better than control subjects in identifying their exposure to electric or magnetic fields during the experiment.

Conclusions

The era of pervasive and ubiquitous communications is inevitably coming and is very much dependent on wireless communications through radio frequency radiation. It is recommended that random audits be done regularly to ensure that the wireless communications environment conforms to international safety levels. The radio frequency radiation readings recorded for selected WLAN and base stations sites in KL and JB in our study were found to be far below the international service safety level.

End Note: Md Zaini Jamaludin, Nagaletchumi Balasubramaniam, Aiman Ismail and Thahirah Syed Jalal were in the team that carried out the study

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Malaysia Broadband:
A Leverage To National Growth

Yee Sye Chung shares how Broadband to the General Population, Highspeed Broadband and USP programmes are pushing broadband experiences to all.

Broadband is akin to utilities like water and electricity these days. The economic and social impacts that come from the implementation of broadband are well documented in many countries. From advanced nations to developing nations, the arrival of broadband results in a change of lifestyle and gain in productivity. Broadband penetration is a catalyst for increased efficiencies in existing economic activities, and also generates new services, which contribute towards increasing the national Gross Domestic Product (GDP).

Broadband overcomes distances and allows citizens and businesses to participate in the global economy, in addition to creating a more cohesive regional networked economy. For a country like Malaysia, with advanced communications and IT services, the move towards a broadband culture is a natural next step.

Users in a broadband centre in a library

By itself broadband is just a connection. However, it is a superlative enabler of national competitiveness and new media digitised lifestyle once users take up the content and applications services over this network – drawing new breadth and scope of activities from its usage. Applications that would not work on a dial up or those that involve long waits run faster and better with broadband connections. Broadband is revolutionising all aspects of society. It is constantly evolving and improving and as it does so, it spurs new innovations such as in the way instant updated references are provided for mobile sales force to digital media storage and archiving facilities in the virtual cloud. Broadband is spawning services and applications that are changing how we do things.

In the area of education, it is facilitating information sharing that spans distances from web conferencing in offices to the e-education of children in rural areas. It is changing the face of payment and banking services by, for example, how we can now "wave" pay for our groceries in a hypermarket. Business to business trades are done on broadband connections, enabling virtual face to face dealings, and contracts signed electronically in the shortest time. Healthcare initiatives benefit from advanced data and diagnostic technologies to mobile monitoring of patients' health at the hospital and at home. At the personal level, entertainment and social networking are taken to whole new dimensions catering to the various demographic segments of Malaysian youth, office workers and the elderly.

Broadband is one of the mega trends driving the world forward in the twenty first century and that too at a very fast speed. It has taken broadband just five years to achieve the level of global penetration which mobile telephony, a mega trend in the early years of the twenty first century, took nine years to achieve. In short, broadband connectivity is now growing into a basic necessity for businesses, homes and individuals; be it through a fixed or mobile connection. The world is truly networked these days through large data pipes offering myriad content and service applications which enable people and businesses to live a modern lifestyle that goes beyond distances and make the world connectedly cosier to work, live and play in.

For the past 10 years, ever since SKMM was empowered to oversee the orderly growth of the Communications and Multimedia sectors as instituted under the Communications and Multimedia Act 1998 (CMA), the national regulatory policy has been towards liberalisation and the promotion of competition. This has led to the accelerated growth profile of the communications and multimedia industry in the last decade from over RM10 billion revenue generated in 1999 to over RM40 billion in 2009. We have yet to experience the full impact of its spillover effects into other industries, especially in the case of the enabling effects of broadband as one of the key enablers to sectorial drivers of a nation's competitiveness.

This direction is also one indicated in the Global Competitiveness Report 2009-2010 by the World Economic Forum, which prompts Malaysia to use ICT services to move into a knowledge-based and innovation-driven economy. An extract of the key message is in the diagram below.

Malaysia Competitiveness

Global Competitiveness Rankings - Selected Countries

	GCI 2009–2010		GCI 2008–2009
Country/Economy	Rank*1	Score	Rank*2
Switzerland	1	5.60	2
United States	2	5.59	1
Singapore	3	5.55	5
Japan	8	5.37	9
Hong Kong SAR	11	5.22	11
Taiwan, China	12	5.20	17
United Kingdom	13	5.19	12
Korea, Rep.	19	5.00	13
Malaysia	24	4.87	21
China	29	4.74	30
Thailand	36	4.56	34
India	49	4.30	50
Vietnam	75	4.03	70

*1 Out of 132 countries (check)
*2 The 2008–2009 rank is out of 134 countries.

Malaysia – Selected Factor Ranking

Factors	Rank	Score
Basic Requirements - Infrastructure	26	5.05
Efficiency Enhancers - Technological Readiness	37	4.51
- Higher Education and Training	41	4.49
Innovation & Sophistication Factors - Innovation	24	4.06

"Mirroring... economic success, Malaysia has featured prominently in the competitiveness rankings ever since its first inclusion in 1994. Indeed, it remains the most competitive Stage 2 (efficiency-driven) country. To maintain its competitive edge, Malaysia now needs to prepare its conversion into a knowledge-based, innovation-driven economy. Improving both the quantity and quality of higher education (41st) and boosting technological readiness (37th), particularly ICT penetration, would serve this effort well."

Source: World Economic Forum – Global Competitiveness Report 2009-2010

TMpoint on Wheels - Bringing broadband to the Rakyat.

The Ninth Malaysia Plan 2006-2010 emphasises ICT and its related services as enablers to grow businesses and individuals. For example, digitisation of content and a networked business processes can provide benefits of labour and time savings, as well as become a conduit to entrepreneurial development and innovation. Therefore, the Government is working hard to increase access to and use of ICT services and facilities. There is parallel emphasis to further enhance e-Government services, and encourage ICT applications usage through e-Commerce.

In line with national objectives, the SKMM is tasked to work with the industry on a key target of achieving 50% household broadband penetration by the end of 2010. This is amongst the strategic direction and plans in its revised framework for industry development that includes development and roll out of infrastructure and services, promoting communications and multimedia industry growth and bridging the digital divide.

While the Networked Content Development Grant (NCDG) programme supports the localised and local content development objective of the Ninth Plan, broadband development in terms of supply and demand follows a multi-pronged approach.

This is seen from the policy of using multiple technologies or a technology agnostic approach for steady rollout of broadband. Fixed broadband rollout is exemplified through the public-private partnership project of high speed broadband network with Telekom Malaysia Bhd. Telekom is also obligated through the access regime under the CMA to open up its network to peers and third parties. Fixed broadband effectively serves the high impact and major economic areas to support high end usage.

For the larger base of the population in urban areas and those outside the high impact and major economic areas, wireless broadband is the key to access high speed broadband services as it provides speed of supply and requires lower cost. Examples of wireless broadband services available in Malaysia today are through 3G/HSPA and WiMAX.

Through these combinations and of course, not forgetting the fixed wireless option in satellite and WiFi, and the workings together of all stakeholders concerned can we see the national targets achieved therein.

In a holistic approach to "broadbanding" Malaysia, the National Strategic Framework for Bridging the Digital Divide as stipulated in the Ninth Plan is further promulgated through the set up of telecentres, promoting PC ownership, and increase in availability of more affordable ICT products and services. For the underserved areas, the Universal Service Provision programme kicks in.

Private Enterprise

The default broadband access level (that is, to the general population) being rolled out wherever possible aims to deliver broadband speeds of between 2 Mbps and 10 Mbps. Both wired and wireless broadband technologies are in use.

The fixed ADSL broadband technology is adopted by nearly 1.5 million subscribers by third quarter 2009; nearly double from 740,000 subscribers in 2006. ADSL is currently the most widespread broadband technology. At the beginning of 2007, the figure stood at 780,000 subscribers. This near doubling of subscribers in two years is a good gauge of the attractiveness of broadband. Most of ADSL connections are found in urban and semi urban areas as that is where copper telephony lines which are required in ADSL were already in place. ADSL subscribers are expected to reach 1.5 million by the end of 2009.

Mobile broadband usage is increasing even more rapidly than wired access currently. There are two main wireless technologies that are bringing mobile broadband to the masses. 3G and its upgrades such as HSPA (and HSPA+) are offered by the 3G mobile service providers. The other emerging technology is WiMAX.

At the start of 2007, there were only 11,000 3G mobile broadband subscribers. By the end of 2008, the figure stood at 386,000 subscribers. The sharp growth continued with 3G mobile subscribers reaching 747,000 by the third quarter of

NBI Launch Dataran Merdeka 2010

2009. WiMAX growth is still in early stages but is on the rise too. P1, the leading player in the WiMAX wireless sector reported that its subscribers grew from 25,000 in Q2 2009 to over 36,000 subscribers in Q3 2009 which is an increase of over 40% , albeit from small base, in the period concerned.

The High Speed Broadband (HSBB) project which will bring high speed broadband in excess of 10 Mbps to high density economically critical areas is set to be implemented by Q1 2010. Under the Plan, the Government is partnering with Telekom Malaysia (TM) in a Public-Private Partnership (PPP) arrangement to implement the HSBB project. TM announced in December 2009 that it has started a trial involving 122 households of its HSBB services in Bangsar, Taman Tun Dr Ismail, Subang Jaya and Shah Alam. The aim is for commercial and retail availability of its HSBB services at the end of the first quarter of 2010 in the above-mentioned four selected areas.

Service providers, both wired and wireless are doing their part to drive demand for broadband. Fierce competition among both wired and wireless providers have driven broadband access prices down. Heavy advertising by all players too have increased consumer interest in broadband.

Content creation is also being addressed by service providers. Packet One sponsored the 15Malaysia short film project early this year. Maxis is spurring content development through its Maxis Developer Programme. TM is building a content aggregation platform that will give smaller developers a platform to market their products. Celcom (M) Bhd (Celcom) has launched the League of Extraordinary Developers Challenge 2008 to encourage mobile developers in the country to develop innovative mobile solutions that are relevant in today's telco industry. The contest is a collaborative effort of Celcom with Microsoft Malaysia and Cradle Fund Sdn Bhd. To date, Celcom is targeting to commercialise 24 new mobile solutions from winners of the contest in 2009 .

Government Support

The Government has various initiatives to address both demand and supply of broadband.

On the supply side, SKMM is utilising USP funds to bring broadband infrastructure to areas where demand is low. A technology neutral approach in this area ensures that every area where broadband access is being brought under the USP programme will receive the most suited technology for that particular area. Both wired and wireless technologies which also include VSAT are considered when implementing USP projects. New spectrum allocation was also accelerated to WiMAX service providers. To assist services rollout in underserved areas, SKMM enlist the assistance of state government in land acquisition through state-backed licensees who can then install towers for service providers' antenna.

In line with the national strategic plan to accelerate ICT services, recent national budgets saw the Government providing tax allowances for expenditure on last-mile broadband equipment. This includes the last mile network facilities providers being given an investment tax allowance of 100% on capital expenditure incurred for broadband. Import duty and sales tax exemptions are also given on broadband equipment and consumer access devices.

Home users too are being given incentives to install broadband. Budget 2010 saw the Government propose giving taxpayers tax relief on broadband subscription fee up to RM500 a year. Also a netbook package with free broadband is offered to university students for RM50 per month for 2 years. For a start, this package will be offered by Telekom Malaysia to 100,000 local university students, effective 1 January 2010.

On the demand side, SKMM administers a Networked Content Development Grant that assists in funding content projects. A total of RM50 million is available under the NCDG grant programme. The Government is also enlisting other agencies into the campaign to spur content development. The Government has announced that it will set aside RM300 million for content industry development. MDeC is administering the Integrated Content Development Taskforce (ICON) funding programme that opens more funding opportunities to content developers. These content projects are expected to spur demand for content.

Another key initiative is the provision of citywide free WiFi in urban areas. Kuala Lumpur has a free WiFi programme that involves the setting up of access points at government buildings and popular spots. Over in

Launch of Digital Generation Initiative in Bagan Pinang, Negeri Sembilan

Penang, the state government has launched Wireless@ Penang project which is also aimed at giving Penangites free wireless broadband services. The Penang Project is coordinated by the state government but it involves no Government expenditure as private service providers are rolling out the infrastructure. Another development is that Miri town in Sarawak is WiFi-enabled to provide high speed Internet connection in support of personnels in multinational companies, for example, Shell, Petronas and others requiring such networked environment. Public safety is also enhanced through public safety agencies using this network.

At the same time, the digital divide is not forgotten and efforts are made to address the issue. SKMM is mandated to work towards narrowing the inequalities of access that exists in underserved areas and populations. The USP programme is the key tool employed by SKMM in this regard.

Through the USP programme, communications infrastructure is brought to underserved areas. However, this alone will not spur broadband penetration, the Government is addressing the issue of affordability in these areas as well by subsidising broadband costs where necessary. Cost is also not the only deciding factor in driving broadband penetration. Awareness of the advantages of broadband is crucial and to spur awareness, SKMM uses the community engagement approach in these areas.

Under the USP programmes, community access programmes are seen as meeting a two-fold objectives. Initially, these community access points will bring Internet access and user guidance to areas totally without Internet access, or where affordability of individual PCs or connections may be an issue. This will allow the population in the area to access services and applications that were previously not possible. Students are able to access education and information resources. Adults are exposed to work related material and applications. In areas after areas, when community broadband centres have been set up, tremendous response has been seen from the population, indicating that broadband is relevant to their lives.

This exposure to broadband is then expected to spur demand from the population where USP programmes have been implemented. Once they experience first hand the possibilities and convenience of broadband, citizens living in rural areas will be attracted to bring broadband to their homes thus addressing to some extent the issue of low broadband penetration in rural homes.

SKMM and other government agencies have various initiatives in enhancing community access in underserved areas. As of 2008, there are 85 Community Broadband Centres, 105 Library Broadband Centres, 42 Rural Internet Centres, and 58 Community Communications Development Programmes located all over the country with more planned to be set up.

Conclusion

There is still a lot to be done but broadband is clearly a part and parcel of Malaysian lifestyle already. Access is still a challenge for rural areas where infrastructure is still not fully available. Cost is another issue that will have to be addressed over time but past trends has shown that costs in the ICT sectors fall sharply over time when the services are widely available. Therefore, cost is perhaps a self-solving problem as demand increases to a certain threshold level to allow economies of scale in supply to kick-in. Nevertheless, all stakeholders, including consumers, have to make every effort to ensure the threshold is reached quickly.

With that, more Malaysians will bring broadband to their homes this year, and in the next year. The only caveat is that service providers must maintain service quality so that these consumers get the right experience from the word "go". smy

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ALE Radio Technology

for Public Protection and Disaster Relief Operations

The use of high frequency radio communications using ALE radio technology developed for times of war is being explored for use in disaster relief operations and other uses. Assoc. Professor Dr Ahmad Zuri of Universiti Teknologi Malaysia shares his research findings under a spectrum research collaboration project with SKMM.

High Frequency (HF) radio spectrum that refers to the frequency band from 3 to 30 MHz can be utilised for voice and data communication applications such as messaging, email, and telemetry. Despite the availability of satellite communications for long range mobile communications, HF communications is still important in a complementary or secondary role for military, relief organisations, aeronautical, maritime, diplomatic services and amateur radio operations.

However HF communications are highly dependent on ionospheric conditions. Solar ionisation of the ionosphere is an important factor in HF communications and the avail-

ability of the channels depends on the time of day, seasons and the condition of the ionosphere. Also, factors that cause the degradation of signal quality such as multipath fading, interference and attenuation can affect transmissions. Thus adaptive HF communications will allow improved service quality, minimisation of interference and efficient utilisation of the spectrum.

Adaptive HF radio technology is also referred to as ALE (Automatic Link Establishment) technology that allows automatic establishment of communication over HF single sideband (SSB) links using the best frequency possible. Besides call establishment, ALE radio will perform sounding and scanning at all operating frequencies to assess the channel quality through a link quality analysis (LQA) process. ALE radio will always choose the best frequency to communicate for a given time of the day to ensure the reliability of communications.

Existing ALE technology could be proprietary to individual manufacturers such as the ALIS and CALM procedure. To ensure interoperability, the US government developed the ALE standard for civilian application, FED-1045, and the subsequent MIL-STD-188-141B for the US military and her allies.

This preliminary report describes the propagation characteristics of the HF spectrum and frequency planning, data applications such as in secured messaging system and telemetry system and finally field trials results that can used as reference by the regulatory body and potential users of ALE radio for communication within Malaysia.

Importance of the Research

Over the past decade, Malaysia's emergency services and military have been actively involved in the South and East Asia regions. For example, the military was involved in peace keeping efforts in Timor Leste under the 5 Nations Defense Agreement. Other involvements in the areas of search and rescue and relief operations include the East Asia tsunami in Acheh in December 2004, the Kashmir earthquake in October 2005 and firefighting operations in Sumatra, Indonesia. In such conditions, damage to infrastructure or the lack of it makes it difficult to communicate within the affected areas and also to Malaysia. In this respect, HF voice communications have proven to be cost effective and reliable in relief operations conducted by the Malaysian Red Crescent Society in the aftermath of the East Asia tsunami in Acheh and the Jogjakarta earthquake.

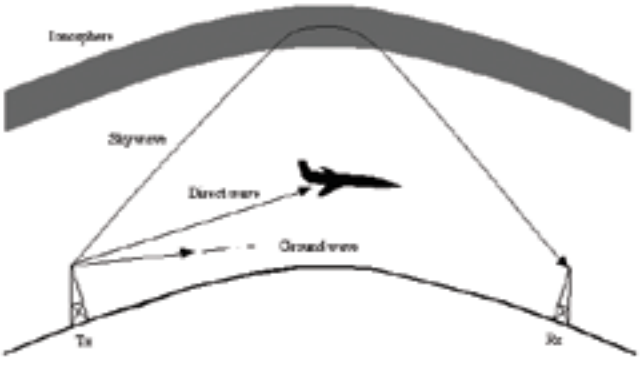
The findings of this research project have direct impact on the international community specifically within the ASEAN region. There is a need for a common set of HF frequencies within the ASEAN countries for disaster relief which is in conformance to Resolution 646 (WRC 03) and Resolution 647 (WRC 07) that recommend the identification of bands for public protection and disaster relief (PPDR) and establishment of frequency data base for emergency purposes. Malaysia has taken the initiative through SKMM at various regional meetings such as the 781st FACSMAB (Frequency Assignment Committee Singapore, Malaysia and Brunei) Meeting and both the 13th and 14th ASEAN Telecommunication Regulator Council's (ATRC) Meetings in 2007 and 2008. To support both national and regional efforts, the research team has evaluated the set of HF frequencies that have been identified for PPDR purposes. The results of the field trials will be valuable to determine the set of operational frequencies as well as its usability when they are required at times of natural disasters and other emergency events.

HF Propagation

In the HF spectrum, radio waves can propagate either using ground wave or sky wave as shown below. Between the two propagation modes, sky wave is more important compared to ground wave in terms of communication over long distances. However, sky wave propagation is more unpredictable and challenging since it is greatly dependent on the refraction properties of the ionosphere.

Ground wave refers to the propagation of radio waves along the surface of the earth. Attenuation loss depends on the frequency and propagation surface. Typically, the best frequency for ground wave is in the lower HF band (that is less than 5 MHz). For a given frequency, the highest attenuation loss is at dry surfaces such as deserts while the lowest loss is for wet surfaces such as sea water. Over sea water, HF radio with a whip antenna can cover up to 400 km with a transmit power of 100 watts. The presence of obstacles such as hills, mountains or islands along the propagation surface can block radio wave reception. At present, prediction

Radio waves propagation



software such as GWPS is available for users to determine the performance of ground wave propagation.

For sky wave propagation, the ionosphere refracts the radio wave from the transmitter to the receiver. The refraction properties of the ionosphere are due to electron density layers that result from solar ionisation. With sky wave propagation, distances greater than 200 km are possible even at lower transmit power of less than 20 watts. In the ionosphere, the various electron density layers lie within 50 to 300 km above the earth surface that are named as D, E and F layers. The D layer that attenuates radio waves only exists during the day time. Both the E and F are useful for long distance communication as the layers refract radio waves. For any given sites, the reliability of communications depends on the following variables: time of day, month, year, frequency, antenna choice and distance.

Sunspot activities are good indicators on the usability of the ionosphere for communications over the HF spectrum. These follow an eleven year-cycle where the years with highest sunspot numbers are the best years to communicate. In general, optimum working frequency is higher during the day time and lower during the night time. Also, as the distance between the sites increases, the optimum frequency increases. It is important to consider the best antenna choice for a given distance. For distances less than 2000 km, a high take off angle antenna such as the dipole gives optimum coverage. A low take off angle antenna such as the whip gives optimum coverage at longer distances. Given these variables, sky wave prediction software such as ASAP and VOCAP are available to the end user to plan and optimise the use of the HF spectrum for sky wave propagation.

At present, the sun is experiencing a solar minimum. As of Sept. 27, 2008, the sun had no visible sunspots 200 days of the year. The last time a similar phenomena occurred was in 1954 when the sun was blank for 241 times. The solar minimum conditions represent an unfavourable condition for effective use of the HF spectrum for communication purposes. However, latest data shows a gradual improving trend which signifies better conditions for communications. Despite the solar minimum conditions, it will be shown later in this article that there is no degradation in the reliability of the ALE radio in field trials conducted within Malaysia.

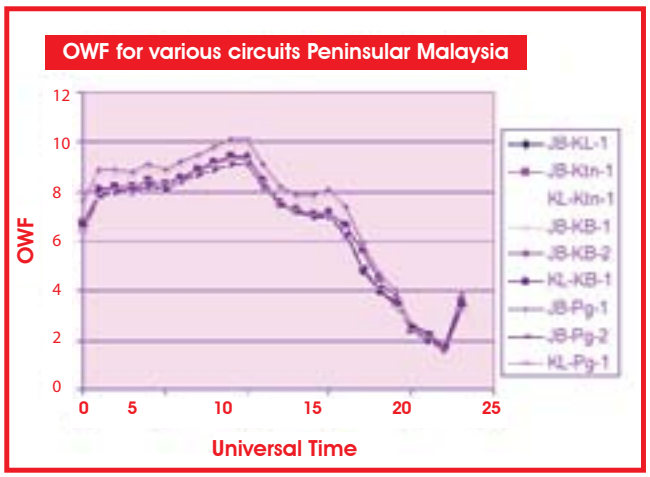
Frequency Prediction

The highest possible frequency that can be used to transmit over a particular path under given ionospheric conditions is the maximum usable frequency (MUF). MUF is divided into three divisions, which are lower decile MUF that is also called Optimum Working Frequency (OWF), median MUF and the upper decile MUF. Normally the OWF is chosen as the communication frequency because it is usable for 90 percent of the time. Since there are so many variables effecting the propagation, it is quite difficult to calculate OWF precisely. However, there are several computer programmes available today to perform prediction of OWF such as Advance Stand Alone Prediction System (ASAPS), Voice of America Coverage Analysis Programme (VOACAP), System Planning, Engineering and Evaluation Device (SPEED) and PROPMAN 2000.

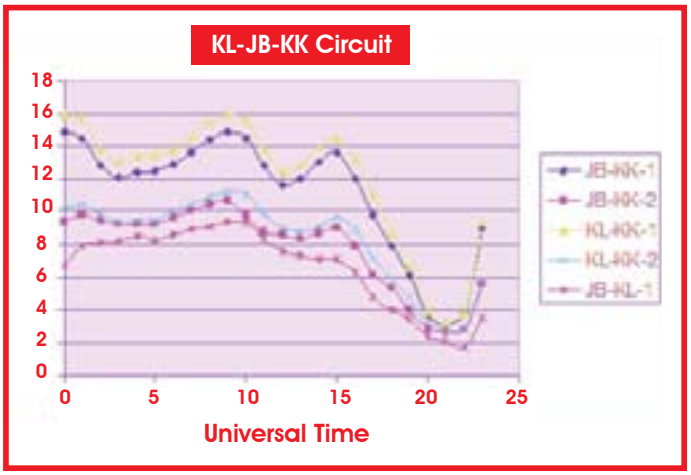
The frequency prediction chart provides the user with information on the usability of the frequency with respect to the time of the day and date. In addition, the chart also provides range of take-off angle for the various electron density layers such as the E and F layers, and for the different propagation modes. For day time communication, the range of frequency with usability of 90 percent lies between the ALF (Absorption Layer Frequency) and OWF. The ALF is defined as the frequency where the D-layer absorbs the radio waves. Usability will reduce gradually for frequencies above the OWF. In practice, a regulatory body assigns a frequency for users and the software can be used to determine the time window to use the frequency effectively.

Frequency Planning

For this project, the sites of interest covered most of the areas within Malaysia and the minimum distance between sites was greater than 100 km since sites of lesser distances would be covered by other systems operating in the VHF and UHF bands. The identified sites are Kuala Lumpur,



OWF for 24 hours communications within selected sites in Peninsular Malaysia.



OWF for 24 hours communications Kuala Lumpur and Johor Bahru in Peninsular Malaysia and Kota Kinabalu in Sabah.

Johor Bahru, Kuantan, Taman Negara Kuala Tahan, Penang, Kota Kinabalu and Sandakan. The ASAP software is used to choose the OWF for all sites with 24 hours coverage. Figure 2.7 and Figure 2.8 show the 24 hours OWF for selected sites within Malaysia.

For Malaysia coverage, the OWF for the various circuits is plotted as a function of time and the results are plotted as shown in Figure 2.8. The longest circuit which is the Johor Bahru-Penang circuit of distance 565 km exhibits the highest OWF values with UT as compared to the shortest Kuala Lumpur-Kuantan circuit of distance 212 km. To maximise frequency usability for all sites, operating frequencies chosen are based on the shortest circuit that is the Kuala Lumpur-Kuantan circuit. Choosing operating frequencies from the OWF of the longest circuit will result in lower usability for the shorter circuits. This can be illustrated by the following example: the OWF for the Johor Bahru-Penang circuit at 2 UT is 8.9 MHz and it is chosen as the operating frequency. If this frequency is used for the Kuala Lumpur-Kuantan circuit, then the usability is in the 50-90 percent days range since the OWF for this circuit is 8.1 MHz. From the OWF list for the Kuala Lumpur-Kuantan circuit, the set of operating frequency for use with the ALE radio is chosen as shown in Table 2.1.

Time (UT)	OWF range (MHz)	Proposed operating frequency (MHz)	Remarks
0-1	6.6-7.9	6.314	PPDR frequency
2-5	8.1-8.3	6.803	UTM experimental
6-11	8.5-9.2	8.095	UTM experimental
12-15	7-7.5	6.803	UTM experimental
16-18	4.2-6.4	5.033	MCMC approved
19-23	1.6-3.5	3.122	PPDR frequency

Set of operating frequencies for used in the ALE radio in Peninsular Malaysia.

A similar approach is used to determine the set of operating frequencies to cover Kuala Lumpur, Johor Bahru and Kota Kinabalu. A set of operating frequencies is determined separately for the Kuala Lumpur-Johor Bahru circuit, Kuala Lumpur-Kota Kinabalu circuit and Johor Bahru-Kota Kinabalu circuit. This is because the OWF for the three circuits has significant differences unlike in Malaysia where the OWF for all circuits are very close to each other. For both Kuala Lumpur-Kota Kinabalu and Johor Bahru-Kota Kinabalu circuits, there are two possible propagation paths which are by first mode and second mode, and the OWF for each mode is different. To improve frequency usability to better than 90 percent of days, the first mode is chosen to select the operating frequencies for both the Kuala Lumpur-Kota Kinabalu and Johor Bahru-Kota Kinabalu circuits and the list of OWF for the three circuits is shown in Table 2.2. The proposed set of operating frequency will be used to set up the ALE radio.

Time (UT)	OWF range (MHz)	Proposed operating frequency (MHz)	Remarks
0-1	6.7-7.9	6.314	PPDR frequency
2-5	8.1-8.3	6.803	UTM experimental
6-11	8.6-9.4	8.095	UTM experimental
12-15	7.1-7.6	6.803	UTM experimental
16-18	4.0-6.3	5.033	MCMC approved
19-23	1.7-3.5	3.122	PPDR frequency

Set of operating frequencies for Kuala Lumpur-Johor Bahru circuit.

Time (UT)	OWF range (MHz)	Proposed operating frequency (MHz)	Remarks
23-1	9.3-15.9	14.540	UTM experimental
2-6	13-13.8	11.202	PPDR frequency
7-10	14.6-16	14.540	UTM experimental
11-17	11-13.9	11.202	PPDR frequency
18-19	6.7-8.7	6.803	UTM experimental
20-22	3.3-3.9	3.122	PPDR frequency

Set of operating frequencies for Kuala Lumpur-Kota Kinabalu circuit.

Time (UT)	OWF range (MHz)	Proposed operating frequency (MHz)	Remarks
23-1	9-14.9	14.540	UTM experimental
2-6	12.1-12.9	11.202	PPDR frequency
7-10	13.6-14.5	11.202	PPDR frequency
11-17	12-13.6	11.202	PPDR frequency
18-19	6.1-7.9	6.803	UTM experimental
20-22	3.1-3.8	3.122	PPDR frequency

Set of operating frequencies for Johor Bahru-Kota Kinabalu circuit.

The process to determine the set of operating frequencies for the sites within Peninsular Malaysia, and the Kuala Lumpur-Johor Bahru-Kota Kinabalu circuit was based on the ASAP prediction software and the set operating frequencies was programmed into the ALE radio according to Table 2.1 and 2.2.

ALE Radio Setup

To enable the use of the radios, it is required to program the set of operating frequencies, the sounding schedule and the threshold signal-to-noise (SNR) ratio for LQA. The operating frequencies for all ALE radios for operating within Peninsular Malaysia are setup based on the recommended frequencies along with frequencies of 10.44 MHz and 14.64 MHz included. Although both frequencies are usable for coverage for Sarawak and Sabah, they are included to determine if the ALE radio will choose these frequencies

for communication over shorter distances. According to the frequency prediction results, this is possible but at a lower probability of usability.

Besides the choice of frequencies, the sounding schedules are assigned for all radios to ensure only one sounding is done at any one time. The ALE radio performed sounding at periodic intervals to determine the link quality between the various stations. Based on the link quality analysis (LQA), the radio will use this information as a basis for selecting the operating frequencies for a given time of the day. For the field test activities, sounding interval for each radio is set at once every 4 hours. Consideration should be placed on the sounding time that is the time taken to sound through all the channels used. More channels mean the sounding start time should be further apart between each station. Based on observations, the sounding time for 15 channels takes about 2 minutes.

For all stations, the transmitted power is set at 30 watts to model situations such as in disaster relief effort or remote telemetry application where there is limited power supply availability. To operate under this condition, the average received signal-to-noise (SNR) ratio is 12 dB based on prediction. Thus, the threshold SNR for the ALE radio should also be set at least 12 dB. The threshold SNR is used to rate the set of operating frequencies every time sounding is performed. When it is required to establish a communication link, the radio will find the frequencies that will meet the threshold SNR or else link will not be established. Thus, the ALE radio will select the operating frequency with received SNR that exceeds the threshold.

Secured HF Messaging System

Besides voice, data can also be transmitted in HF communications similar to other frequency bands. Due to the broadcast nature of HF communications, any adversary with the same equipment and setup could also access the transmitted information. Thus, it is essential to incorporate a security module with the communication system to protect from both active and passive attacks. Active attacks include masquerading where the adversary attempts to act like an authorised user of the system. Under passive attacks, the adversary listens to the traffic coming from the various users and extracts information of interest. Since HF communications are always used for mission critical applications such as disaster relief, military command and control communication and diplomatic mission, the traffic information has to be electronically protected to ensure authenticity, integrity and confidentiality.

A security module can be implemented either by software or hardware. Software security module is easier to develop and maintain but it also easier to be altered or reverse engineered and duplicated. Since it makes use of shared memory and runs on top of the operating system with unknown number of security flaws, it is significantly less secure compared to its hardware equivalent. Thus, better security can be achieved in embedded hardware and this section describes the development of HF messaging system

HF messaging interface

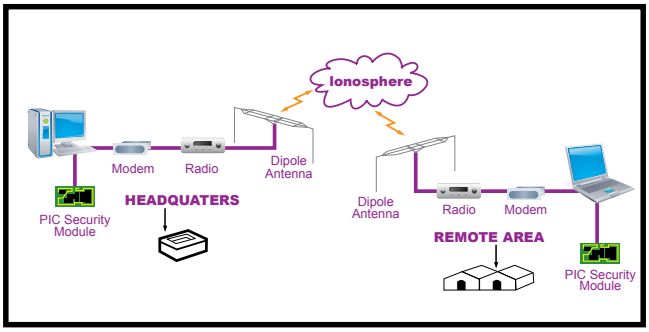
with embedded security module to provide authenticity, key distribution and confidentiality to the transmitted data.

This is an enhancement over the previous work done by Abd Rahim from Universiti Teknologi Malaysia in 2005 who had implemented a similar system totally in software. The PIC18F4520 microcontroller is used to design an embedded security module due to flexibility, economical and low power properties. More importantly, the 32k bytes flash memory is sufficient to allocate all the security functions, minimising the implementation complexity of the system.

Messaging System Structure

The developed secured messaging system consists of two stations connected to each other via HF medium. It is a point-to-point communication system that allows user to exchange digital data such as text, image and text files in either encrypted or unencrypted manner. The system also performs authentication and key distribution function to ensure the authenticity and confidentiality of the transmitted data. Each station will have same hardware configuration which consists of HF transceiver with antenna, HF modem, general purpose computer and embedded security module.

Secured messaging system



HF transceiver

The transceiver is used to send and receive radio signal from the antenna to connect two stations via HF medium. The transceiver with ALE capability is preferred for more effective communication with reduced user workloads.

HF modem

A HF modem receives audio signals from the transceiver and translates it into information and vice versa. It also performs a number of control and information storage functions. For this project, KAM 98' [Kantronics, 1998] with PACTOR 1 capability was used with future expansion to PACTOR 2 with more robust data format and higher throughput.

Computer

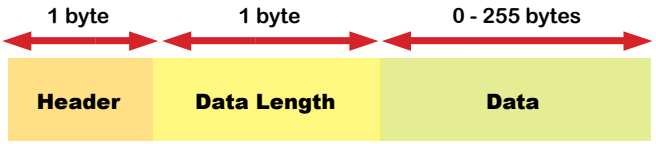
The computer is used to communicate digitally with HF modem via RS232 serial port so that the user can send data to, or receives data from other station and also to control the operation of the HF modem. The secured messaging system will be installed into a computer to provide Graphical User Interface (GUI) so that the user can type their messages, view received message and select the desired mode to communicate either in secured mode (encrypted) or clear mode (unencrypted).

Embedded System Implementation

An embedded security module was designed using a PIC18F4520 microcontroller unit from Microchip Technology Inc [PIC18F2420, 2007]. This device was chosen because of its easy usage, low power consumption and comparative low prize. The security module will communicate with computer via RS232 serial port and has an SD card reader for key storage.

An embedded security flash memory was divided into five portions. The main portion is to allocate the control function. This function is responsible to manage received data and send it to the various functions in the security module. The data is sent to the module in a packet format. The first byte represents the header that describes the type of processing to be required with the incoming data. The second byte represents the length of the incoming data in byte. Since there is only one byte, the maximum length of the data is 255 bytes. This is enough since typed messages are always less than 255 bytes. If the message is more than 255 bytes, the messenger software will divide it into several parts before sending it to the security module. Lastly, the end of the packet is the data itself. The control function inside security module will continuously receive the data with regards to its length and it will send an acknowledgement to the computer when the data is fully received. After receiving an acknowledgement, the computer will automatically standby to receive an output from the security module.

The second portion in the flash memory is allocated for AES256 encryption for authentication function. The secure mode operation begins with authentication to prohibit an unauthorised user from logging into the communication link. The security module uses challenge and response method to perform authentication.



Packet format for embedded security module

The third portion allocated in embedded security module flash memory is AES192 algorithm for key distribution function. At this session, the session key will be randomly generated and exchanged between the stations.

The last two portions are allocated for two improved RC4 stream cipher algorithm because the system will use different keys for encryption and decryption since the embedded security module has limited memory. Therefore, the key-stream is generated at every encryption or decryption process. The number of generated key-stream depends on data length in packet format.

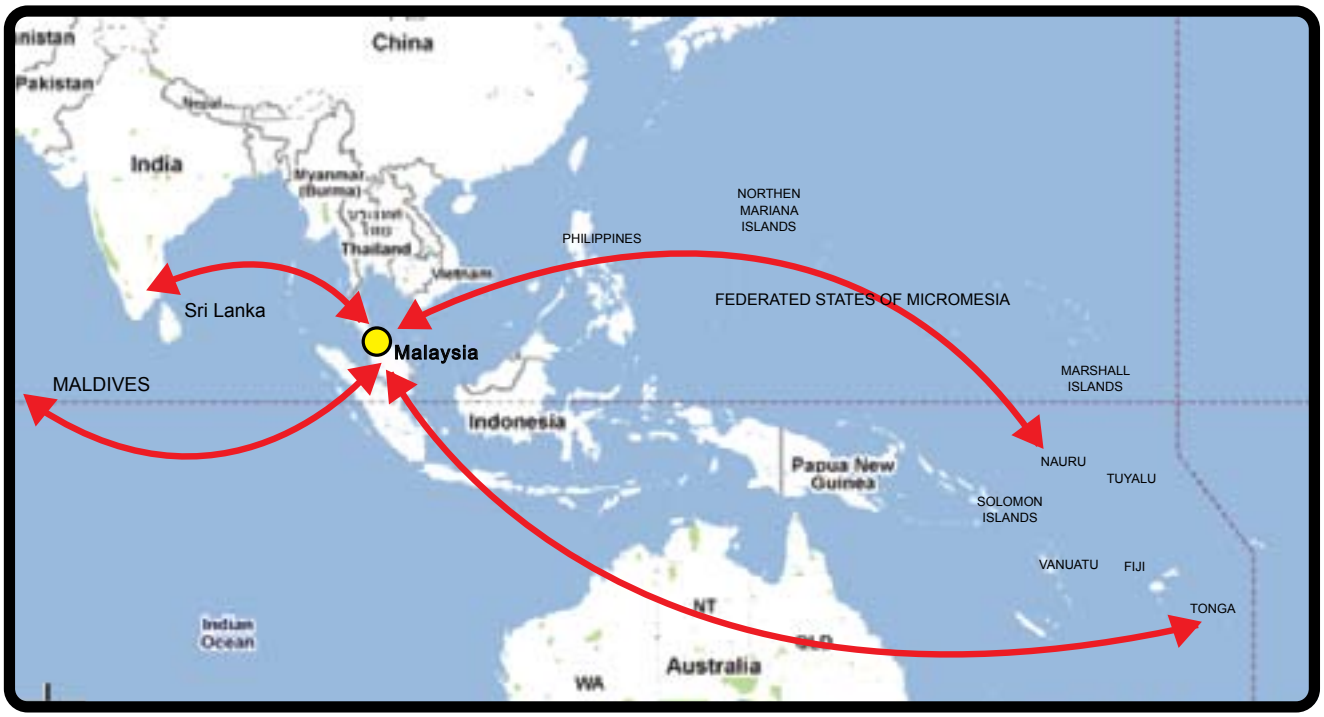
System Implementation Results

This section presents the results on memory usage and performance of both AES and RC4 encryption with 128-bits key length on embedded security module. The security module implementation is restricted by the size of flash memory and SRAM since it was built using a microcontroller. Flash memory is usually used to store programme instructions while SRAM which is smaller than flash memory is used to store dynamic data accessed during program execution. Security has become a very important issue for HF communication. Anyone with similar equipment and setup and within range could access the information.

MV Pemancar radio room

Common Alert Protocol and HF Short Messaging System

Around the mean time of a crisis window, terrestrial communication networks such as switching and cellular networks get congested. Unless a state has established priority channels for emergency operators, which is unlikely



Implementation coverage for HF communication system.

due to excessive unrecoverable cost, emergency communicators are unable to use telecom operator networks. Also, terrestrial communication infrastructure may be damaged at ground zero and hamper the coordination of rescue efforts. Past disaster cases have shown HF Radios to be one of the first technologies used by rescue teams during operations until such time satellite or other high bandwidth terrestrial infrastructure is made operational.

Similar to any wireless communication technology, HF radios can be enhanced to operate beyond voice. It can be utilised to broadcast (point-to-all) or multicast (point-to-many) complete standardised alerts and warnings in the form of data that would be, otherwise, cumbersome to comprehend over voice. Moreover, HF data communication platform can support exchange of situational reports right after the disaster impact to notify ground information (termed as situational reports) to a crisis management centre to effectively coordinate ground search and rescue operations.

Research Initiative

The proposed research is the first phase of a larger initiative to harmonise HF frequencies in ITU Region 3 for long distance (international) and short distance (national) risk information communication. The ASEAN countries are in the process of approving a set of frequencies for public protection and disaster relief that can further be extended to other countries within the Asia Pacific and South Asia regions.

Pilot research is expected to be conducted in selected countries in the Indian and Pacific Ocean with Malaysia advocating the initiative to operate as the gateway hub for the ITU Region 3 countries to test the HF data communication platform for dissemination of emergency information.

During this phase of the pilot project, the researchers will evaluate the technology, application, content, and social elements in relation to adopting the HF data communication platform for dissemination of emergency information during the early warning and rescue operation stages of a disaster. The project will:

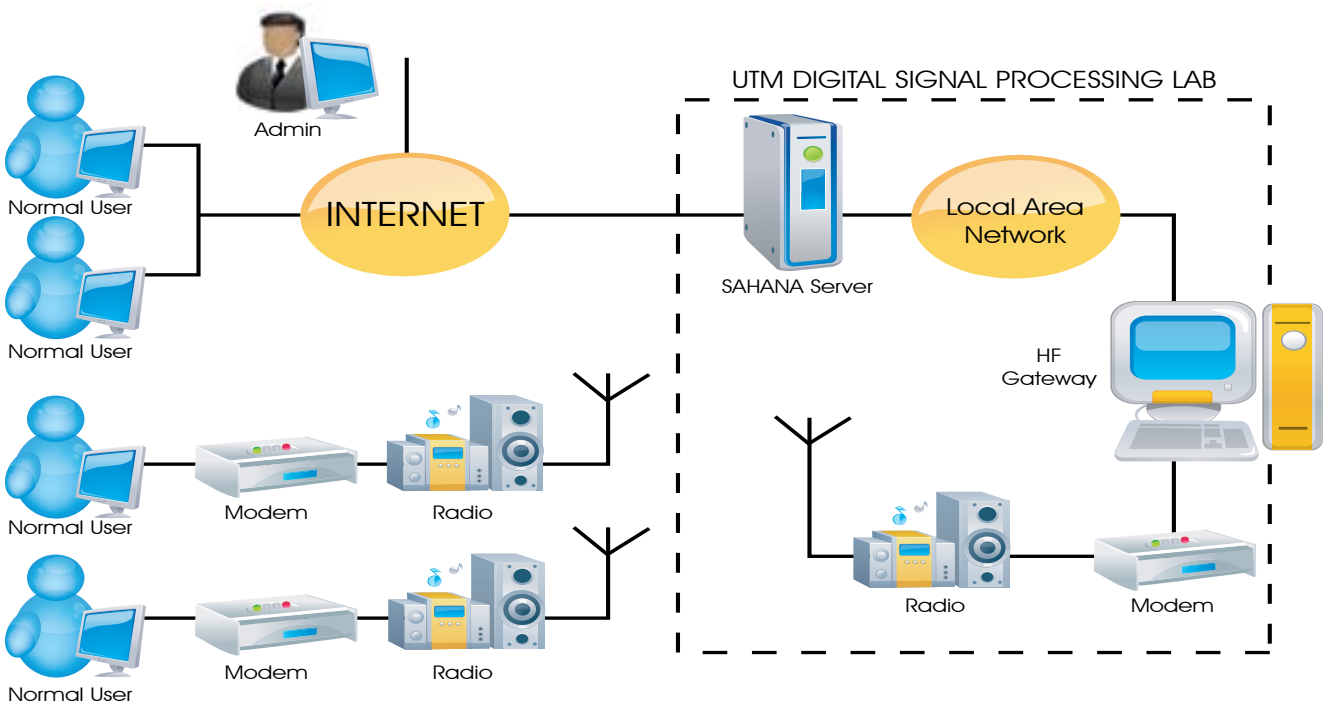
1) Develop a Sahana Alert/Situational report standards to be exchanged over HF transport layer
2) Pilot the solution in five chosen countries in the Indian and Pacific Oceans (e.g. Malaysia, Sri Lanka, Maldives, Nauru, and Tonga)
3) Share the lessons learned, in the context of a wider scale deployments

System Architecture

To connect to the HF network, an IP based network requires (i.e. each node): a laptop, SCS PTC llex Modem Pactor II data format DSP Multimedia Pactor Controlled, and an ALE HF transceiver. A PC with software based controller works as the HF gateway and basically interprets the HF signals, transforms them into TCP/IP, and communicates with the application servers.

This project depends on two major software components: the Sahana Alerting Module and the Sahana Situational Reporting Module. Both modules belong to the web based Sahana Disaster Management Suite of Modules; specifically to the Messaging Module. The emergency teams will be the first trained in each country to use the software applications as well as the HF data communication platform hardware and network for sharing risk information.

An operational prototype system is already in place at the Digital Signal Processing (DSP) Lab, Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Skudai, Johor. The system is able to send alert through the Sahana server via an HF gateway to the remote station. Field trials within the Peninsular Malaysia were successfully conducted to assess the system reliability. Further development work that



Interoperable system architecture

needs to be introduced includes the features for situational reporting (Sit Rep), the use of higher data rate modems similar to Pactor2 and Clover 2000, and the integration with ALE radio technology. All of these features will further enhance the system in terms of reliability and bandwidth utilisation.

Field Trials Results

Once the frequency planning is completed, the next step is to verify the frequency usability for both voice and data communications. In December 2008, the research team received the delivery of the Barrett ALE radios with accessories. With this delivery, the research team is able to verify the frequency usability for selected sites within the Peninsular Malaysia which includes Johor Bahru, Kuantan, Kota Bahru, Gua Musang, Kuala Lumpur, Taman Negara Kuala Tahan, Kota Kinabalu and Sandakan for both voice and data. The field test results presented will cover the period from January to September 2009.

Equipment Setup

List of equipment used for the field test activities:

1. Barrett 2050 ALE HF base station transceiver.
2. Barrett 2040 ALE HF tactical manpack transceiver.
3. Barrett 912 multiwire dipole antenna.
4. Kantronics KAM 98/XL HF modems with PACTOR I data format.
5. SCS PTC II EX HF modems with PACTOR II data format.
6. Barrett 2023 HF modems with CLOVER 2000 data format.
7. MyHF Messenger software with short messaging, file transfer and electronic security feature

To verify the coverage from prediction, field test activities were conducted for the selected stations. The dates for the activities for 2009 are shown in Table 6.1.

An example of a one-day data collection log on 3rd June 2009 for the Johor Bahru-Kota Bharu circuit is shown in a table on the next page. The type of communication used

No.	OWF range (MHz)	Date	Dist (km)
1.	Gua Musang-Kota Bharu	Feb	151
2.	Johor Bahru-Kota Bharu	Feb	532
3.	Johor Bahru-Kuala Lumpur	Feb, April	278
4.	Johor Bahru-Kuantan	Jan, Feb	269
5.	Kuala Lumpur-Kuantan	Feb	212
6.	Johor Bahru-Taman Negara	May	250
7	Johor Bahru-Kota Bharu	June	532
8	JB – KK	Sept	1400
9	JB-Sandakan	Sept	1600

Circuits and dates for field test conducted in 2009.

was voice, ALE short messaging (SM) and data using the Barrett 2023 modems. Since the threshold setting for SNR is chosen at 12 dB, it is observed that the average received voice quality based on the perception scale is 4 to 5 out of possible 5 once a link is established. The operating frequency of 14.54 MHz is not chosen as this frequency is suitable for communications at distances beyond the present circuits of choice.

Generally, the operating frequency selected by the ALE radio at a given time and circuit is lower than the predicted OWF. For example, the radio chose the operating frequency of 6.4501 MHz for voice communication at 1023 hours that

is lower than the OWF at 7.7 MHz. There are other instances where the operating frequency is higher than the OWF. At 1815 hours, the radio chose an operating frequency of 10.44 MHz which is higher than the OWF of 8.4 MHz. The results show that the chosen frequency is usable at that particular moment and gives the best SNR performance compared to the other frequencies.

From the field test conducted, the ALE radios are able to provide reliable communications with 90 percent usability within a window of 18 hours from 0600 to 0000 hours. The usability between 0000 to 0600 hours downgrades greatly from 90 to 10 percent. The usability problem is related to the characteristics of the ionosphere and has nothing to do with the equipment reliability. Based on prediction results, the OWF within 0000 to 0600 hours varies from 2.5 down to 1.5 MHz. Since the minimum operating frequency chosen for the ALE radio setup is 3.122 MHz, this frequency is not usable within this time window. The problem can be resolved if a lower operating frequency which is less than the predicted OWF is used. A lower operating frequency can be requested through the regulatory body but the solution is not practical since minimum frequency of most HF radios is 3 MHz.

Time (UT+8)	Freq (MHz)	OWF (MHz)	Traffic Type	Remarks
015		2.5		Call fail
0245		2.5		Call fail
0415		2.0		Call fail
0500	6.803	1.8	ALE Call	Call fail
0815	6.4501	5.9	ALE Call	Strength 5
1023	6.4501	7.7	ALE Call	Strength 5
1621	8.095	8.2	Data (mod 8PSM/QPSM)	3k text file transfer, time-51 secs. Throughput-3kbyte/min
1624	8.095	8.2	Data (mod 8PSM/QPSM)	2.3k JPEG file transfer, time-105 secs. Throughput – 1.5 kbyte/min
1815	10.44	8.4	ALE Msg	
2030	10.44	6.5	Data (mod 8PSM/QPSM)	3k text file transfer, time-43 secs. Throughput– 4.3 kbyte/min
2245	8.095	4.4	ALE Call	Strength 5

One day data collection log for Johor Bahru-Kota Bharu Circuit 4 June 2009.

Conclusions

The research grant was awarded to UTM in September 2007 with the objective of evaluating the use of ALE HF radio within Malaysia for both voice and data. Due to the importance of PPDR activities within the South East Asia region, the research team evaluated the set of HF frequencies allocated for experimental purposes with adaptive HF radio which at the same time enabled the evaluation of their usability. Instead of the four frequencies allocated under the experimental frequency assignment, the research team is allowed to use 21 frequencies. In addition to the secured messaging system, the team has developed an alert system that integrates the Sahana Common Alert Protocol (CAP) with HF messenger. Lirneasia, an organisation that is based in Sri Lanka, is interested to continue further with UTM to enhance this system.

Unlike communication systems in the VHF and UHF bands, the operation for HF communication using sky wave propagation depends on the time, day and year. In principle, a single frequency will not be able to support reliable communications for a given circuit of a period of 24 hours. The operating frequencies are chosen based on the OWF to ensure 90 percent days from the list of assigned experimental frequencies and the PPDR frequencies. Field test were conducted to verify the coverage for various sites within Malaysia that include Johor Bahru, Kuala Lumpur, Kota Bharu, Kuantan and Taman Negara Kuala Tahan. On the average, reliable voice and data communication are possible for 18 hours for all the chosen circuits. However, this is not possible using fixed frequency HF radio where the frequency usability is dependent on the distance, time and day. The usability problem is related to the characteristics of the ionosphere and has nothing to do with the equipment reliability. Thus, the findings from the field test not only verify the coverage but also determine the limitation in the use of ALE radio within Malaysia. .my

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Ubiquitous Library:
Strategizing Information Delivery Services to Connect Communities in a Knowledge Society

The initiative to bring the ubiquitous library service to the nation is underway. Assoc. Prof Indahsah Haji Sidek tells where it is headed and the journey to date.

The Age of Knowledge

The ubiquitous availability of knowledge is crucial to the development of a nation. The role of the ubiquitous library in the context of development, national unity as well as competitiveness is vital for any nation today. The world itself is being transformed from a production-based economy into a knowledge-based economy and any nation that has aspirations of playing a meaningful role in this new economy must work on developing an innovative information delivery system. Dame Lynne Brindley, Chief Executive of the British Library has acknowledged that being in an era of knowledge economy is "great news for research and scholarship and will give unparalleled access to our vast collections to people all over the world: they will be available to anyone, anywhere and at anytime".

World bodies such as the UN and World Bank are measuring the progress and state of countries in the area of Knowledge Economy. Two indices, the Knowledge Index

Knowledge Economy Index (KEI) and Knowledge Index (KI) for 2008/2007 by the World Bank

Rank	Rank	Country	KEI		KI		EIR		INNO.		EDU.		ICT	
2008	2007		2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007
1	2	Denmark	9.58	9.22	9.55		9.66	8.97	9.57	9.43	9.80	9.22	9.28	9.25
8	9	United Kingdom	9.09	8.88	9.03		9.28	8.54	9.18	9.21	8.54	8.5	9.38	8.93
9	10	United States	9.08	8.8	9.05		9.16	8.45	9.45	9.44	8.77	8.35	8.93	8.95
19	17	Japan	8.56	8.46	8.64		7.71		9.15		8.71		8.66	
24		Singapore	8.24		7.75		9.71		9.56		5.19		8.50	
31	27	Korea	7.68	7.74	8.38		5.57		8.47		7.97		8.71	
40	40	Malaysia	6.06	6.23	6.02		6.10	6.50	6.03	6.74	4.14	4.45	7.06	7.23

Knowledge Economy Index : **Environment is conducive for knowledge to be used effectively for economic development based on the normalized scores of a country or region on 4 pillars – Economic Incentive Regime, Education, Innovation and ICT**

Knowledge Index : **A country's ability to generate, adopt and diffuse knowledge and is based on 3 pillars – Education, Innovation and ICT**

Economic Incentive Regime : **3 variables – Tariff & Nontariff Barriers, Regulatory Quality, and Rule of Law**
Innovation : **3 variables – Researchers in R & D, Patent Applications Granted by the US Patent and Trademark Office, Scientific and Technical Journal Articles**
Education : **3 variables – Adult Literacy Rate, Secondary Enrollment and Tertiary Enrollment**
ICT : **3 variables – Telephone, Computer and Internet penetrations (per 1000 people)**

(KI) and the Knowledge Economy Index (KEI) are universally recognised measurements in this area.

The KI is about a country's ability to generate, adopt and diffuse knowledge. It measures the overall potential of knowledge development in a given country. This is done by averaging the performance scores of three key Knowledge Economy pillars, through education and human capital, innovation system and information and communication technology (ICT).

The KEI examines whether the environment is conducive for knowledge to be used effectively for economic development. The index is an indicator of the overall level of development of a country or region towards the Knowledge Economy. The KEI is calculated based on the average of the normalised performance scores of a country or region on all 4 pillars related to the knowledge economy that include economic incentive and institutional framework, education and human capital, the innovation system and ICT.

Malaysia has reasons to put priority on this area. Out of 145 countries reviewed over 2007, 2008 and 2009, Malaysia slipped 8 places, from 40 in 2007 to 48 in 2008 and 2009 respectively. This list enabled national planners to see the effectiveness of measures taken in the areas of education and human capital, the innovation system and ICT as well as economic incentive and institutional regime. Malaysia is ranked below other Asian countries like Korea, Japan and Singapore. Denmark has been bestowed with the first place in 2009 and 2008 – a rise from the second place in 2007.

Globally, the push for a knowledge-based global society was proclaimed at the World Summit on the Information Society (WSIS) in 2003 with the International Telecommunications Union (ITU) as the lead UN organising agency for the summit. The WSIS 2003 Declaration of Principles called for a common vision for an inclusive Information Society. It envisioned a people-centered information society with information infrastructure where life long learning and capacity building take place.

- A plan of action that is to be achieved by 2015 was launched at the WSIS. The plan called for the following:
- To connect villages with ICTs and establish Communities Access Points.
- To connect universities, schools, research centres, public libraries, cultural centres and health centres
- To connect all local governments and establish websites
- To encourage the development of content in all languages
- To ensure more than half of the world's inhabitants have access to ICT within their reach by 2015.

The summit noted that information and communication infrastructure is an essential foundation for the Information Society. That infrastructure is central in achieving the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICT by all citizens.

If evidence is needed that knowledge as an entity has direct links to mass development, one has only to look at Boston, which is described as the brain capital of the world. Its 65 colleges and universities attract 250,000 students. Boston has become a magnet to attract the best talent from around the world. Its university libraries are the nerve centres for growth. Boston is recognised as a world leader

in the areas of software development, telecommunications, venture capital and Internet networking.

Global Projects

The convergence of real world and the virtual world is taking place on many fronts. The Google Digitisation Project 2004 has included millions of valuable information material from the New York Public Library, Stanford University, Oxford University, Harvard University and the University of Michigan into the digital domain. It is making available digitally scanned library books for users worldwide to search them in Google. Google's innovative search technologies connect millions of people around the world with information every day.

The Universal Digital Library, championed by Carnegie Mellon University, USA seeks to digitise books of common interest to different Communities of Interest (COI) and make them available in a manner that is independent of language, location and time. It is reported to have state-of-the-art planetary scanners for scanning, cropping, OCR and XML converting. The massive efforts and overall costs in selecting the books, manpower and hardware make it prohibitively expensive for any one nation to execute the project by itself. Thus it involves the participation of several countries including Egypt (Bibliotheca Alexandrina), USA, India and China. The mission is to create a Universal Library which will foster creativity and free access to all human knowledge, accessible to anyone in the world 24x7, without regard to nationality or socioeconomic background.

The Library of Congress, UNESCO and 32 partner institutions launched the World Digital Library in April 2009, with a website that features unique cultural materials in libraries and archives from around the world. The site includes manuscripts, maps, rare books, films, sound recordings, prints and photographs, and is designated to function in seven languages and offer content in dozens of languages.

Leading Countries

Singapore has completely transformed its library services over a decade. By implementing the latest technologies and practices it made major progress over six years (1995 – 2001). Significant achievements of this transformation include the following:

- It quadrupled the visitorship
- Tripled the collection
- Doubled the membership and the physical space.
- Loan rate increased from 10 to 25 million books
- It reduced queues from 60 to 15 minutes.
- 1 million people joined the library in five years compared to a total of 800,000 during the first 35 years of the library system.
- Nearly half of Singapore's population is now members of the local public library.

Denmark, the number one country in the KEI and KI indices has a thriving library services system. Out of a 5.51 million population, the online bibliothek.dk service handles 2 million Inter-Library Loan requests per year. The Books to Your Doorstep – Danish Home Delivery Service through "The

Barbican Library, London

Library Express" national transportation scheme gets books to the homes of Danes.

The New York Public Library has unveiled a $1 billion transformational plan. The Library's five-year goal is to double the number of unique users who take advantage of its rich collections, wide-ranging programmes, inspirational reading rooms, and online offerings. Germany, Austria, Switzerland are covered by the subito document delivery service for research libraries, with its tagline " Literature At Right Place and At Right Time". The British Library is transforming too and it is working to bring knowledge to life.

Korea has launched the National Digital Library which is furnished with a ubiquitous environment without limitation of time and space, where all kinds of information are distributed real time, anywhere in the country. The vibrant building has incorporated l knowledge space planning features with the bridge of knowledge, digital learning space, exhibition space, multiplexes, media labs and a digital book café.

Japan works on the undertaking that seeks to create a ubiquitous network society that it calls U-Japan and it pivots on an information and communication network that enables users to safely and easily use network facilities to access digital content, anytime and anywhere, without even having to think about how they are accessing it. The 4Us in the U-Japan concept include 'Ubiquitous' that connects everyone and everything; 'Universal' as it relates to friendly communication, friendly to people, and contact from heart to heart to overcome barriers between generations and localities to create togetherness; 'User-oriented' for a society that is even more aware of user convenience than the ideas of the supply side; and 'Unique' in the context of being creative and vigorous. It embraces the creation of vitality of the individual, and to vitalise the society by creating new social systems and business services, and by getting out from the stereotype to realise local revitalisation. Japan is working to raising quality of life by transforming an industrial society into an information oriented society where information and knowledge will be the foundation for growth.

The Malaysian Foundation for a Knowledge Society

Malaysian planners too had set the nation on the path towards a knowledge-based economy. The Knowledge-Based Economy Master Plan 2002 which laid down the strategies to move the nation from a Production-based economy (P-economy) to a Knowledge-based economy (K-economy) had listed 7 strategic thrusts for the transition.

The third strategic thrust in that Master Plan had direct implications to the system for accessing and delivering information. The thrust called for 'incentives, infrastructure and infostructure necessary for the optimal application of knowledge in all sectors of the economy' to be in place. With this mandate the U-Library project began to take root. The foundation upon which this project was ultimately conceptualised was elaborated in recommendation 54 of the Knowledge-Based Economy Master Plan which says, 'Review and enhance the role and contributions of museums, libraries and think-tanks in lifelong learning'. Elaborating further, it recommends that 'institutions in society – libraries, museums, think tank organizations, research centres and consultancies can also provide resources for learning and should be made more accessible to the majority of citizens.'

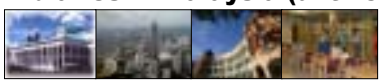
Malaysian Ubiquitous Library Project

After looking at many examples worldwide, the move towards a ubiquitous library began to take shape in Malaysia. SKMM took a lead role in this as SKMM, under the National Broadband Plan, was given the mandate to work on the two areas of broadband take up which is supply and demand.

On the demand side, the realisation came that one area that hitherto unexplored was the rich intellectual content that is sitting in Malaysian libraries that have Internet access. Unlocking that content and making it accessible to every home across the nation will literally open up massive amount of content. Thus it is justifiable to include the clause "leverage the development of traditional information resource" to create attractiveness for broadband take up. Community Broadband Centers in underserved areas have flourished and it became obvious that if the content in these libraries could be made available nationally, it would spur the adoption of a lifelong learning culture as well as aid the economic and social progress of the nation.

The unveiling of the 1Malaysia concept brought further impetus. Libraries can play a big role in social networking and connected communities. When content from diverse sources across the nation is available to everyone, national

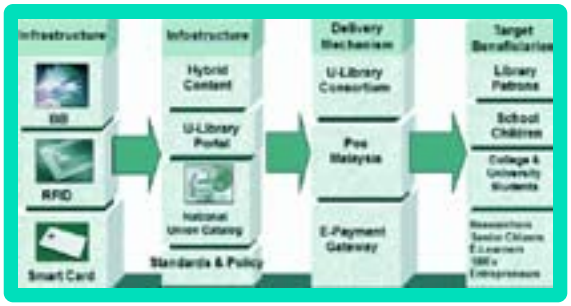
Libraries in Malaysia (until July 2008)



12,217

1	National Library of Malaysia
1386	State Public Libraries - State (14), Region (1), Branch/District (173), Town (27), Rural (1,089), Mobile (82)
410	Academic Libraries - IPTA (20), IPTS (390)
491	Special Libraries (Ministries/Department/Government Agencies)
123	Special Libraries (Private Agencies)
9806	School Resource Centres - Primary School (7,643), Secondary School (2,163)

U-LIBRARY AS A PROPELLING MECHANISM FOR BROADBAND PENETRATION IN A KNOWLEDGE SOCIETY



High tech system at Sydney Library

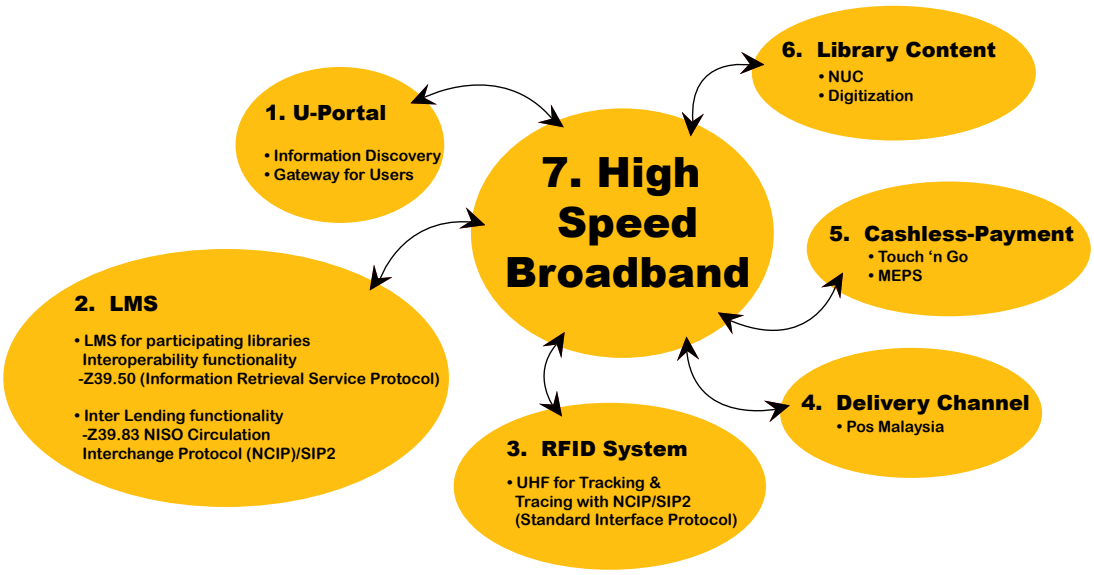
unity and understanding would increase. The ubiquitous library project is an ideal platform to achieve this objective. Our libraries have been collecting local works ever since they came into being. Malaysians could learn plenty about the local content of every state, if they can access the interesting literary materials that the State Public Libraries have in their collection. Public libraries may hold a special place in the minds of many people of all ages and social backgrounds. They should sit at the heart of every community. Their appeal to such a broad spectrum of people offers enormous potential to provide a whole gamut of services and information, through raised awareness, encouragement, tailored opening hours and ubiquitous service, anytime, anywhere.

The previous Chairman of SKMM, Dato' Dr Halim Shafie envisaged the benefits of unlocking the nation's knowledge resource and championed the concept. This matter was brought up and discussed at the Integrated Content Development Task Force (ICON) Meeting in September 2008. ICON is chaired by the Chief Secretary to the Government and is empowered to spur local content development. A presentation comprising the Ubiquitous or U-Library concept, model, projected plans and also a readiness assessment of libraries that had been identified was made to this task force and approval was then given to support the U-Library initiative.

Technical Assessment

The Ubiquitous Library Steering Committee (ULSC) consisting of representatives from the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), Economic Planning Unit (EPU), Ministry of Information, Communication and Culture (KPKK), Ministry of Housing & Local Government (KPKT), Multimedia Development Corporation (MDeC), National Library of Malaysia and Council for State Public Library Directors acts as a driving force for the pilot project, whilst the Ubiquitous Library Technical Committee (ULTC) members from the

U - LIBRARY MODEL- REFLECTION OF CONVERGENCE



Multimedia facilities at the Kuala Lumpur Library

consortium of participating libraries, Center of Excellence for Wireless Sensor Network at UPM and partners for delivery service, and e-Payment gateway work in synergy on the conceptualisation of the U-Library model.

The entire chain of U-library information landscape as well as the technologies that would be needed for the U-Library project have been identified, after weaving through a series of fact finding and brainstorming sessions. The readiness assessment of the libraries revealed that much work needed to be done.

There were technical challenges as libraries were running different Library Management Systems (LMS). The heterogeneous nature of the different LMS has to be addressed by virtue of standards conformance in respect of interoperability for possible seamless connectivity to the National Union Catalogue via ANSI/NISO Z39.50 which is the American National Standard Information Retrieval Application Service Definition and Protocol Specification for Open Systems Interconnection.

A major step was taken when the National Union Catalogue (NUC) was launched in December 2008 with 101 contributing libraries. The National Library which is the nerve centre of the NUC has been maintaining and managing this knowledge repository. The building of the NUC is no mean feat as there are different Library Management Systems installed in various libraries in Malaysia.

The decentralised digitisation activity at the different libraries is another content related information discovery domain that requires policy, guidelines, best practice to be in place in order to offer opportunities for access through a 'Single Window to Knowledge Resources & Delivery Service'.

Library membership level has been generally low with a record of less than 50% of the population in the identified library locations. Adjacent to this is the decentralised library circulation policy. Coming from a long tradition of sharing, libraries are better-suited to benefit from increased cooperative opportunities to offer friendly and accessible service to citizens via 'common membership' or affiliated membership to be introduced in the U-Library environment with the use of MyKad/MyKid/MyPR.

A new experience with the U-Library Inter-lending policy will have to be explored, as this entails an integrated management of nation-wide U-Library membership, resources and delivery service, anytime, anywhere.

The use of Radio Frequency Identification (RFID) technology is significant in relation to the 'tracking and tracing' of knowledge resources in the consortium libraries to activate inter-lending transactions. RFID-Ultra High Frequency (UHF) with spectrum release of 919-923 Mhz and RFID middleware with NISO Circulation Interchange Protocol (NCIP) or Standard Interface Protocol – Version 2 (SIP2) shall be adopted for the U-Library initiative. RFID embedded devices at the gantry, book drop, multi-purpose kiosk, tagging station and auto sorter have been identified to be part-and-parcel of the U-Library requirement.

Membership - Limited Across All Participating Libraries

NO.	LIBRARIES	POPULATION	MEMBERSHIP	PERCENTAGE
1.	Selangor State Public Library	5.2 million	151,082	2.9%
2.	Negeri Sembilan State Public Library	467,260	59,603	12.7%
3.	KL Library	2.2 m.	31,010 (10 H/Cap)	1.4%
4.	INTAN Library			
5.	Pustaka Negeri Sarawak	435,000	28,174 (174 H/cap)	6.5%
6.	National Library of Malaysia	2.2 m.	797,685	36.3%
7.	Pahang State library	420,400	7642	1.8%

Facilities at the Negeri Sembilan Library

Book collections of the Negeri Sembilan Library

There will be 2 aspects of access in the ubiquitous library system. The first is physical access which would bring the Borrowing & Returning Anytime concept to all physical material found in participating libraries. This would be done through a delivery system that would be run by Pos Malaysia through the U-Library Portal that handles requests anytime, anywhere.

The second aspect which would take longer to implement would be bringing full digital access to citizens via the U-Library portal. This would provide information discovery anytime, anywhere. The process would involve digitisation of physical material as well as the creation of new digital content that shall be embedded with security features. The pilot project shall concentrate on the ubiquitous physical access and exchange system whilst building the foundation of a fully digital system in the future.

Pilot Project

With funding support from EPU and SKMM, the pilot project involving seven libraries, namely the National Library of Malaysia, State Public Libraries of Selangor, Negeri Sembilan, Pahang, Pustaka Negeri Sarawak, Kuala Lumpur Library and INTAN Library at Bukit Kiara shall experience the changeover with U-Library practice when the system becomes operational by mid 2010. The U-Library portal with its components shall be hosted at a data center and all participating libraries shall be provided with broadband facilities and RFID enabled library equipment.

Quick wins as preamble to the pilot project, has been reflected in two trial runs. The first trial run that took place in January 2009 saw 20 U-members carrying out 88 transactions. The second trial run in May saw 70 U-members participating and there were more than 10 transactions per day during the trial.

The trial run leveraged on the U-Form as the mechanism for exchange, and the NUC which showed positive utilisation. The delivery service provided by Pos Malaysia was satisfactory too as it delivered between the participating libraries within 2 days and at most 3 days.

The best outcome observed was the social networking that took place between the U-members. There were keen exchanges of emails and communications between members which bodes well for the future.

Next Steps

Futher initiative is in the pipeline. SKMM has been continuing with all the groundwork activities with the ULTC members. A project management team is being assembled to get the project moving. An awareness building campaign plan is also taking place at the library levels. Workshops and meetings are being held so that everyone sees the big picture.

Information creates value in a learning society. The Ubiquitous Library Project has the objective of making information accessible with the widening of broadband service and RFID technology, in a cooperative library network system, to keep communities together, promote life-long learning and deepen social network in a knowledge society within the context of 1Malaysia. .my

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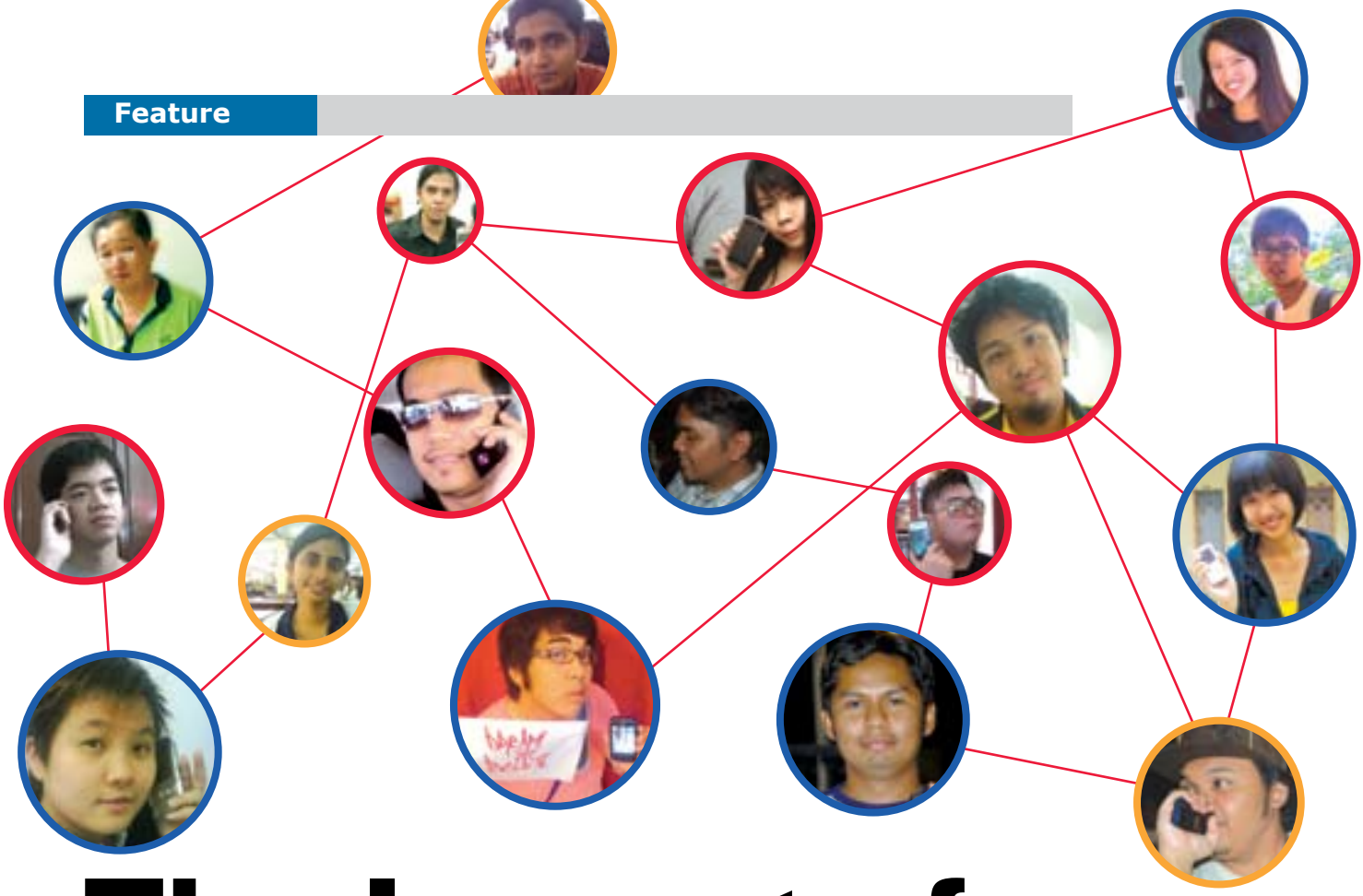

The Impact of Social Networking

The Internet has grown into a vast net of services and applications that entertains as well as serve as an indispensable work aid for hundreds of millions of users around the world. Megat Ishak, Director of Licensing Department, SKMM, explores its impact.

The first useful Internet service for the masses was email. Then came the first of the graphical web in the form of websites. Today, this vast network has grown into a truly worldwide web that is accessible to ordinary users, turning the Internet into a mainstream phenomenon. Access to the Internet can be found at home, cybercafes, offices, Internet kiosks, cafes and anywhere else where there is a meeting of people for social or business purpose. What assists Internet usage growth even more is the expansion of devices such as desktop computers, notebooks and smartphones. Thus not only has it grown in popularity but it has grown into a necessity in our everyday lives.

Over the last few years, the Internet has expanded with powerful applications such as blogs, instant messaging, eCommerce, VoIP (which includes peer to peer voice communication), video, online news, podcasting, multiplayer gaming, photo sharing, online maps, GPS services and a lot of other terms have entered into the vocabulary as these services became popular with Internet users.

As the Internet came out with more and more sophisticated services, inspired entrepreneurs brought

many of these services together into sites that aimed to connect people. With such widespread use, it was only natural then that people began using the Internet as more than just a means of seeking information. People found that the Internet could be used to connect with other people, whether for business or commercial purpose, and also to make new friends and to rekindle old friends and long lost relatives.

The social networking revolution was born. Today, social networking sites form the bulk of most lists of highly valued Internet companies. This is because just about everyone who uses the Internet is a member of at least one and often many online social networks. With such widespread adoption, it is no surprise that social networks have impacted the way people live and socialise.

Online social networks focus on building and reflecting social relationships among people who share interests and or activities. Most social networks allow users to maintain profiles of themselves and lists of their friends. These social networks encourage people to share their personal experience with others through music, videos and other media. Among the most popular social networks these days are Facebook, MySpace and Friendster. Of course, social networks are not a new phenomenon on the Internet as people began socialising with one another almost as soon as the Internet came into being (for more on the history of social networks, read the accompanying article on the history of social networks in this issue).

Spread of social networks

Today, there are hundreds of social networking sites operating. Some of them are popular in certain countries while others have global reach. Some of these sites are targeted at very specific interest groups while others are general in nature. One of the best examples of a special interest social network is LinkedIn, a very popular social network for business executives. The popular general social networks are sites such as Facebook, Twitter, Friendster, MySpace, Blogger and many more.

No one predicted the extent and impact of social networking at such a phenomenal scale. At one point during the year 2005-2006, MySpace, a social network that promotes independent music and the socialite scene across the globe, actually ranked higher than Google in terms of page viewed. The winning angle for this network was the ability of users to listen to new music and find out about the latest party as well as promote creativity through the creation of unique profiles and the sharing of favorite videos. MySpace claims that it has over 100 million music playlists with over 5.5 billion song listened, 7 billion photos and at least 600 world famous celebrities blogging.

Friendster.com was launched in the year 2002. People using this site tend to focus on sending messages, invites, and blogging to stay in touch. Friendster used a degree of separation concept called "Circle of Friends" (wherein the pathways connecting two people are displayed), and promoted the idea that a rich online community can exist only between people who truly have common bonds. And it ensured there were plenty of ways to discover those bonds.

The current most popular social networking site in the world, Facebook, has grown into more than 300 million active users with an average of 50% of them logging on to Facebook everyday. Facebook.com is similar to Friendster and started with an emphasis on the college community. From that, it just grew and grew in popularity and reach. Today, the number of adults on Facebook dwarf that of college students and it has become the de facto social network for the English speaking world.

At least 8 billion minutes are spent on Facebook each day. One of the reasons Facebook is so addictive is because it is a convenient way to track the status of friends.

But even before the explosion of Facebook and its likes, there were weblogs, or blogs for short; making them the first real social networks. The power of blogs is its usability. It enables ordinary people to use and voice out opinions on practically anything to an audience from practically anywhere. Although blogs started as people's personal diaries, they have grown bigger today, touching on a variety of topics such as fashion, automotive, technology, food, entertainment, personal opinion, politics and many more.

While it takes hours or days to build a traditional website, creating a blog is simple and it only takes a minute to set up a blog on sites such as Blogger.com, a blogging platform owned by Google. As of June 2008, blog search engine Technorati indexed over 112.8 million blogs and over 250 million pieces of tagged social media, according to its page on Wikipedia. The growth of blogs has been slow over the past one year but the impact it has created is impressive.
The latest social networking phenomenon is Twitter, which is best described as a micro-blogging tool. Twitter (www.twitter.com) allows user to send or "tweet" about their latest updates within 160 characters. Twitter is now accessible via a number of third party application and mobile sites making it very popular among users.

While Facebook may be the fastest growing social network in the world, there is another social network that rivals it. The Chinese language social network, QQ is number one in China and claims more than 300 million users.

There are a few other social networks that dominate in specific regions or countries. In Russia a social network called V Kontakte dominates while Brazil and India are avid users of Orkut. Hi5 is very popular in Central America, Peru, Mongolia, and Thailand while South Koreans love Cyworld. Malaysians loved Friendster so much that they are among the most avid users on it.

Nielsen Online report that social networks and blogs are now the fourth most popular online activity ahead of personal email, member communities are visited by 67%

Facts About **facebook**

Source: Facebook

The fastest growing demographic is those 35 years old and older
 # Average user has 130 friends on the site
More than 45 million status updates each day
 # More than 10 million users become fans of Pages each day
More than 2 billion photos uploaded to the site each month
 # More than 14 million videos uploaded each month
More than 2 billion pieces of content (web links, news stories, blog posts, notes, photos, etc.) shared each week
 # More than 3 million events created each month
More than 45 million active user groups exist on the site
 # More than 70 translations available on the site
About 70% of Facebook users are outside the United States
 # More than one million developers and entrepreneurs from more than 180 countries
Every month, more than 70% of Facebook users engage with Platform applications
 # More than 350,000 active applications currently on Facebook Platform
More than 250 applications have more than one million monthly active users
 # More than 15,000 websites, devices and applications have implemented Facebook Connect since its general availability in December 2008
There are more than 65 million active users currently accessing Facebook through their mobile devices.
 # People that use Facebook on their mobile devices are almost 50% more active on Facebook than non-mobile users.
There are more than 180 mobile operators in 60 countries working to deploy and promote Facebook mobile products

of the global online population. The time spent on social networks is growing at three times the overall Internet rate, accounting for almost 10% of all Internet time

Malaysians on social networking

By all accounts Malaysians are avid adopters of social networking sites. As mentioned, Malaysians are big on Friendster and also MySpace. Malaysians are also among the most prolific of bloggers, reportedly among the first three worldwide on Blogger.com.

Facebook, of course is the current hot social network in Malaysia. Some 100,000 Malaysians are joining Facebook every month, on top of the 1.4 million Malaysians who are already on board. On Facebook, Malaysians actively network with each other on social and work groups, causes and pages. Facebook has become a very popular tool to promote or share just about anything.

Nine of the Top 20 websites in Malaysia according to Alexa are social networking sites. The top 6 sites are Yahoo!, Facebook, Google.com.my, YouTube, Google.com, and Blogger. Malaysians consume digital media heavily according to the Nielsen Global Online Consumer Survey on entertainment media usage. The sampling is based on 26,000 online users (including 500 Malaysians) from 52 countries. The survey defined digital media as video (movie, TV show, music video, short video), audio and video games. Malaysians ranked very high in this survey: They were No 5 in digital media consuming nation and were the third ranked nationality in spending over 20 hours a week watching streamed or downloaded content from the Internet.

An article published in the Star newspaper by David Gibson, managing director of Inter.Asia Communications says that social media is very big in Malaysia and will grow bigger over time. According to that article, by 2010 there will be 17 million Internet users in Malaysia. These users belong to a variety of social networks, they actively consume and adapt information, and they have a sense of global culture.

The Impact of Social Networks

With the phenomenal figures mentioned above we can appreciate the fact that social networking does leave an impact or a dent on both individuals and businesses.

Let's look at the youths of today. For them, the online community is where it's at. Modern day life in the city at times restricts physical social interaction among these young people. Long school hours, commuting times and threat of rising crime combined together act as a compelling factor which keeping many youth at home for long hours. As a result, those with Internet access turn to online social networks which enable not only instant communication with friends but also enable the sharing of similar interests. In that sense, social networks represent an effective platform for teenagers to interact and socialise.

These social networks have also been responsible for bringing together like-minded people in a quick and efficient manner that would be difficult to duplicate without the Internet. There have been claims that the Internet is impersonal and reduces social contact between people but that assumption is being proven wrong on social networks where it often leads to real world activities. For example, a group of Malaysian outdoor lovers set up the Malaysian

Outdoors Trekking, Hiking, Scuba Facebook Group. Within a year of setting up, the group had attracted more than 5000 members and volunteers had organised numerous outings all over Malaysia.

In Malaysia, the impact of social networking on society was proven during the 2008 Malaysia General Election, where blogs and other social networking sites played a major role during the election. That also resulted in more blogs being created such as the blog of Prime Minister Najib Tun Razak. There are also a number of blogs related to the Government and opposition out there including the blog of Tun Dr Mahathir, Dr Mohamad Khir Toyo and many more. Even in the United States, President Barrack Obama spent a lot of time campaigning on social networks to win the election.

There is an impact on education too. Social networks are also being used by teachers and students especially in the West as a communication tool. Teachers and professors are forums and groups to extend classroom discussions. Some of them routinely use Twitter to communicate announcements and information to their students. It is a two-way process as students too are using these mediums to share feedback to their teachers.

Social networks have also become platforms for doing good. Social activists all over the world have learnt how to spread word about their causes, enlist volunteers, embark on actions and raise funds. There are many examples all over the world. Locally, one good example would be the Twestival Local event that was held in September 2009 in Kuala Lumpur. A group of Malaysians who used Twitter was inspired by the Global Twestival project held earlier in the year in some cities across the world. The event name came about by combining two words: Twitter + Festival. The global project raised awareness of water issues and ultimately raised more than USD200,000 which was used to build wells in countries in Africa and other places.

The Twestival Local was an event where Malaysian tweeters could come together for a social event and raise funds at the same time. Four people decided to organize this event. Publicity was done mainly through social networking sites and especially over Twitter. People paid RM30 or more to attend and the event ended up raising more than RM11,000 for Destiny Starting Point, a second chance home for juvenile delinquents.

Many social networks have been started just for promoting positive social change. Some examples of social networks that promote social good are TakingITGlobal, Care2, WiserEarth, OneWorldTV, OneClimate and Network for Good.

According to new figures released by The Nielsen Company, Internet users in August 2009 spent 17% of their surfing time on social network and blogging sites, nearly triple the percentage of time spent on such sites a year ago.

Not surprisingly then, this segment has also become an attraction for business. The term social media has become part of business speak. All over the world, businesses have learnt that it is cheaper and easier to grow their businesses using social networks. Companies can easily build a brand online for free just by using the power of blog or sites like Facebook, MySpace and Twitter.

According to comScore, a marketing research company that tracks Internet traffic, social networking sites accounted for 13.8 billion display ad impressions in August 2009, representing more than 25 percent of all display ads viewed online, in a study of U.K. online display advertising on social networking sites.

Social media is changing the way marketing is done. No longer can marketeers rely on putting out one general message to the public. They have to also figure out how to influence people on a one-to-one basis online as these people will share their opinions and choices online and can undermine or bolster any traditional marketing campaign. In Malaysia, 80% of affluent Malaysians (those with a household income above RM5,000) use social networking sites. The opinions of bloggers and friends have become more influential than advertisements.

Using social media allows businesses to reduce cost on marketing or connect with customers. A number of Malaysian companies use social network to promote their product or service. A recent example is mobile operator DiGi who used social networking to create awareness on mobile broadband. One of the many campaigns DiGi did was Pimp My Broadband (www.pimpmybroadband.com.my) which was a contest allowing people to post up creative videos to the site. DiGi used mostly Facebook and Twitter to spread the word and communicate with people.

In another example, the Prudential insurance company was running in December 2009 a contest for which people were asked to guess the retirement fund a fictional character named Adam would need to retire comfortably. This campaign was heavily promoted over social networks and blogs.

Most organisations have jumped onto the social networking bandwagon. Large and small organisations alike maintain Facebook fan pages and groups. The leading budget travel airline, AirAsia, has more than 20 different Facebook pages and groups that promote some aspect of their service. It also has Twitter feeds as well as its own social network located at www.airasia.ning.com. The results have been impressive. It claims to lead all other airlines with a fan base of approximately 100,000. The AirAsia blog is ranked as the world's second most popular blog site by an airline while CEO Tony Fernandes' blog is the most popular in Malaysia by a corporate leader. Its YouTube site is very popular while its Twitter account has 15,500 followers. AirAsia's investment of time and effort to reach out socially to Internet users must be bringing results; it recently announced plans to launch a brand new social network for travelers.

The Nielsen Company estimates online advertising spent on the top social network and blogging sites increased 119 percent, from approximately USD49 million in August 2008 to approximately USD108 million in August 2009.

Businesses and professionals are also connecting with one another on social networks. It has become commonplace for professionals to maintain accounts at LinkedIn. Using

The Good & Bad of Social Networks

GOOD	BAD
Cheap/Free way to communicate	Addiction
Networking	Identity Theft
New Interest	Danger to Kids/ Predators
Information sharing	Privacy
Opportunities	Wrong Information
Business purpose	Negative Information
Easy to use	Not profitable in a big way

that platform, businessmen are able to find contacts that they can trust as introductions come from people they know and trust. At the same time, networks such as LinkedIn have become fertile grounds for job seekers. Employers often scour these sites to find suitable recruits for open positions.

While social networks generally are having positive impact on businesses, especially reputable ones who take the time to engage online with their customer base, there are also negative impacts on society.

For one, it is impacting the workplace. A recent survey in the UK revealed that the cost to the economy due to use of social networking sites like Twitter and Facebook by office workers during office hours could be over GBP 1.38 billion per year. The survey found that more than half of office workers used these social networking sites for personal use during the working day, and admitted to wasting an average of 40 minutes a week each.

Children too are especially vulnerable to predators on social networks. Law enforcement agencies in US and UK have found that many convicted sex offenders have accounts on social networks. It is very likely that some of them would be using these accounts to lure young people.

Also, as more and more people spend their online time inside social networks, spammers and phishers have also appeared on these sites. The amount of private information posted by users on social networks is worrying. Crooks are able to use this information to craft scams that seem believable. Friends are more likely to fall for these scams as it would seem to originate from a trusted friend.

Privacy is another major concern. Already people have lost jobs because the information they posted on social networks was not liked by their employers. Recruiters are increasingly using social networks to check on job applicants raising the possibility that photos and postings made by people will one day come back to haunt them.

Connecting Further

Nevertheless, social networks are not going away anytime soon. No one will deny the benefits of being able to easily keep track on the latest happenings and interact within a network of people, groups or companies that share a person's interest. While social networks already connect individuals or groups, they are also beginning to connect businesses in the future.

The features available on social networks are also improving. Location based services are beginning to appear. Imagine a social network that marries the best features of Facebook, GPS and YouTube. A user could simple upload a video from their 3G phone or track their friends using GPS on Facebook. Integration between Twitter and Google Maps could allow users to track their friends on a map or update their location using GPS or A-GPS.

Going forward, only time will tell how social networking will be in the future. One thing for certain, social networking will remain as people always want to "connect" with other people. .my

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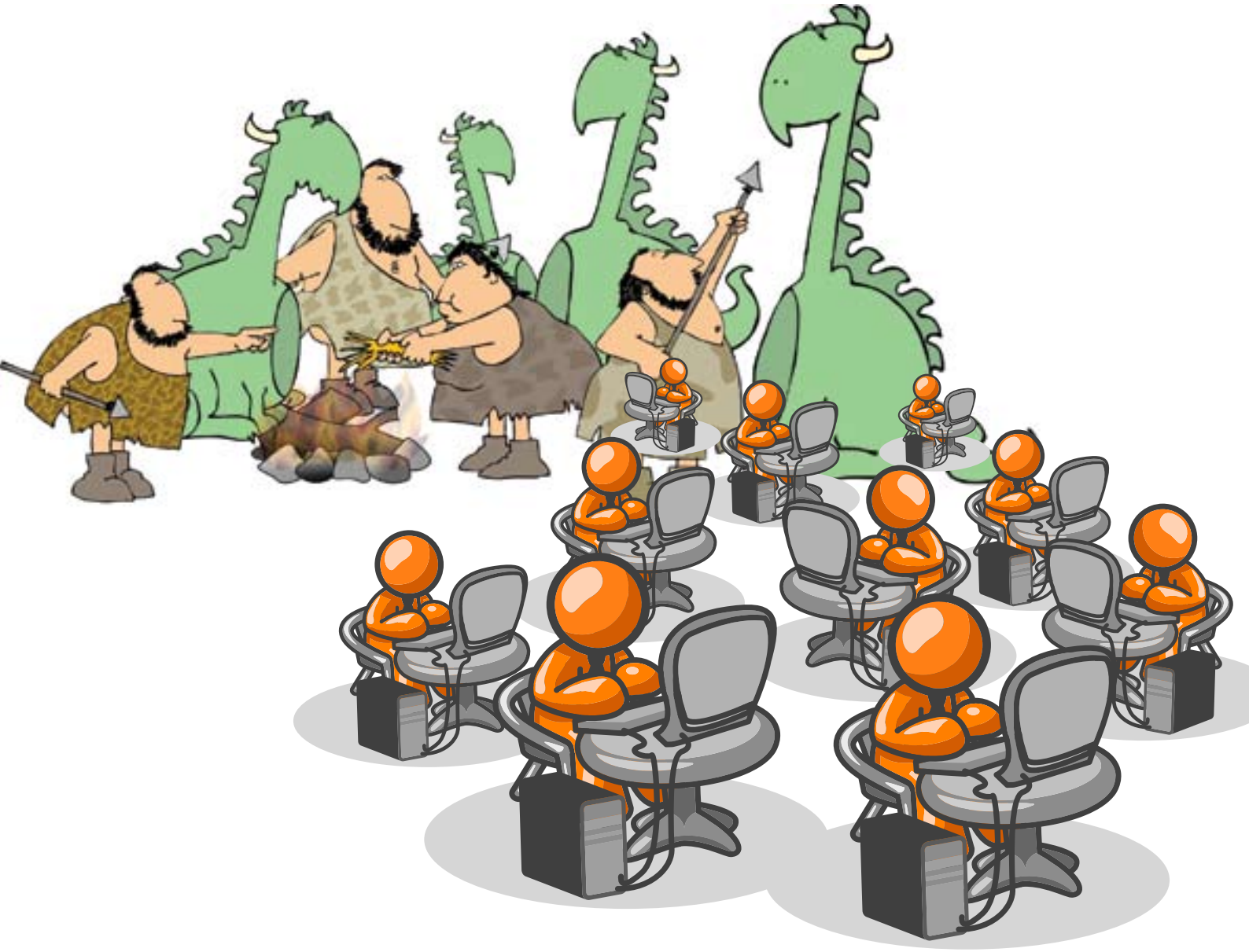


Social Networks
Then and Now

Man is by nature a social being. The human species cannot thrive alone unlike some other species of animals that live isolated lives. The human species has since recorded history lived in clusters and social networking has always been a part of our lives.

The first social networks were built around a cave and a fire. Cave drawings typically depict humans of those times gathering around fires probably to discuss the day's hunt and plan. Since then we have continued to socialise with one another by utilising various platforms and venues. All over the world people have used tea shops, pubs, village squares, markets, clubs and more to interact with one another. In many

Typical scene at a *kopi tiam*

places, being part of the crowd at a football or rugby match was and still is social networking. In Malaysia, the *kampong warung* was the place where people gathered in the evenings to socialise in rural areas while corner *kopi tiam* was the place to meet one's social networks in the urban areas.

While these venerable platforms of social networking continue to be used to this very day; in the last fifteen years or so the term social networks have evolved to mean web based networks that connect people together. Services like Friendster, MySpace and the current gorilla among them, Facebook, have become household names. Social networking, like many of our other activities, has moved onto the Internet. A history of the evolution of web based social networks brings forth a fascinating picture of how people used whatever technology was available at that time to connect with people who share similar interests or live in the same area.

Rudimentary Social Networks

The Internet today is vastly different from what it was when it began. In its early days, the Internet was a mainly text based networks that was mainly utilised by IT professionals and academics who were the first to venture out into the new and exciting cyber world. More often than not in those early days of computers, most of the social networking that took place was technology-related.

When dial-up Internet was dominant, Bulletin Board Systems (BBS) were online meeting places. These BBSes were mostly run by people who were passionate about a particular hobby or interest. Internet users who shared the same interest joined these BBSes and the sharing and communications that took place among these members created social networks that were very much like those that existed at say '*kopi tiam*' before the Internet came into being. People shared views, made friends and more often than not, engaged in debates that often sank to personal levels when they became heated. The term 'flame war' was coined around this time when individuals took arguments beyond the subject at hand and began posting personal attacks on each other. Nevertheless, many early adopters of the Internet have fond memories of the BBS and some fans keep the spirit alive at sites like http://www.fidonet.org.

This system evolved into the Usenet which was one of the earliest of communications systems and still in use to this day. It utilised the UUCP transport protocol to offer mail and file transfers. Users posted articles in newsgroups that were differentiated by topics and sometimes levels of expertise in those topics. Participants used news client software to read these articles. Terms like 'news threads', which stood for a whole chain of responses that originate from a single new posting, became part of IT-speak at this time.

The advances of Internet technologies led to the mushrooming of online forums. These forums which are still very popular to this very day are simply improved versions of newsgroups. Popular ones such as Howard Forums internationally and Lowyat.net locally still teem with participants who actively engage one another. Like any other social networks, these forums developed hierarchies, either formally or informally. Some participants became natural leaders while others ranged from active participants down to 'newbies'. To distinguish them, some sites even award different 'avatars' to participants that served as badges of distinctions.

Life on these early social networks was and still is very much like that seen in 'cowboy' towns. People could be rude and most users preferred to remain anonymous, usually taking on fanciful usernames that hid or disguised their genders, location or age. One never knew for certain whether a user with a clearly female name and who had put up a user photo of a beautiful girl was really a vivacious girl who led an active social life judging from her posts or a fifty-

Launch date of Major Social Networking Sites

95	-Classmates
97	-SixDegrees
99	-Live Journal -Cyworld
02	-Friendster
03	-LinkedIn -Myspace -Hi5
04	-Orkut -Facebook
05	-Yahoo 360° -Xanga -Bebo -Ning -QQ -Brightkite
06	-Twitter
08	-Plurk
09	-Foursquare

something overweight male couch potato who never left his home all day.

No look-back of social networks would be complete without mentioning AOL (America Online), an ISP that had at one time as many as 30 million subscribers, which was a gigantic figure those days. In many ways AOL was ahead of its time. It was a huge social network where members created communities and profiles of themselves. AOL's 'walled garden' business model could not compete however with the arrival of free services and it is still trying to reinvent itself today.

The Beginnings of Today's Social Networks

The Internet as we know really kicked off in the nineties when browsers revolutionised the Net experience. The arrival of Netscape, Internet Explorer and other browsers spawned the early social networks. Sites or services such as Yahoo, Amazon, eBay and Hotmail dominated this period. And the first of social networks as we know them today came into existence. It did not have all the characteristics of today's social networks but it did bring people together. Classmates.com had a simple proposition: Where are my classmates? Where have they ended up?

The site did well back then as it hit a chord with Internet users in the United States. It drew in millions of subscribers and this site is still around. Another website, SixDegrees.Com also made an appearance slightly after Classmates. Com, conceptualised around the idea that we are closer than we think to anyone else in the world. It was popular at that time but is no longer around. The successes of these sites led to many other similar ventures. Some did well while others floundered. But the ground had been laid for the social networking revolution.

Current Social Networks

The definition of social networks evolved into that as we know it today. These social networks all have similar features. They allow users to maintain profiles, build a network of friends and publish updates and news that can be seen either publicly or semi-publicly.

The social network explosion has resulted in many hundreds of social networks these days. Some are broad in aim and interest while others cater to very specific interests and target groups. Whatever their size, these social networks have become the Hyde Park soapboxes and meeting places of this age.

LiveJournal was social networking built around the idea of a user keeping a diary or journal. Each journal has a friend list which users utilised to keep abreast of the latest postings of their friends. LiveJournal was started in 1999 in the United States. In 2007, the then owners, blogging software company Six Apart, sold Live Journal to a Russian company. It currently has around 7 million registered users with the majority coming from the United States. The second largest user base is in Russia.

Not every social network started from the United States. Other countries that had advanced Internet infrastructure and active cyber citizens also came up with their own social networks. In 1999, the service that would grow to become the defacto national social network of Korea began operations. Cyworld was built on the concept of a cyber world. Users make friends by sharing each other's home pages. More uniquely, users were able to have 'avatars' which are very commonly seen in forums and online games where users maintained a screen name and unique image as their representative. Cyworld did try to conquer the world but its operations are only strong in Korea and Vietnam. It remains wildly popular in its country of birth. Apparently almost every young South Korean has a Cyworld account.

In 2002, the social network that is no stranger to Malaysians came to life. Friendster as its name implies was created to help friends connect with their friend's friends with its Circle of Friends feature. It was very popular in the United States when first launched but over time it was overshadowed by other social networks there. However, it has retained strong market share in South East Asia. Countries like Philipines, Malaysia, Singapore and Indonesia form its main user base these days. In late 2009, a Malaysian company, MOL bought over

Friendster with the aim of consolidating and strengthening its presence in this region.

In 2003, a business focused social network emerged. LinkedIn was the serious version of networks. It brought professionals together and its concept was simple. LinkedIn aimed to become a networking point for corporate people to connect with similar professionals. It allowed users to build up a list of people that they come into contact with in the course of their work. A typical user would have many connections - the term used to refer to these contacts – which would consist of people they have done work with and grown to trust. LinkedIn is a great place to look for jobs and business opportunities as well as research someone's business credentials. The site has seen steady growth and more than 50 million professionals from many countries are members today.

The popularity of Friendster naturally attracted more entrants to the social network segment. Among the most significant of these new entrants was MySpace which was launched in 2003. Being less restrictive than earlier social networks, MySpace built a niche by becoming the site to promote independent music. It also made a point to attract young people with its emphasis on music and celebrities. Users also had a lot of customisation options and could build very creative profile pages. It became wildly popular and rocketed to number one in many countries. Even until early this year, MySpace was number 1 in the United States.

MySpace was the start of an avalanche of social network startups over the next 2 years. Hi5, another reasonably popular social network was also launched in 2003. The site became quite popular in the United Kingdom, New Zealand, and Australia along with a decent user base in many other countries. Conceptually it was like Friendster and MySpace. Users created a profile in order to show information such as interests, age and hometown. Features such as photo albums and music playing capabilities, standard in most social networks today had begun appearing in social networks in 2003.

In January 2004, Google decided to get into the social networking business by launching a social network known as Orkut. This site was created by a Google employee Orkut Büyükkökten after whom the site is named. Like many of other Google projects, the Orkut community was made exclusive through an invitation-only membership system whereby only existing members could invite others to join. Despite Google being behind it, the site did not make much headway in the United States. But somehow, to the surprise of even its creators, Orkut grew to become the number 1 social network site in Brazil. With many Brazilians using it, the site became filled with Portugese language content which deterred its adoption worldwide. Strangely again, Indians began to adopt it in recent years and today Orkut is also very popular in India. Orkut integrates Google products such as Google Talk and YouTube into its offerings.

After Orkut, 2004 was a momentous year for social networking. Facebook, which would grow to become the current dominant global social network, came into being. The story of Facebook is a fascinating study of how a small site can grow to become one of the mega websites of the world. Facebook began in early 2004 at Harvard University. It's difficult to believe it today seeing what Facebook has grown into but when it started, only bona fide Harvard University students could join Facebook. Users had to have a harvard.edu email address or they were rejected. It was so good that other university students began asking to join. At that point it was limited to just university students.

Facebook was started by Mark Elliot Zuckerberg who was then a Harvard student. Others credited as being co-founders are fellow classmates Dustin Moskovitz, Eduardo Saverin, and Chris Hughes. Another group of Harvard students did claim in a lawsuit that the idea behind Facebook was stolen from their ConnectU project. The lawsuit was settled in 2007 with Facebook paying US$65 million as settlement.

In September 2005, Facebook began to accept membership from high school students, then from corporate people from large organisations and professionals inside corporate networks, and, eventually, everyone in the world.

It also transformed its concept from that of closed user networks inside a large network – where one could only join a specific network by proving to be a member of that network – into a huge open social network that was completely open.

Many believe that the distinctive feature that made Facebook so successful is its openness. People simply cannot remain anonymous in Facebook. Whatever the exact reasons, Facebook is phenomenally successful. Facebook grew exponentially from the time it opened membership to the public and as of now, it claims 350 million users.

Other social network startups, some backed by big names, have tried to compete with Facebook but it has managed to withstand all challengers till now. Yahoo! for instance, launched the Yahoo 360° social network in 2005. Despite extensive promotion work, it never took off. By 2007, Yahoo! was no longer actively supporting Yahoo 360 and in July 2009, it was shut down. A Vietnam only version still exists however.

A social network known as Xanga fared a little better. This site which started in 2005 combines blogging with social networking and has managed to gain some 40 million users worldwide. Another site that launched in the same year is Bebo which apparently stands for "Blog early, blog often". It has achieved moderate success in English speaking countries such as Ireland, Canada, the United States, the United Kingdom, New Zealand and Australia.

Some other entrepreneurs took a different path. Marc Andreessen, the founder of one of the first successful browsers, Netscape and another person decided in 2005 to create a platform which other people could use to create specialised social networks. They named it Ning. Using Ning, anyone can create a social network. For instance, it would be possible for a dog lover to create a social network on dogs on Ning. The site has both free and paid options. Free social networks set up on Ning run ads served by Ning. The paid option removes Ning ads and the creators of that particular social network can then run their own ads or make it ad free.

Even Microsoft got into the act with Windows Live Spaces, launched in December 2004. The site was yet another social network that allowed users to publish blogs, photos and other stuff. It did not do too well but a re-branding exercise in 2008 has brought a bit more success.

Chinese Internet users had their own social network option when QQ was launched in 2005. QQ had actually been around for a few years before that but not as a social network. When it added social networking features it instantly became the world's biggest social network. Today it claims over 300 million users, a figure that is only eclipsed by Facebook. QQ allowed users to chat with one another. It also boasted many features such as games, pets, ringtone downloads, and online storage. QQ did try to expand outside China but efforts were not successful. Nevertheless, it has remained untouchable in China. Microsoft tried recently to compete with QQ in China with their MSN Juku service but it has been suspended amid allegations that the application contained code stolen from another social network startup.

A new wave of social networks

Facebook has remained untouchable for a few years now but over the last 18 months, a brand new genre of social networks has emerged as viable contenders. These social networks, of which Twitter is the dominant example, promote networking through micro-blogging. Users send out short updates that usually consist of SMS-like text that tell other people what they are doing or their opinion of something.

Twitter actually began in 2006 but it spent about two years picking up steam before finally roaring into the mainstream in 2008. The service is free and it has created a culture of its own with users, who are known as twitterers sending out tweets to their 'followers' as well as retweets which are forwarded tweets of someone else. Twitter itself has not generated any revenue yet but is nevertheless given high valuations by analysts because of its potential. Interestingly too, Twitter has led to the development of many third party client software which allow users to post tweets and organise their incoming tweets.

The success of Twitter has also spawned several other Twitter clones. Among the more successful is Brightkite which adds location based information or geo tagging, as it is called, into status messages. Users can thus see who else is nearby when they send out their updates. Plurk is yet another similar application that has seen encouraging success. Working on the same concept of short messages, Plurk is built around the concept of a timeline whereby users can see updates of members in a chronological order.

The latest social networking sensation is Foursquare which is yet another fresh approach to social networking. Foursquare users have to 'check-in' their location and the person who has been the most at any particular restaurant, establishment or area will become the 'mayor' of the place until he or she is dethroned by another user. Incorporating bragging rights and other status symbols such as badges and points, Foursquare has seen very rapid growth since its launch this year. It is not universally available at this point in time as it works on a city concept. It was first progressively offered in major US cities and has now expanded to many cities worldwide including Kuala Lumpur.

The Future

The way the Internet has developed, it is hard to predict where the social networking trend will end up. Facebook is certainly the king of social networking but as any seasoned Internet observer will tell you, things can change very fast when something fresh and exciting catches the imagination of web surfers. The ongoing movement of web surfers from computers to mobile devices is certain to stir things up even more. Only one thing is sure; humans have not and never will stop socialising with one another. The tools may change but people will continue to congregate with their circles. .my

Will Our Beloved AM-FM Radio Sound the same Going Digital

Radio is facing a digital future. Shamsul Najib examines the merits of emerging digital audio broadcasting technologies.

Amplitude Modulation (AM) and Frequency Modulation (FM) in broadcasting service transmissions have been a way of Malaysian life for as long as radio enthusiasts can remember, even though AM has been phased out of the picture except in certain cases. The growing demand for new content, coupled with the increase in the local population, are now affecting FM audio broadcasting, which has long been the backbone for audio broadcasting in Malaysia and a popular choice in the region.

Perhaps the greatest problem that Malaysia is experiencing with FM Radio at the moment is due to its lack of 'space' within the available spectrum. With a total of 19 private and 34 government-owned radio stations occupying the spectrum, the regulator of spectrum finds it hard to fit in new radio stations to meet the growing needs of radio listeners in the country.

At the same time, the country is also bearing witness to the eventual phasing out of analogue technology, and this can already be seen in the transition process from terrestrial to digital television.

Before we can carry on to the different digital technologies feature in this article, it would be relevant to elaborate further on the various radio frequency (RF) ranges available within the Very High Frequency (VHF) spectrum.

Band I, which ranges from 47 to 68 MHz was originally used for monochrome television systems during the early to mid-1900s, and is still in use today for certain television broadcasts, especially in the United States. However, usage of this band has been steadily phased out for other usage.

Band II occupies the familiar 87.5 to 108.0 MHz range, and is primarily utilised for FM radio. Band III, which ranges from 174 to 230 MHz, is used for sound and television broadcasting, although it has only come into use for the former in recent years, particularly that of Digital Audio Broadcasting (DAB).

The three different digital technologies that have been designed to ultimately replace FM radio in the near (or perhaps distant) future are DAB, Digital Radio Mondiale (DRM) and In Band On Channel (IBOC) or commonly known as High-Definition (HD) radio .

Moving to DAB

Although considered a new technology in many different regions across the world, the DAB standard was actually created in the 1980s. DAB is the first digital radio transmission standard, having enjoyed its maiden transmission in 1995.

There are many known advantages that come with the implementation of DAB. Chief among them perhaps is its lower cost of transmission. While FM basically requires one programme channel to be broadcasted over one transmitter, DAB has the ability to combine several channels into one transmitter, also known as multiplexing. By incorporating multiple signals into one or multicasting, a DAB broadcast has the potential to dramatically reduce costs especially when it comes to maintenance and transmissions.

FM also suffers from static and hisses, which may result from weak signals. Because DAB transmits digital audio, these hisses are non-existent, although receivers that happen to be on the edge of a DAB signal may experience an interruption in audio or the sound cutting out altogether. It also maintains a technology known as Dynamic Label Segment (DLS). DLS is a set of information from a broadcasting station that contains a series of details such as artiste name, song title, genre or even traffic updates.

DAB is more bandwidth efficient than analogue for national radio stations due to the use of Single Frequency Networks (SFN). DAB will enable more stations to be placed into a smaller section of the spectrum, although it is only marginally more efficient than FM for local radio stations. Additionally, it also allows programmes to be carried at lower bit rates, leaving remaining bandwidth to be used for other programmes within the transmission.

Yet, the question that must be asked is; if DAB presents so many advantages over FM, then why hasn't it taken a greater foothold when it comes to broadcasting? Despite having transmitted for the first time in 1995, why is it so that only 1,000 stations across the world have adopted this technology as a means of transmissions in 2006?

Perhaps the greatest barrier to the widespread adoption of DAB is its audio quality, or rather the lack of it. A series of tests carried out by captains of the broadcasting industry have revealed that DAB actually had a lesser quality compared to FM. This may also be due to the fact that these transmissions are broadcast in mono, as opposed to stereo format for FM.

While it has been highlighted earlier that DAB allows for lower costs due to multiplexing, it should be noted that DAB transmissions actually account for much higher costs than their FM counterparts. Sure enough, a single digital transmitter can carry several channels, thereby resulting in lower maintenance costs in the long run. However, some DAB broadcasters may attempt to limit their costs, causing signals to not only carry too many channels, but also deliver lesser sound quality as a result.

And last, but certainly not least, DAB receiver sets have not been known to be cheap. DAB receiver sets are many times more expensive than analogue receivers.

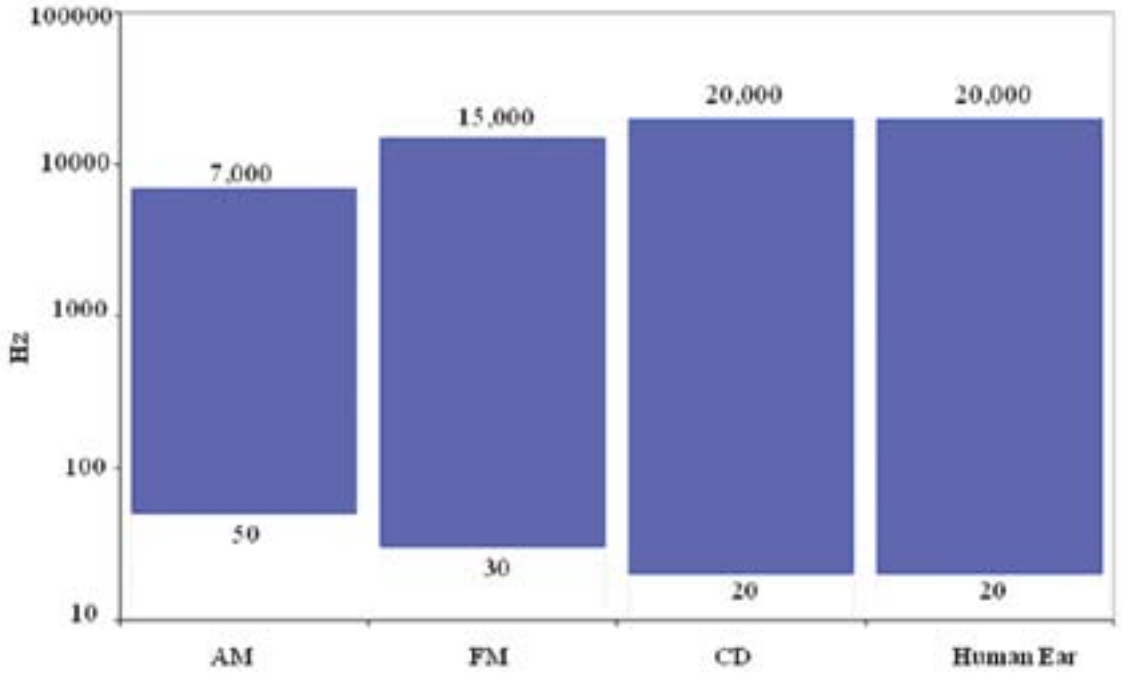
Digital Radio Mondiale

After enjoying a maiden broadcast on June 16, 2003, DRM's proponents have come to include the BBC World Service, Radio Canada International, Deutsche Welle and even Vatican Radio.

While DAB makes use of Band III to propagate its services, DRM on the other hand has been designed to work over the AM frequency, including that of short wave (SW), medium wave (MW) and long wave (LW). By using MPEG-4 HE-AAC (High Efficiency - Advanced Audio Coding) encoding, DRM has been made to fit more channels than AM at a higher quality, and because of its usage of AM bandwidth, requires less processing for audio compression than the other two alternatives.

When it comes to audio quality, DRM has been known to deliver a sound comparable to that of FM, even over the AM spectrum range. Because of it being able to transmit on frequencies lower than 30MHz, DRM also allows for extreme-range signal propagation just like shortwave radio. However, discussions involving the DRM consortium have involved the ongoing process to extend the frequency range to that of Band II (87.5-108MHz).

Another addition to the factor of cost has been DRM's ability to work with some older AM antennas, without requiring the need for an upgrading of technology. However, DRM does not come without its own set of disadvantages, including the fact that not many broadcasters around the



Audio Frequency Range

world are keen on picking up the technology. This may be due to its usage of the AM spectrum to propagate its signals.

Going HD

Short for High-Definition, HD radio is a system that can be utilised by both AM and FM broadcasters to transmit not only audio transmissions, but also data via a digital signal. While the technology does allow for a completely digital mode, HD radio is currently in use by certain AM and FM radio stations in the United States to simulcast both digital and analogue audio, as well as textual information in the form of a hybrid signal within the same channel.

While other FM or digital technologies such as DAB would require additional bandwidth or equipment before being able to perform a successful operation, HD radio only requires a hybrid approach by its systems. To receive HD Radio content, listeners are required to purchase receiver sets in order to receive digital signals.

In comparison with the other two technologies mentioned in this article, there are more digital radio stations in the world that utilised HD radio technology, as of May 2009. There are nearly 2,000 radio stations broadcasting with this technology mostly in the United States, including more than 1,000 HD2/3 multicast channels .

Like DAB and DRM, HD radio does not come without its own list of disadvantages as well. For starters, despite having a larger use and coverage than both DAB and DRM (perhaps even combined), HD radio is not as well-known as the other technologies, and has not been well-received as its proponents claim it should.

Additionally, HD Radio is not known as an open standard, unlike DAB and DRM. If a HD Radio receiver were to be used in a location other than the US for example, it would not be able to pick up DRM or DAB signals. Likewise, the same applies for DAB and DRM receiving HD Radio signals in the US. This is because HD Radio uses a different digital broadcasting standard, as it allows normal AM and FM stations to upgrade to a digital transmission without requiring frequency change.

Finally, there is also an issue with cost, especially with HD radio receivers. A receiver has the potential to be priced from around USD50 to up to several hundred dollars, which is a lot more expensive than many FM radio receivers.

Sound quality is certainly an important consideration when discussing the merits of audio technology. As can be seen in the Audio Frequency Range, the sound quality of AM radio is admittedly poor. But FM radio quality is good; almost as good as that produced by a CD. That is about as good as it can get because the audio range provided by a CD is roughly equivalent to the full audio frequency range that is detectable by the human ear.

Conclusion

With all the advantages the digital system in sound broadcasting can offer, it is no doubt that this will be a new experience that will attract listeners to migrate to digital system.

The main question involving the digital radio is that; "Which technology will be most suitable for the demographic and geographical qualities that Malaysia possesses?" SKMM will be looking into a series of trials in the near future, in order to gauge the perspective of the available technologies and interest of listeners.

Our gut feeling is that digital conversion in radio may be some distance away in the future because there are only few drivers of these technologies. Digital migration is mainly driven by demand for the 700 MHz band by broadband wireless access technologies. Futhermore, listeners too are still satisfied with FM sound quality, its ubiquity and low cost reception. .my

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Network Security Portal:

Educating and raising awareness on Internet security

Harme Mohamed, Director of Security, Trust & Governance Department expounds on the latest project by the National Security Centre.

Today, there are an estimated 1.7 billion Internet users globally, and it is estimated that consumers spent more than $2.8 billion on online shopping worldwide in 2008. The Internet has shifted key financial and personal information to the hands of Internet users at home, as more and more commerce are transacted online by this group of Internet users – those data may now be kept in personal computers or even mobile phones instead of large data centres owned by corporations. As a result, securing online transactions has become more complex and challenging – it is no longer sufficient to only secure information contained in large data centres, consumers at home also need similar kind of protection.

According to a cyber security report released by Symantec on September 2009 (http://bit.ly/46kCzF), nearly 10,512,000 identities are stolen every year, averaging one identity theft every three seconds. The seriousness of the situation becomes apparent when one compares this rate to crime rates in some of the largest cities in the world. New York City sees a crime once every three and a half minutes and Tokyo, one crime in every two and a half minutes.

Cyber crime is highly profitable. In March 2009, US telecommunications company, AT&T's chief security officer, Edward Amoroso and a panel of security experts told a US Senate Commerce Committee that revenues from cyber crime are running up to USD1 trillion annually, even exceeding drug-related crimes (http://bit.ly/9D303e).

While e-commerce in Malaysia has yet to see the level of acceptance seen in the US or Europe, local Internet users should not be oblivious to Internet threats. Today, Internet users face Internet threats in the form of crimeware – malicious software stealthily distributed by cybercriminals with the purpose of secretly extracting information and gaining money from Internet users. Crimeware may take the form of viruses, worms, Trojans, Botnets or other malicious programmes. In addition, cyber crime allows perpetrators to hide behind the anonymity of the Internet, making it difficult for law enforcers to prosecute them compared to offline crimes.

It is therefore paramount that an Internet user, whether using a personal computer or a mobile device, to know what these threats can do and the ways to overcome them. Hence, SKMM's Network Security Portal was born.

SKMM Network Security Portal

To ensure that Malaysian Internet traffic is secure, SKMM has established the SKMM Network Security Centre (SNSC) that has a dedicated team to monitor Malaysian Internet traffic for network threats in collaboration with Malaysian ISPs. The SNSC serves as the national Internet network thermometer to provide overall understanding of macro cyber threat level with the involvement and cooperation of both public and private sectors.

The SNSC security professionals monitor the ISPs' networks 24 x 7, all year round, checking on any known threats and anomalies. The threat monitoring will generate early warning of massive attacks or malicious propagation. This is to ensure continued protection of networks and ICT systems of ISPs and other key organisations from the security infringements.

Started in early 2009, the SKMM Network Security Portal is designed to raise awareness and provide valuable network security related information to home users, organisations and service providers that use the Internet for their various activities. The Portal is divided into two main sections - one section focuses on information for home users and organisations and the other on information for service providers. The Portal aims to be a one-stop centre to engage and empower Internet users, by providing information on how to protect themselves when they are on the Internet.

For example, it educates home users that their home computers are a popular target due to lack of security measures that have been put in place as compared to computers in their workplace. The Portal lists several simple ways home users can begin to protect their computers. It stresses the importance of good online practices such as using anti-virus software, not opening junk emails, installing firewalls, creating strong passwords and only downloading files from trusted sources.

As for the section for service providers, the information is much more technical and in-depth. Here it is more about sharing and giving out relevant information to the ISPs for them to provide a secure Internet environment to its users. While ISPs also have their own monitoring systems, the Portal has distinct advantage because it compiles and distributes the information gathered from the real-time traffic monitoring of the ISPs in Malaysia - thus the Portal'a significant information will be relevant to the service providers.

The portal also contains real time security alerts. These alerts provide timely information about current security issues regarding vulnerabilities, exploits and patches found from various resources on the Internet. The security alerts provide steps and actions to home and corporate users.

There are also statistics to show the network occurrence for the last 24 hours. Data for the statistics is collected from the SNSC. Statistics includes:

Top 10 Attacks

This shows top 10 network attacks for the last 24 hours. Internet traffic was scanned against SNSC's vulnerabilities databases.

Top 10 Ports

This shows the top 10 TCP/UDP ports that had been targeted by attackers.

Top 5 Countries

This shows top five countries of attackers targeting Malaysia's network. Currently the sources of the majority of attacks are local, followed by the United States, Republic of Korea, China and United Kingdom.

The portal has also uploaded two advisories, one regarding Nine-Ball and one about the Win32/Conficker. B worm. It also has files for best practices from US-CERT (United States Computer Readiness Emergency Team) and NIST (National Institute of Standards and Technology). Lastly, there are articles on cyber security tips on common security issues for technical and non-technical computer users.

SKMM Anti-Phishing Portal

Complimentary to the SKMM Network Security Portal, SKMM has also established the SKMM Anti-Phishing Portal in cooperation with banking and financial institutions in Malaysia. This Portal disseminates information related to Phishing and Phishing activities in Malaysia.

The Network Security Portal team at work

Apart from network security threats, Malaysians are also faced with Internet frauds or generally known as Phishing - a fraudulent attempt, usually made through email, to steal your personal information. Phishing emails usually appear to come from a well-known organisation, requesting for Internet users' personal information such as credit card number, account number, login names and password. Often times Phishing emails/attempts appear to come from sites, services and companies with which Internet users do not even have an account.

In order for cybercriminals to successfully "Phish" financial personal information, they must get users to go from an email to a website. Phishing emails will almost always tell users to click a link that takes them to a site where their personal information is requested. Legitimate organisations would never request this information via email. In Malaysia, most Phishing attempts involve Malaysian financial institutions. Emails sent usually cited that the financial institutions were experiencing problems with their computer systems and requests their Internet clients to resubmit their personal information for verification purposes.

This Anti-Phishing Portal aims to educate users on how to detect Phishing attempts and protect themselves against these type of threats. The Portal list several precautionary steps to avoid getting phished. Internet users should never respond to any emails that:

- Require users to enter their personal information directly into the e-mail or submit them online.
- Threaten to close or suspend users' accounts if they do not respond.
- Claim that users account has been compromised or that there has been fraudulent activity on the users' account and requests the users to enter, validate or verify their account information.
- State that there are unauthorised charges on the users' account and requests their account information.
- Claim that the bank has lost important security information and needs users to update their information online.
- Require users to enter their card number, password, user ID or account numbers into an email, pop-up window or non-secure webpage.

Phishing victims should file a report with SKMM. The reports will be used to identify the owners of the Phishing sites and SKMM will act to take down the offending sites by issuing instructions to relevant parties. The swift actions to take down Phishing sites are crucial in preventing further damages to Malaysian Internet users. SKMM will instruct the ISPs to reroute the Phishing sites to SKMM's Anti-Phishing Portal to alert Internet users that they have visited a Phishing site. On average, SKMM received a three to four of phishing reports every day. SKMM's phishing portal also has examples on how phishing websites look like, raising awareness amongst Internet users.

Conclusion

The setting up of the NSC coordinates not only the Commission's efforts towards securing the nation's information and network systems but will also effectively coordinate with other similar efforts in Malaysia. In that same breath, the SKMM's Network Security Portal aims to heighten awareness on Internet security and be a one-stop shop for Malaysians to get up-to-date information on network security. .my

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Windows
To The World

SKMM's USP funded Community Broadband Centres are reaching very inaccessible populations and localities, with very impressive results. SKMM's Md Rusli has the stories of two locations in Sabah.

While computers and Internet access are to be commonly found in urban areas these days, there are still many areas and population groups in Malaysia where the long tentacles of the World Wide Web (WWW) have not reached yet.

Areas without Internet access are mostly found in rural areas. Specific population groups that also face challenges with regards to Internet access include the disabled and minority groups.

These segments are in serious danger of being left out of the Information Age. The gap that exists between rural and urban areas as well as that between marginalised groups and the affluent is a universal issue. With the world steadily going digital, the need to address this issue

has become imperative. The Universal Service Provision (USP) programme that was initiated by the International Telecommunications Union (ITU) is a worldwide initiative to bring telecommunications services to everyone. It was first started as an initiative to bring telephony services to isolated populations. It has now grown into a programme that promotes equitable and universal accessibility to all communications services to the people of the world.

The Malaysian Universal Service Provision programme (USP), run by SKMM, has various initiatives that seek to close the digital divide in Malaysia. One such initiative has seen many Community Broadband Centres (CBC) set up in underserved areas, as well as those aimed at specific population groups.

In these areas the arrival of computers and Internet access at the community level is a major event. It generates enthusiasm and a level of interest that people who have been exposed to computers for their whole life would find hard to imagine. These CBC projects, along with other initiatives under the Corporate Social Responsibility (CSR) scheme, are making powerful impact on rural communities. A recent trip to two centres in Sabah gave a glimpse of the effectiveness of this initiative.

Kampung Sukau Community Broadband Centre in Kinabatangan district, Sabah

The journey to this centre starts from the town of Sandakan, located on the north east coast of Sabah. The 135 km journey takes around 2 hours. Once we turn off the main road from Sandakan to Kota Kinabalu for the final forty kilometres of this journey, one can only see newly planted oil palm trees as far as one can see. The entire area must have been virgin jungle not too long ago.

View of computer lab

Sukau may be isolated but it is a very popular eco-tourist destination. The Kinabatangan River runs through here in its final stretch before it meets the sea. In 2006, 27000 hectares of this area was declared a protected area and named the Kinabatangan Wildlife Sanctuary.

Today many of the *orang sungai* (river people) who live along the banks of the river in **Sukau** have become small-time bed & breakfast (B&B) lodge operators. They cater to the tourists who come to experience a river cruise which introduces them to the many species of wildlife living in the sanctuary.

Papar Centre of Disabled People

Village life at Sukau

Abdul Gafar Ismail

The small hamlet of Kampong **Sukau** consists of just around 20 to 30 homes. Surrounding this village are another hundred homes or so. A primary school caters for residents living here and in the oil palm plantations. The CBC that serves this picturesque village was opened in November 2008. The centre has 2 rooms, with one serving as a small cybercafé (5 PCs) and the other as a training room for six students at any one time. The entire area surrounding this centre has no Internet infrastructure. The Internet access for the centre goes through a satellite dish that connects to a Telekom Malaysia gateway in Sandakan. One problem that plagues the centre is irregular and unstable power supply – the village suffers from fairly frequent blackouts.

Abdul Gafar Ismail, aged 32, serves as the centre's administrator, a duty he shares with an assistant facilitator. Both of them take turns manning the centre, and Gafar also teaches the many computer classes that have sprouted up. Gafar studied Management of Information Science at UiTM Shah Alam. After graduating, he worked for some time as a librarian and part-time lecturer at an IT college in Kota Kinabalu.

Gafar told us that there are more than 40 regular students at this broadband centre. The youngest is 7 years old while the eldest is 56 years old. The classes are held at different times to accommodate the lifestyles and work times of the village folk. Gafar told us that the older folks mainly go through very basic courses as many of them have very little formal education. He concentrates on the youths and young children as they are quick learners. Even the younger children took some time to become familiar with the computers. Gafar says that many of them had never touched a PC before and some experienced outright technophobia when they were introduced to the PCS. Some were hesitant to try the PC mouse as it looked strange to them. But once they got over the initial peculiarities, they quickly took to the many possibilities of the computers.

Beyond the computer lessons, this broadband centre has become an important community resource. Young patrons use the PCs to access school sites such as tutor.com.my or play educational games at funbrain.com.my. Smallholders come in to check oil palm prices. Perhaps the most important contribution of this centre to the community is tourism related. The operators of the B&B lodges use the facilities of the centre to advertise their services. These operators use email to send quotations and finalise bookings with clients who come from areas as far away as US, UK and Japan. The arrival of the broadband centre also allows these B&B operators to maintain ties with their customers and even builds friendships with them. During the tourist season many tourists make use of the WiFi service offered by this centre to keep in touch with loved ones. One of the locals also maintains a blog on their village at oneSukau.blogspot.com. The centre earns a steady income from patrons that pay to use the PCs and also through the sale of telco prepaid top-ups. Gafar is proposing to also make this centre a one-stop payment centre where residents would be able to make online payments for their utility and satellite TV bills using a common credit card account that he proposes to set up. He has also made a proposal to the area's state assemblyman to conduct IT skills training programmes for all of the village's committee members.

During our visit to the centre, we saw one class that consisted of 6 young ladies in progress. Rizuana, Noraslina, Norlina and Susan are sisters. These four young ladies hail from a family of 12 children, and they make a living operating a bed and breakfast lodge. Norlina and Noraslina are in secondary school and they have seized the opportunity to use the computers for their school work. Rizuana and Susan are older and have mainly kept to learning how to surf and use emails. Tuty Haryatie and Sahnita are the other members of this class. These ladies told us that they feel much more confident now that they have learnt how to use computers. They have made use of the computers to make friends with people of their age in other areas. Now they feel much more connected with the modern world.

It may seem to be a small effort, putting ten PCs at the disposal of isolated populations and villages, but our visit shows that the impact of these centres are immense with both direct and indirect contributions to the society there. It was no surprise to learn from everyone we spoke to that they plan to get their own computers as soon as they can afford it.

Kimanis Disabled People Rehabilitation Centre in Papar District, Sabah – a CSR project on broadband

To reach this centre one has to drive south from Kota Kinabalu for about an hour. The road hugs the coast with fishing villages and rice fields to be seen along the way. The centre itself is about two hundred metres from the main road.

There are 65 disabled people currently at this centre, of which 20 are children aged 7 to 14. These children are basically being taught how to manage themselves. The other 45 disabled persons are aged from 15 to 35, and they are pursuing various skills programmes. Some are learning carpentry, others welding, electric or sewing courses.

The types of skills taught at this centre have been reinvigorated this year with the introduction of IT programmes. SKMM with the cooperation of agencies and

service providers set up an IT lab here. There are 12 PCs and one notebook on the network. Internet connection is fast at 2 Mbps as the area is blessed with a fibre optic line that is pulled from Kota Kinabalu. A facilitator was also hired to teach PC courses to this batch of disabled students.

Communications accessibility for the disabled is perhaps the most challenging of tasks and also the most rewarding. Prior to the setting up of this broadband centre, the disabled people in this centre had little avenues of reaching out to the outside world or sharing their worldviews. Since February this year, ten occupants of this centre have been undergoing an IT skills programme that introduces computers and the Internet. We spoke to some of them to find out how this programme is impacting their lives.

Deris is 23 years old and he moves around on crutches or wheelchair. Life dealt this young man a cruel hand. He had struggled to overcome poverty and became a guide for a travel company in 2001. He spent 5 years leading tourists up Mount Kinabalu before meeting with an accident that left him disabled. He comes from the Keningau district and was helping his family run their sundry shop before being accepted for this IT course. He is absolutely ecstatic with the chance to learn IT skills here. "I am very happy because I can now see the world again from my chair," Deris told us.

Another student, Ajidey, 24 years old, lost the use of his legs in a car accident in 2006. He studied up to Form 3 in Ranau, Sabah. Since he arrived at the centre, it has been a brand new educational experience for him. He is learning how to use Microsoft Excel and Word programmes, as well as the email programme. He learnt of this programme through the District Office in Ranau and was selected, he thinks, because he showed the desire to learn and also demonstrated the required capabilities. Ajibey has also joined the social networking revolution as he maintained accounts in Facebook and Friendster.

Aunnie

Aunnie is 30 years old and from the Tambunan district. She has been disabled since birth. She had also lived for some time in another disabled people's centre previously, in Simbulan. Besides learning Microsoft productivity applications, she is fascinated that the Internet can make friends and connect with people far away. Aunnie has a Friendster account and a Yahoo email address. She has developed a keen interest in exploring how people in other countries live their lives.

Dayang was born with cerebral palsy. She is now 16 years old and despite her disability, she stayed in regular school until she was 15. She is a cheerful girl who is determined to live as normal a life as possible. Like most young girls, Dayang has become infatuated with the social networking phenomenon. In fact she may be above average in the social networking scene as she told us she had accounts with Facebook, Friendster, MySpace and Tagged. "I have 16 friends on Facebook and I look forward to making more friends soon from Malaysia and also all over the world", she said. Dayang has also become a user of instant messaging

The Kinabatangan River

Rozanna

Elvysia George

applications. It is not all play for Dayang as she has become conversant with Word and Excel.

Rozanna, 18 years old and a native of Bongawan, Sabah, approaches this programme as a second chance to educate herself. She stopped schooling at Year Six, and she told us that although she does use applications such as Facebook occasionally, her priority is to master Microsoft Office as she wants to succeed in life. This disciplined girl serves as the monitor of the class. She appears to have the ability to inspire the rest to work hard too.

The student that is overcoming the most challenging disability to become IT proficient is 25 years old Risdam. He was born without any fully formed limbs. He walks around with artificial limbs connected to the stubs of his legs. He has no hands and his arms stop short of what would be his elbows. Despite that, Risdam has learnt to use a notebook computer. He controls the touchpad mouse with the end of his arm and is able to type the same way. Risdam told us that this was the first time that he had ever used a computer and was grateful to be given the chance to extend his mobility in a virtual sense through the Internet. Beyond learning Office applications, Risdam has a special affinity for YouTube as he loves music. "I love to listen to Malay and Indonesian songs and when I have the time, I look for songs I like on YouTube and listen to them", he told us. He has also downloaded some songs. He is so in love with PCs and the Internet that he wants to open a cyber café one day.

The lady tasked with introducing IT skills to these students is 25 year old Elvysia George. She grew up in Kota Kinabalu but has relatives who live in the **Kimanis** area. Elvysia graduated from Universiti Malaysia Sabah with a degree in Software Engineering. She applied to work as a facilitator for this programme without really knowing what to expect. When she learnt she got the job, she did feel a bit of trepidation as she wondered if she could cope with the challenge of working with a group of disabled people. All

Risdam

How Risdam type on a keyboard

Class in progress

Students at Sukau

her fears disappeared when she started work, as she found them to be very willing to learn and infinitely enthusiastic. "I love my job as I can see how much my efforts mean to my students. It is personally very rewarding as I can literally watch then improve on a daily basis." The courses are also aiding in instilling self belief in these students. "When they first started, all the students had no confidence and were very hesitant to use the computers. Now they are eagerly learning new skills," she told us.

She does not see herself as a tutor but more as a friend to this special group of IT students.

The programme is structured to run in 4 semesters over 2 years. Each semester they learn one Microsoft productivity application and one other skill. In the first semester they were taught to use Microsoft Word and Introduction to PCs. The second semester which they had just completed when we visited the centre saw them learning Microsoft Excel and introduction to Internet. Along the way they have also been introduced to emails and social networking. Coming semesters will see them learning PowerPoint and Publisher applications.

Elvysia told us that potential students had to be screened for suitability before being accepted for the programme. All students undergo a three-month trial before their place is confirmed. Some were not able to cope with the programme because they could not read and write as they had never been to school, while others with extensive mental disabilities also had difficulty following the programme. Even those who made it into the student list had varying absorption level. She tailored her programme so that some moved faster while slower ones were allowed to take their time.

In perhaps the most empowering experience of all, Elvysia got her students to set up blogs. Some of the blogs are just cut and paste jobs but others are eye openers for readers. The blog run by Dayang, the girl with cerebral palsy, details the trials of a disabled person (babypinks69.blogspot.com) as does Risdam's blog (adamrisdam.blogspot.com). Deris' blog poignantly tells of his time as a mountain guide (ajiependakiangunungkinabalu.blogspot.com). The centre also maintains a blog at kpokukimanis.blogspot.com, which is full of photos and descriptions of the activities of the centre.

List Of Blogs Maintained By Disabled Students At Kimanis

Student Name	Blog
Rozana Mail	http://robotoemo94.blogspot.com/
Deris Kautang	http://keningauindah.blogspot.com/
Dayang Siti Nurafizah Bte Moksin	http://babypinks69.blogspot.com/
Ajidey Pulis	http://ajiependakiangunungkinabalu.blogspot.com/
Risdam Bin Asrimenang	http://adamrisdam.blogspot.com/
Endruny Lumbang	http://kenz-kenhenz.blogspot.com/
Nuraisah Bte Sapar	http://nuraisah93.blogspot.com/
Arby Rodziary Bte Ariffin	http://sukukaumbisaya.blogspot.com/
Christoper Juanis	http://christopher-papar.blogspot.com/

The computer centre is not exclusively beneficial to the ten students who have enrolled in the IT programme. Elvysia told us that the other residents of the centre have the chance to use the computers at certain times under close supervision. In doing so, even more previously disengaged people are being introduced to the Internet. .my

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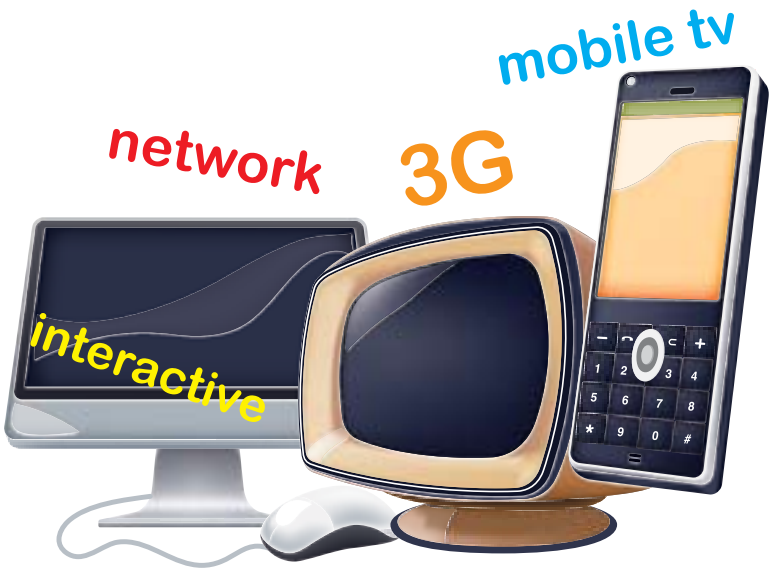
Networked Content Development Grant



NCDG: Spurring the Malaysian Creative Industry

Since its inception in 2007, SKMM's Networked Content Development Grant gains momentum to push the industry to greater heights. Roslan Mohamad shares some success stories.

There is a growing awareness that digital content plays an important role in our aim to build a sustainable knowledge-based economy and after a five-year slump, the industry is steadily making a comeback. The revival of the content industry can be directly attributed to the measures taken by the Government to spur the development of the local content industry.

Much of the efforts have focused on providing funding and start-up supports to creative entrepreneurs. A multi agency effort is in place with grants and funding programmes run by Government related agencies such as SKMM, MDeC, FINAS, Cradle and so on.

SKMM promotes its creative content development activities through its Networked Content Development Grant (NCDG). According to an update report from the Multimedia

Development Corporation (MDeC), by 2010 the digital content industry is poised to reap in RM1.14 billion and that roughly translates to about USD326 million. Content export alone will be worth RM660 million (USD188 million). This digital content includes among others broadcast content, mobile content, online content and advertising content. Digital content can be in the form of animation, games, training and education module, documentary, films, music video, entertainment, simulation etc (source: http://www.scribd.com/doc/17463966/Updates-on-the-MSC-Malaysia-Digital-Content-Industry).

That particular report also stated that we should expect 13,100 jobs to be created from the healthy growth of the industry. This projection falls nicely into the Government's plans as outlined in the ICT Chapter of the 9th Malaysian Plan and the MyICMS 886 strategy.

In the ICT Chapter of the 9th Malaysian Plan, the Government emphasised the urgent need to produce "Malaysian content" for Malaysia and the world, and for Malaysia to be positioned as a hub for content creation, production, broadcasting and outsourcing activities.

The MyICMS 886 strategy, the blueprint for the communication and multimedia industry, has identified content development as one of the growth areas in the next five years.

The expected results from the MyICMS 886 strategy are, among others to have adequate local content, reflecting the culture and values of the nation digitally available and accessible for the various application requirements. It also expects that content will be a sizeable export revenue contribution for Malaysia.

An even more telling evidence of the industry's importance was during the announcement of the Malaysian Budget for 2010. Prime Minister Datuk Seri Najib Tun Razak announced that the Government was going to allocate RM200 million to establish the Creative Industry Fund for the development of local content.

The Creative Industry Fund is going to be a comprehensive policy, including a RM3 million welfare fund for artistes and actors. These incentives are not limited to performing arts and music, but include design, animation, advertisement and content development. On a separate occasion, the Prime Minister also said that the target set for a number of multimedia content companies operating in MSC Malaysia would be revisited at the forthcoming International Advisory Panel (IAP) meeting to accelerate the industry further.

NCDG

As one of the initiatives to realise the content development agenda envisaged by the National Policy Objectives of the Communications and Multimedia Act (CMA) 1998 and the 9th Malaysian Plan and MyICMS 886, the Networked Content Development Grant was established in 2007 with an initial allocation of RM20 million.

The term "networked content" for the purpose of the NCDG is "all text, audio, audio-text, still pictures, moving pictures and software that is accessible over publicly accessible electronic networks which includes broadcasting (TV), moving pictures (exclude cinema distribution and VCD/DVD sales), online content, mobile/wireless data services (3G, Mobile TV etc) and interactive digital TV and other content which can be created, manipulated, stored, retrieved and communicated through the use of a network facilities and services".

For the purpose of the NCDG, the focus areas for development are Mobile Content (for 2.5G and 3G) and TV Content. The types of content that are being considered for funding are:

- Information based content – content created based on information such as tourist attraction locations, nearest hotels with ratings and prices etc
- Entertainment – content created for entertainment such as multiplayer gaming, folklore music and jokes, funny video clips etc.
- E-commerce – transactional based content such as m-shopping, interactive advertising etc.
- Education – content utilised for educational purpose such as quick notes and formulas; interactive education content etc.

In 2009, the size of the scheme has been increased to RM50 million to introduce a new programme called NCDG Campus Scheme.

Under the NCDG Campus Scheme, 10 public and 10 private higher institutes of learning (IHL) are selected to be nurtured as breeding grounds of creative talents. Each IHL will be given an annual grant of RM150,000 to fund content development projects undertaken by students. The aim is to reduce the skill gap among fresh graduates by allowing students to acquire more resources to produce better content when doing their academic projects.

Challenges faced

Traditionally, the creative industry is seen as high-risk due to the uncertain returns-on-investments, hence procuring funding is difficult and becomes one of the biggest challenges faced by entrepreneurs venturing into this area.

In the conventional financial practice, funding normally requires collaterals or properties to insulate the lender from losses. Most content developers only have their creativity and skills to produce a content which can be registered as an intellectual property (IP). Unfortunately, conventional banking principles do not recognise creativity, talents and even IP as convincing collaterals, hence getting a commercial funding assistance from conventional banks is almost like a mission impossible.

Under these difficult circumstances, Government grants like the NCDG and venture capital investments become the lifelines for the local content industry.

Insufficient funding and capital also impairs the ability of local players to expand their market scale in order to yield good returns from their content. In many cases, an adequate return on investment may only be realised if the content finds buyers in multiple markets. Established global contents are considerably cheaper than local content because their market scale is sufficient to generate lucrative returns. The market scale affects the acquisition costs in the local scene which becomes another challenge to the local players.

The cost of buying local content is generally ten times higher than foreign content. For example, a local TV station may acquire a half-hour episode of a popular cartoon like Doraemon or Crayon Sin Chan for around USD1,000 (RM3,700), while the asking price for an episode of a new local animation series may be as high as RM40,000. The real issue here is market scale without which local animation companies have no choice but to ask for a high price from local broadcasters in order to sustain their operation. By expanding the market scale, local animators would have more avenues to gain revenue which then may lead to the production of more local content.

However, getting into the global buyer circuit costs a considerable amount of money to carry out promotions and advertising which many new content developers might not have. Without a proper marketing strategy and sufficient funding, it would be difficult to penetrate and promote our local content to other potential markets.

Success stories

To date the NCDG has approved eight projects. Through this grant as well as the marketing and business support that the Government agencies provide, these grantees should be able to achieve global success. Among them are Inspidea Sdn Bhd, Firdaus Maju Sdn Bhd, Murasu Systems Sdn Bhd, Just Mobile, Billadam and Trinity Wizard.

Inspidea Sdn Bhd

They are the producers and creators of an animated series known as Mustang Mama Die Hard Sports Fan. The series is currently distributed locally and in Japan, Russia, Canada and Italy. During the Olympics, Yahoo bought the licensing rights to showcase Mustang Mama on their online portal.

Firdaus Maju Sdn Bhd

This company produced a six-episode documentary called Alexander Bukan Zulkarnain. Firdaus Maju was successful in getting Astro Oasis to broadcast the content in January 2009 and more recently Celcom offered short clips of the series on its 3G services. In addition to that, they came up with a book on the same subject.

Murasu Systems Sdn Bhd

Mobile applications creator, Murasu Systems has developed an application for Jawi messaging called Mobile Jawi. This is a Java application that allows users to compose text in Jawi and send it to their friends. It is currently available on Maxis, DiGi and Celcom. They also have a version for the iPhone. This company is also working with another company to introduce the application in different languages.

Just Mobile

Another mobile related content developer, Just Mobile produces mobile games. Subscribers can upload their scores on TV while playing. The company is working with Media Prima and has launched the UPlayUWin game on local channel, 8TV.

Billadam

Billadam gets the grant to develop animated mobile greeting cards. Billadam launched MobiGreets in three different languages with customisation features. These animated greeting cards are available from local telcos. They also have P. Ramlee On Mobile video greeting cards which are based on classic P. Ramlee comedies. P Ramlee, a legendary local actor.

Trinity Wizard

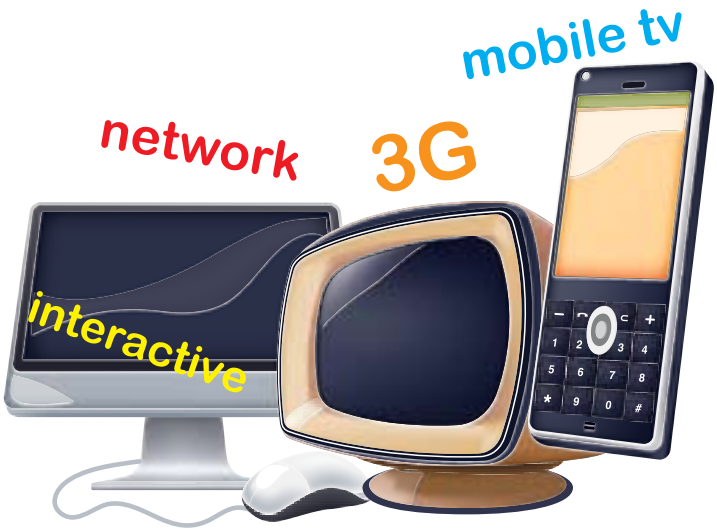
This company introduced its version of Mobile Pets (Mopetz) where users can feed, take care and interact virtually with the pets. Trinity Wizards launched this service with Maxis. Thus far they have five Mopetz characters available for adoption with more being planned. The company has also seen keen interest from foreign telcos and it is in discussions with service providers in Thailand and Indonesia to bring Mopetz there. Trinity Wizards was named Malaysia's Best Mobility Content & Applications Company at the inOvation Malaysia Awards handed out recently at the Mobile World Star Awards & Gala Dinner 2009 organised in conjunction with GoMobile 2009.

Current efforts

Apart from seeding creative companies and individuals, SKMM, FINAS and MDeC also jointly sponsor pavilions at international content trade fairs such as in Cannes, Middle East, Hong Kong and so on, allowing those with ready-to-market content to be highlighted to potential global buyers. These market access plans carried out by SKMM, FINAS and MDeC are vital for our local creative industry because the Government absorbs most of the cost to provide the exhibition space and even offer subsidies on the marketing costs.

Interested parties only need to liaise with the agencies to confirm attendance and foot the bill for flight and accommodation. There are a lot of advantages to binding local content providers together. Aside from keeping overheads low, Malaysia can be well-represented under one SKMM-FINAS-MDeC pavilion which will make a bigger impact than a single exhibitor fighting to be seen in a crowded marketplace. To date they have participated in exhibitions held in 3GSM World Congress (Barcelona), HK Filmart, Locations Trade Show (LA), MIPTV, Mobile Entertainment Forum (UK), SICAF, Seoul Character Fair, MIPCOM, BIFFCOM (Busan), Thailand Entertainment Expo, TIFFCOM, Character Dubai and ATF.

The Government is also committed to providing infrastructure, expertise and encouragement for content developers to get access to opportunities. There are also tax incentives for the private sector involved in the creative industry. .my



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Expansion of Infrastructure and communication facilities in Sabah
28 December 2009

The Ministry of Information, Communications and Culture with its agency, SKMM, launched the Malaysian Internet Exchange (MyIX) node and the state level Community Broadband Centre at Sabah at a ceremony graced by the Minister Yang Berhormat Dato' Seri Utama Dr. Rais Yatim. The launch was held at the Sabah Trade Centre and was witnessed by the representative from of the state government Yang Berhormat Datuk Haji Tawfiq Datuk Seri Panglima Abu Bakar Titingan, Deputy Minister, Sabah Finance Ministry and the Chairman of SKMM, Yang Berbahagia Tan Sri Khalid bin Ramli and invited guests.

The MyIX initiative forms part of the Government's efforts to bring economic development to the nation as well as to bring forth a knowledge culture. This initiative is seen as being able to raise the economic competitiveness of the nation. When the MyIX node is operational, it is expected to enhance Internet services in Sabah from the aspect of speed, quality of service and lowering of costs. It is also expected to raise the amount of local Internet traffic as well as contribute to economic development in line with the Sabah Development Corridor intiative.

A key target of the National Broadband Plan is to raise the household broadband penetration rate to 50% by the end of 2010. At this ceremony, the Honourable Minister announced that the nation had achieved
30.8% household penetration at the end of November 2009 and that it is expected to reach 31.4 % by the end of December 2009; leaving 18.6% to be completed in the final year.

On the USP programme, SKMM is working to narrow the digital divide through initiatives that encompass all aspects of ICT services such as telecommunications, Internet, content, knowledge and infrastructure.

The Community Broadband Centre (CBC) at Bingkor will be maintained by Celcom (M) Berhad while the CBC Sukau will be maintained by Telekom Malaysia.

The Government has allocated RM383 million for Sabah as part of its initiative to narrow the digital divide. This allocation will be used to implement USP projects over 5 years starting from 2010. The projects include programmes for the Underserved Groups - including disabled people – (RM8 million) , 24 CBC (RM55 million), 14 Broadband-enabled Libraries (RM22 million) and 212 towers for coverage expansion (RM297 million).

IKTIRAF 2009 Carnival for FELDA folks
20 December 2009

The Prime Minister, Datuk Seri Najib Tun Razak officiated the IKTIRAF 2009 Carnival that was held at the grounds of Universiti Teknologi Mara (UiTM), Shah Alam on 20 December 2009. The 3-day carnival may have been the largest gathering of Felda settlers to date as there were 8,161 of them from all over the country. Another 30,000 city folks from across the Klang Valley were also estimated to have attended. One of the aims of the carnival was for it to serve as a platform that would bring urban dwellers and those living in Felda schemes closer to each other.

200 booths comprising participants from both the private and public sectors were set up during the carnival. SKMM participated by taking up exhibition space at both the main and general expo areas. The aim was to share details of its efforts to bridge the digital divide with Felda settlers and other expo visitors. SKMM has initiated such projects in selected Felda schemes under the Universal Service Provision programme.

Two forums under the purview of SKMM also participated at this carnival. The Communications and Multimedia Consumer Forum of Malaysia (CFM) and the Communications and Multimedia Content Forum of Malaysia (CMCF) shared their efforts to enhance awareness among consumers on issues related to the communications and multimedia industry.

Award Ceremony for successful Universal Service Providers Tenderers
2 December 2009

Award Ceremony for successful Universal Service Providers Tenderers

The Malaysian Communications and Multimedia Commission (SKMM) has designated six licensees as the new universal service providers for the rollout of Community Broadband Center (CBC) projects.

Tan Sri Khalid Ramli, Chairman of SKMM presented the tender awards to the new universal service providers. They are Telekom Malaysia Berhad, Celcom (M) Berhad, Packet One Networks (M) Sdn Bhd, Redtone-CNX Broadband Sdn Bhd, eB Technologies Sdn Bhd, and Danawa Resources Sdn. Bhd. at the presentation ceremony held in Cyberjaya yesterday.

Infrastructure build-up in Malaysia, including promotion of high speed broadband network and USP programmes involving broadband access services, is fast underway to meet the target of 50% household broadband penetration by end-2010. Community Broadband Centres (CBC) is one of the enablers towards providing access for rural communities.

The ultimate goal of CBC is to ensure that communities living in underserved areas e.g. FELDA are connected to mainstream Information and Communications Technology (ICT) development. It aims to enable and to empower these "connected communities" via broadband; and to bring about socio-economic development for those communities in agriculture, education, health, and business, amongst others.

SKMM had earlier identified 36 new universal service targets areas including 71 Felda settlement areas for the roll-out of CBC projects. These FELDA areas include 13 target areas in Johor, 2 in Kedah, 8 in Negeri Sembilan, 5 in Pahang, 5 in Perak, 2 in Perlis and 1 in Terengganu.

The commencement date for the implementation of the approved USP Plan took effect on 30 November 2009 and the timeline to complete the implementation is within 16 weeks from the commencement date.

The implementation would see increased utilisation of ICT in programmes for women, elderly, disabled, indigenous, rural, the poor, small and medium as well as macro enterprises. Telecentres will continue to play an effective role in meeting the needs of the underserved communities.

"The digital divide issue in Malaysia is real and growing, and has profound implications. It is not just an issue of equitable access to technology and gaps between the info-rich and info-poor but also covers the literacy, basic skills, localised content, the development of self-managed communities and empowering society by providing opportunities to use ICT," said Tan Sri Khalid Ramli.

"SKMM firmly believes that ICT should be available to everyone under the spirit of 1Malaysia. Even to those who might find it out of reach. I have great confidence that significant benefits would be reaped out of the new CBC rollout in FELDA areas in alignment with the national agenda on bridging the digital divide."

GoMobile 2009
23 to 25 October 2009

SKMM and the Multimedia Development Corporation (MDeC) were the Strategic Partners of GoMobile 2009, Malaysia's largest and most comprehensive mobile lifestyle event. GoMobile encompassed the GoMobile Expo (23-25 October 2009, KL Convention Centre), the GoMobile Conference (20 October 2009, Istana Hotel) and the Mobile World Star Awards and Gala Dinner (21 October 2009, Istana Hotel) took place in October 2009. The show was themed: 'We Are The Mobile Generation'.

Maxis was Pinnacle Sponsor of the GoMobile 2009 and a host of other companies including Yellow Pages Malaysia, Ericsson, RRecords, Dapat Vista, Cyberview, i-Pixel and Bitemark partnered the event organisers Commtechasia Sdn Bhd into making this year's edition of Malaysia's Ultimate Mobile Lifestyle Event a thrilling, fun-filled and learning experience.

The Minister of Information, Communications and Culture, Y.B. Dato' Seri Utama Dr. Rais Yatim delivered the keynote address at the GoMobile Conference. SKMM Chief Operating Officer, Y. Bhg Dato' Mohamed Sharil and other SKMM senior officers also spoke at the conference. The event had 'Fast Forward For Mobile' as its theme. It focused on identifying emerging opportunities and openings and covered all aspects of the mobile lifestyle, major trends and issues.

The Deputy Minister of Information, Communications and Culture, Y.B. Dato' Joseph Salang graced the Mobile World Star Awards and Gala Dinner. The premier celebration of the mobile industry in Malaysia saw three different awards being presented, namely InOvation Malaysia awards for mobile services, applications and content companies, Mobile World Handset Awards for best mobile devices and the APAC Mobile Learning Advisory Panel recognitions for mobile learning initiatives.

Nearly 50,000 visitors came for the GoMobile Expo. All major mobile handset brands and telcos participated in the expo. Among the exciting activities and promotions included competitions, fashion showcases and demonstrations of mobile applications. Expo visitors also experienced mobile technology in action through mobile downloads of the show directory, Bluetooth based treasure hunts, text based registrations and more.

Spectrum Research Colloquium 2009
23 to 25 November 2009

The annual Spectrum Research Colloquium 2009 was held from 23 to 25 November 2009 at the Putrajaya Marriott Hotel in Putrajaya. The event was officially launched by the Chairman of SKMM, Tan Sri Khalid Ramli. Fourteen research teams attended and presented their research projects, including some who presented their final findings as well as recommendations based on their completed project.

Lecture Series
21 August 2009

On August, 21st 2009, a Lecture Series was held at SKMM Auditorium. The theme chosen was "Wireless Technology and Us" and the series featured two speakers from Universiti Kebangsaan Malaysia (UKM) and Universiti Teknologi Malaysia (UTM). Both are recipients of the Spectrum Research Collaboration Programme (SRCP) fund in 2007.

The speaker from UKM was Assoc. Prof. Datin Dr. Norizan Abdul Razak and she spoke on subject 'The Impact of Wireless Technology Among Malaysian Society' while Prof. Dr. Rose Alinda Alias of UTM covered the topic 'Adoption and Appropriation of Mobile Phone on Malaysian Society'.

Launch of 'Generasi Digital' Programme, Negeri Sembilan
8 October 2009

SKMM launched the state level Digital Generation Programme for Negeri Sembilan where eight schools were provided with computer facilities. This programme forms a part of SKMM's Corporate Responsibility activities. The schools that benefited from this programme are as follows:

- Sekolah Kebangsaan Panglima Adnan, SiRusa, Port Dickson
- Sekolah Kebangsaan Telok Kemang, Port Dickson
- Sekolah Kebangsaan Kampung Baru SiRusa, SiRusa, Port Dickson
- Sekolah Kebangsaan SiRusa, Port Dickson
- SJK (T) Ldg Sungala, SiRusa, Port Dickson
- SJK (T) Ladang Sua Betong, SiRusa, Port Dickson
- SJK (C) Ladang Sua Betong, SiRusa, Port Dickson
- SJK (C) Ldg Bradwall, Siliau, Port Dickson

The programme was launched by Yang Berhormat Dato' Seri Utama Dr. Rais Yatim at Sekolah Kebangsaan Panglima Adnan, SiRusa, Port Dickson.

SKMM will continue to focus on the importance of education in building a knowledge society. The aim of the programme is to aid in creating a digital generation of youths in rural areas that are able to use ICT technologies ethically without compromising Malaysian values.

Singapore Next Generation Broadband Network close to rollout

OpenNet the operator of Singapore's Next Generation Broadband Network (Next Gen NBN) recently issued a residential user guide for their fibre optic network which will be rolled out in the near future. The guide details everything a user needs to know about this next generation broadband network; starting from who is building it all the way to how installation will be done.

The guide explains the responsibilities of the three layers of the network. OpenNet has been appointed as the Network Company (first layer) and the company is responsible for the passive infrastructure of an all-fibre broadband network that is truly open access.

At the second layer is Nucleus Connect which was selected by the Infocomm Development Authority of Singapore (IDA) to design, build and operate the active infrastructure of the Next Gen NBN. Nucleus Connect will work together with OpenNet on a coordinated nationwide rollout of the network and is expected to start offering commercial services to Retail Service Providers (RSP) by the first half of 2010.

Finally, RSP will form the third layer. They will offer services over this high speed broadband network as well as other networks.

The guide reveals that OpenNet will install a Termination Points (TP) in homes. When users purchase services (e.g. broadband) from a RSP, a Network Termination Equipment (NTE) will be connected to the TP for the service to be delivered.

The installation cost for the first 15 metres run from the point of entry or gate post (in the case of landed premises) to the termination point is listed as being chargeable at $220 or $450 (before GST) respectively. But OpenNet announced that will it provide it FREE for the first 15 metres run if home owners respond to the letter of offer before the deadline stated. For fibre run that exceed 15 metres, a fee of $33 per additional 5 metres (excl GST) will be charged.

More consumer-friendly terms for Singapore's telecom subscribers

Consumers of telecommunication services in Singapore will enjoy better terms from their service providers once new guidelines by telecom regulator, the Infocomm Development Authority of Singapore become effective from 1 March 2010.

These new guidelines will apply to new or renewed contracts for all fixed-line, mobile and broadband services offered to consumers from 1 March 2010 onwards.

They limit the maximum contract period for all such services to not more that 24 months. Consumers who terminate their contracts early but beyond the first three months will only have to pay a pro-rated early termination fee based on the number of remaining months of their contract left, rather than a fixed penalty.

Also, these early termination charges must not include costs which operators can avoid when the consumer terminates his service. Such costs could include back-end administrative and operational costs that the operator would not have to incur once the customer terminates the service.

The new guidelines came about due to consumers' concerns that contract periods might be becoming unduly long, and early termination charges excessively high, which together would tend to lock then into a particular operator and prevent them from switching operator.

These guidelines were subsequently developed by the IDA after a public consultation and a review.

Singapore NIC to launches Chinese domain names

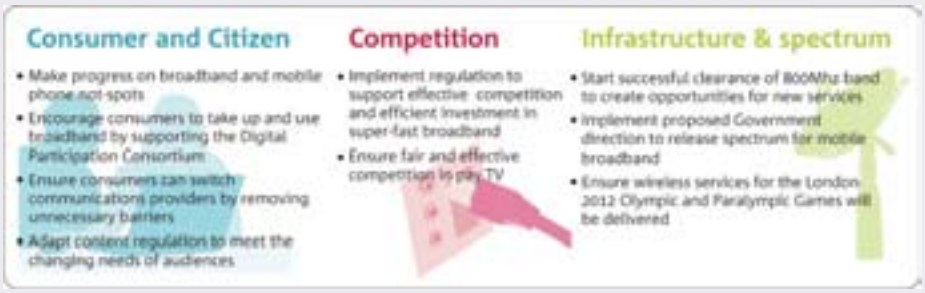
Singapore's national domain name registry, the Singapore Network Information Centre (SGNIC) began accepting initial registrations for Chinese-script domain names from 23rd November last year, in a move which allows Singapore businesses and consumers to use Chinese characters in their web addresses.

These Chinese character addresses include second-level domain names ending in .sg or third-level domains ending with .com.sg, .gov.sg, .org.sg, .edu.sg, .net.sg, .per,sg and so on.

This launch of Chinese-character domain names follows the introduction of a slew of new domain names, including single-character and purely numeric domain names over the past two years.

SGNIC (www.sgnic.sg) will continue to monitor market developments and demand, and consider offering domain names in other languages.

Ofcom's top priorities in 2010



The U.K.'s radio, television, fixed and mobile communications regulator, the Office of Communications or Ofcom has made the tackling of broadband and mobile "not-spots" and the ease with which consumers can switch service providers its two priorities in 2010.

The plan comprises nine key areas where Ofcom will make significant progress this year – namely:-

- Make progress in broadband and mobile phone "not-spots."
- Encourage consumers to take up and use broadband by supporting the Digital Participation Consortium.
- Ensure consumers can switch communications providers by removing unnecessary barriers.
- Adapt content regulation to meet changing needs of audiences.
- Implement regulation to support effective competition and efficient investment in super-fast broadband.
- Ensure fair and effective competition in pay TV.
- Start successful clearance of 800Mhz band to create opportunities for new services.
- Implement proposed government direction to release spectrum for mobile broadband.
- Ensure wireless services for the London 2012 Olympic and Paralympic Games will be delivered.

The UK's child safety strategy

The U.K. Council for Child Internet Safety (UKCCIS) launched that country's first Child Internet Safety Strategy which sets out what is being done to keep children safe online.

It began with the launch of the first stage of the 'Click Clever, Click Safe' public awareness campaign, starting with the launch of a digital code; "Zip it, Block it, Flag it," which encourages children to not give out personal information on the web, block unwanted messages on social networks and report any inappropriate behaviour.

Online safety is already a compulsory part of the U. K's National Curriculum for secondary schools and is also being taught in many primary schools, and from September 2011, online safety will become a compulsory part of the National Curriculum for children aged five and upwards.

UKCCIS will also review how it uses guidance for online services so that parents and young people can be confident that they are using those services safely.

Established in 2008, UKCCIS comprises over 140 organisations, including Ofcom.

It also has a video guide on how parents can manage children's access to the Internet and digital TV, as well as a guide on parental controls for games consoles and portable media players, and a guide on parental controls for mobile phones.

Hong Kong regulator implements single licensing regime

Hong Kong telecom regulator, the Telecommunications Authority (TA) began the implementation of a single, streamlined licensing regime for the regulation of all service-based public telecommunications services, effective 30 October, 2009.

It previously had two licensing regimes – namely, the Public Non-Exclusive Telecommunications Services ("PNETS") Licence and the Service-based Operators ("SBO") Licence, for regulating service-based public telecommunications services, which provided for under these two licences include, among others, external telecommunications, Internet access and Internet Protocol ("IP") telephony services. In March last year, the TA consulted the industry on its proposal to streamline the regulatory framework by merging the two licensing regimes.

This merger enables the use of one single licence with harmonised conditions and fees for regulating all the relevant public telecommunications services and based upon feedback, this initiative was well received by the industry.

The over 500 existing PNETS and SBO licences will be replaced with the new one over a one-year period since its introduction.

Thailand sets interconnection benchmark at 56 satang

Thailand's National Telecommunications Commission (NTC) sets a benchmark interconnection rate between mobile operators at 56 satang (0.56 baht), following a settlement of a six-month court case between GSM operator DTAC and Hutch, a small CDMA operator in which CAT Telecom is both a concession holder and shareholder.

This new benchmark for the whole industry will let the interconnection mechanism proceed more smoothly.

Interconnection rates are the fees operators pay each other for inter-network calls.

DTAC had earlier wanted 1.07 baht, while Hutch proposed 20 satang (0.2 baht), which let to the dispute being taken to court.

It is now left for the NTC board of commissioners to decide on whether to apply the benchmark retroactively or from the date of the new benchmark.

However, all is not over yet, as it's possible that ToT, which is engaged in a legal dispute with CAT Telecom and its concessionaires, DTAC and True Move, could still oppose the benchmark, leading to it having to be settled in the courts.

The NTC had introduced this in Thailand three years ago but there was no decision maker to enforce it. This was also because CAT, ToT and Hutch refused to enter the regime but if CAT is able to conclude a takeover deal for Hutch, it would enter the regime and end the dispute.

Meanwhile, Hutch customers faced problems connecting to True Move customers as a result of this dispute.

Forum agrees to accelerate ICT development across five countries

Government ministers, senior government officials and business leaders agreed to take concerted action to accelerate ICT development across Cambodia, Lao, Myanmar and Viet Nam at the International Telecommunication Union's (ITU) Subregional Telecommunication Ministerial Forum for Cambodia, Lao P.D.R., Myanmar and Viet Nam, which was hosted by Viet Nam's Ministry of Information and Communication in Nha Trang, Viet Nam last December.

Mr Sami Al Basheer Al Morshid, Director of the ITU Telecommunication Development Bureau, joined with partners to announce development initiatives for the four countries through a joint communiqué issued at the end of the Forum.

New CLMV-specific initiatives announced would particularly include the areas of human capacity development, cybersecurity, green ICTs and connecting villages. The Forum also called for increased cooperation among all stakeholders at the subregional and national levels, with a view to find creative ways and strategies to turn challenges into opportunities for the subregion and individual countries among the four.

A special report, Enabling Frameworks for ICT Development in CLMV: Moving Forward www.itu.int/ITU-D/asp/CMS/Events/2009/CLMV/index.asp was also released at the Forum.

It highlights the significant differences that exist between countries comprising the sub-region, noting that such disparities will need to be taken into account when making an assessment of its progress and suggested measures for possible improvement.

Proposed new partnerships and initiatives to assist the sub region, including collaboration with:

- Nokia Siemens Networks to test low cost solutions to connect rural villages
- The International Multilateral Partnership Against Cyber Threats (IMPACT) to assist CLMV countries in developing national computer incident response teams and strengthening capacity building for selected cybersecurity programmes
- Viet Nam Posts and Telecommunications Group on information exchange for practices relating to rural telecommunication development, and for setting up an information portal for community development
- VIETTEL on Internet-for-schools initiatives.

Europe Region to focus on E-accessibility, digital broadcasting and e-applications

Delegates at the Europe Regional Preparatory Meeting for the ITU World Telecommunication Development Conference 2010 (WTDC-10) in Andorra La Vella last December, reached a consensus on regional strategies to foster the development of information and communication technologies (ICTs), which would form the basis for strategies and priorities at WTDC this year.

Following a review of the 2006 WTDC Doha Action Plan, the meeting set priorities for future development. For the first time, Europe proposed a set of key regional initiatives:

- e-accessibility for people with disabilities;
- the transition from analogue to digital broadcasting; and
- e-applications, including e-health.

ITU Deputy Secretary-General Houlin Zhao noted the ITU's increasing emphasis on action to help combat climate change, such as the development of standards to improve the energy efficiency of ICT technologies, and the coordination of essential radio-frequency spectrum for climate monitoring and disaster prediction and relief.

At the same time, the ITU released a new report profiling the European region: Information Society Statistical Profiles 2009: Europe, which showed that the European market, with around ten per cent of the global population, accounts for over 18% of the world's mobile cellular subscriptions, 21% of fixed telephone lines, 22% of Internet users and 31% cent of both fixed and mobile broadband subscriptions.

PLACES

Penang Heritage Walk

Georgetown is a vibrant city which is best experienced on foot. A walk along any of its many narrow roads usually reveal something interesting. With so much history accumulated over the years, it is actually possible to take a few different heritage trail walkabouts especially if tourists stop and spend time at some of the heritage locations. Nevertheless if one wants to simply experience the sights and sounds from the outside, the following route could be a possibility.

Start at the point where Penang Road meets Leith Street. Walk up Leith Street and you will see the Cheong Fatt Tze Mansion which is a fine example of a Chinese courtyard house. The mansion has been restored and serves as a hotel. There are also highly recommended guided tours that take 2 hours or so.

At Farquhar Street, turn right and the visitor will come up to the Cathedral of the Assumption, one of the earliest religious landmarks in Penang. This is followed by the Penang Museum & Art Gallery. Next up is St George's Church. In the vicinity is also Logan's Monument that was built erected in memory of James Richardson Logan, a lawyer who was renowned for championing the rights of the non-Europeans in Penang back in the time when the East India Company ruled it.

Then turn right into Masjid Kapitan Keling Road. This street, formerly known as Pitt Street, is renowned as the "Street of Religious Harmony" as there are houses of worship of the major Faiths along it. One can see the The Goddess of Mercy (Kuan Yin) Temple first. A bit further up is the Sr Mahamariamman Temple and Little India area. The next attraction is the Kapitan Keling Mosque which was built in the 19th century by Indian Muslim traders.

After that, turn left from Masjid Kapitan Keling Road into Chulia Street to see the Han Jiang Ancestral Temple. Walk on to junction of Beach Street, turn right and you can see the Nagore Shrine on your right and Central Fire Station on your left.

Then turn right into Armenian Street where the the Khoo Kongsi is located. Walk on until you come to Masjid Kapitan Keling Road again and turn left to go back towards the mosque. Turn left into Chulia Street to experience Chinatown and your walk will end at Penang Road.

HEALTH

Many countries are grappling with the issue of caring for ageing populations. This situation is exacerbated with the accompanying trend of older persons living on their own. The UN estimated that 14% of senior citizens were living on their own in 2006.

To address issues that arise from this, three students from Ngee Ann Polytechnic, Singapore have developed a monitoring system that may help ensure that these people receive proper monitoring from their homes.

The system utilises motion sensor technology to track the activities of these elderly folks. Motion sensors placed around the living quarters track the movements of the occupants. The sensors are programmed to alert nearby senior citizens' centres if they do not detect movement at certain times of the day. A sensor placed at the front door also detects when the senior citizen leaves and returns home.

The system can serve as an effective first level monitoring system. In the event of an alert from the sensors, phone calls could be made to check on the senior citizens and when an emergency is suspected, assistance can be despatched rapidly.

With the deployment of this technology, the developers hope to alert care givers of potential problems at early stages of emergencies. In cases such as heart attacks and strokes, quick intervention by medical personnel can be crucial.

FOOD

Penang Food Trail

Penang, of course, is not only famous for its heritage buildings; it is also well known as a food paradise. While there is excellent food to be found all over Penang and many visitors do make it a point to crisscross the island looking for the best hawker fare, it is possible and even fun to sample great food on foot.

One such location lies within along Penang Road and Macalister Road. In the daytime, one can experience famous Indian Muslim Nasi Kandar dishes at the Line Clear food stall along Penang Road. Line Clear is touted by many to serve the most authentic Nasi Kandar in Penang.

After a taste of the fiery curry dishes at Line Clear, the best place to cool oneself down is to have deliciously cold Penang Teochew Cendol at the very popular stall located at Lebuh Keng Kwee off Penang Road. There are actually two stalls selling cendol on this narrow lane but it is very easy to spot the real deal. There's always a huge crowd of people around it waiting for their orders to be filled.

A great place to sample famous Chinese hawker fare is also within walking distance of Komtar. The Sin Yin Nam Café or more popularly known as New Lane may possibly be the place with the most number of stalls in one location. One can find just about any famous Penang dish at this food paradise and the food is mostly delicious. Among the more popular stalls are those which sell Char Kuey Teow, Oh Chien, Char Hor Fun, Popiah, Chee Cheong Fun, Hokkien Mee and much more. Prices are a little higher here but that is more than made up for by the sheer variety available here. New Lane is located off Jalan Macalister.

Another good area to sample Penang food on foot is the Gurney Drive area right beside the sea. This area is very popular with tourists but yet the food has remained surprisingly good. There are outdoor hawker stalls as well as coffee shops along the beach area. One can also find just about any famous Penang hawker food here but the Assam Laksa and Pasembur are especially good.

• Nasi Kandar

• Prawn Mee

• Char Kuew Tiao

PRODUCTIVITY

Yammer

Twitter has rapidly gained popularity over the last few years. Its ability to get information and updates out quickly through short tweets has made it indispensable to Internet users who are always interested to know what their friends are doing.

Twitter would be wonderful for the workplace too if not for its lack of privacy. Twitter feeds are generally viewable by everyone and that does not make it a good candidate for a communication tool for corporations.

Yammer however has been built for just that purpose. The founders have cleverly combined the idea of Twitter with the concept of a closed network. Think of it as a private Twitter service where tweets are locked and only viewable between colleagues. Instead of asking "What are you doing", Yammer describes its service as a tool for making companies and organisations more productive through the exchange of short frequent answers to one simple question: "What are you working on?"

The look and feel is very Twitter like. Adding the # character before a word will tag the message with that word so it can easily be searched for. Placing an @username will direct messages to that particular user. Conversations can also be sorted into threads.

There is also a desktop-based application which displays entries on your computer and alerts you when a new message arrives. Yammer also has apps made for Blackberry or iPhone phones so that colleagues can catch up with each other when they are away from their desks.

Yammer maintains privacy by enforcing a corporate email requirement. Only users with valid corporate email of any particular organisation can join that network. GMail, Yahoo mail or any other free email addresses are not accepted.

The basic Yammer service is free. This includes Microblogging, File Sharing, Groups, Mailing List Integration and Desktop, iPhone, and BlackBerry Apps. Anyone can start a company network. Companies that want to formally manage a network can do so by taking up the paid options that allow more control and offer extra features.

Yammer is a very simple yet very useful communications tool because it offers an easy way to stay in touch and keep conversations going within the company.

Number of Post Offices

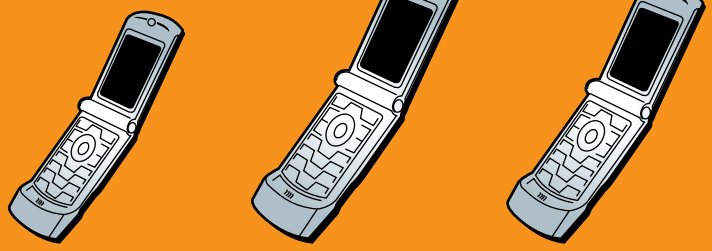
947 (2006) | 997 (2007) | 1040 (2008) | 1049 (2009)

Number of SMS text messages

39.9 Billion (Q3/2007) | 52.7 Billion (Q3/2008) | 65.1 Billion (Q3/2009)

Penetration rates: Cellular Phones by persons

85.1% (Q4/2007) | 98.9% (Q4/2008) | 106.2% (Q4/2009)



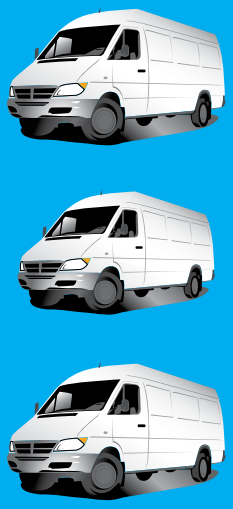
Penetration Rates: Fixed Lines by household

47.8% (Q4/2007)

44.9% (Q4/2008)

44.0% (Q4/2009)

Number of Courier Companies



109 (2007)

114 (2008)

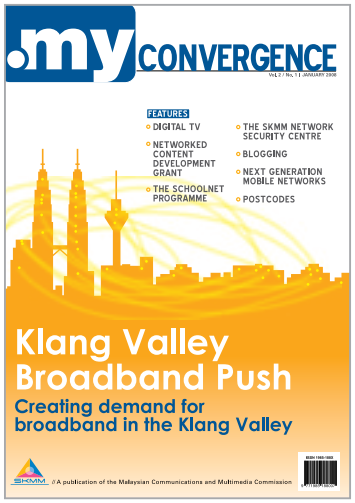
105 (2009)

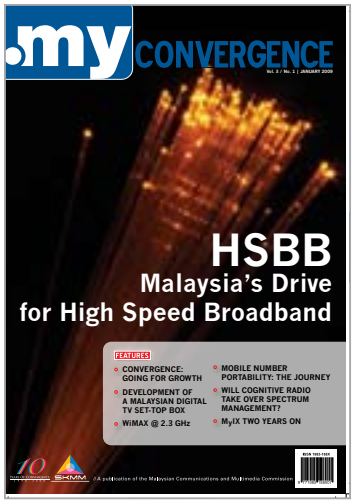
Penetration rates: Broadband by household

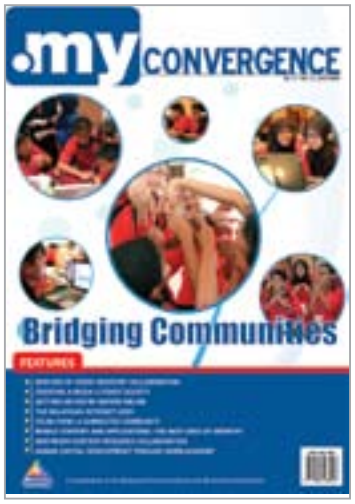
Q4/2007 15.2%

Q4/2008 21.1%

Q4/2009 31.7%







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