The Regulatory Challenges and Opportunities of IP Telephony: Perspective on Malaysia

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Abstract

IP telephony is a transmission of voice and data over Packet Switched IP Networks and it has become a key issue in the telecommunication industry worldwide because of its higher efficiency and cheapest call rate. Hence, most of the countries in the world set up their telecommunication platform on IP based network as a fast revenue generating sources. Though Malaysia is on the way forward on IP based platform but the growth is not reached at satisfactory level due to the absence of effective regulatory frameworks policies. So, growth of IP telephony is declining and foreign joint investors are facing difficulties in Malaysia. Besides, local incumbent operators are gaining market advantages of having huge subscribers locally and providing service in a form of direct calling system. So, this paper tried to explore the issue of "obstacle and Survive" and reasons of declining IP telephony service providers in Malaysia.

Keywords*: IP networks, regulatory framework, incumbent operator, market advantages, IP telephony.*

1. Introduction

The development of Internet Protocol (IP) in mid -1970's has started a whirlwind of change in the telecommunications market in the world. IP development has opened a wide range of services in global communications. This service offers alternative cheapest voice call that evades Public Switched Network (PSTN). It is capable of providing higher efficiency and lower cost for communication to the consumers as well as end-users. VoIP service offers *"Everything over IP"* based platform. Nowadays, dual-mode handset and its services offer VoIP calls over wire or wireless mode. BT (Fusion) in UK, T-Mobile in Germany (At home) and Orange (Unik) in France are the best examples of this type of system. However, VoIP is going to be a mainstay in the corporate world and Japan announces that, currently 60% subscribers are using VoIP service. In 2007, there were 100 million VoIP subscribers in the world but over the time increasing very fast. It assumes that, at the end of 2011, there will be 250 million VoIP subscribers throughout the world. Following the trend of IP development, Malaysia is also sets the VoIP infrastructure where service providers are rapidly expanding their cost effective service. Malaysian Communications and Multimedia Commission (MCMC) along with local incumbent operators are facilitating to the foreign investors to commence IP telephony services. Telecom Malaysia Berhad (TM) is the leading operator in Malaysia where it contributes the higher revenue in this sector. Alongside, Redtone Sdn Bhd and Marchantrade Asia Sdn Bhd also providing IP telephony service in Malaysia. In order to start this service there is pre-requite to have an ASP license from Malaysian Communications and Multimedia Commission (MCMC) and every year has to renew. In every year, ASP licensed company is increasing very fast. At present it has crossed 400 ASP license holders' local as well as foreign companies in Malaysia.

With the forward movement of VoIP, everyone facilitates to the use of IP telephony services because of its reliability and lowest cost. Though IP telephony takes a new place in the global communication even in Malaysia incredibly, there are so many obstacles to establish IP Telephony business in Malaysia for foreign investors.

1.1 Research Objectives

The objective of this research is to focus on the difficulties to run IP telephony business in Malaysia for foreign investors or companies. Due to the regulatory and pricing challenges, foreign investors are facing problems to establish the business in Malaysia. For this, this paper is specially focuses on regulatory issues and tried to find out a way to overcome these problems to continue IP Telephony business in Malaysia. This paper also conducted research upon a number of countries to set its opinion and recommendations.

1.2 Problem Statement

VoIP is getting popular all over the world because of higher efficiency and lowest call rates. Unlike Japan, Australia, USA and others countries, Malaysian service providers are charging more [SPL high rate] to the ASP service holders or companies. Reducing the cost is one of the main issues of IT business, therefore, everybody will find out the cheapest call rate and best sound quality. Japan, USA and Australia offers low price that's why ASP service providers get benefit from them. In the competitive market place outside carriers offers low cost whereas TM offers high rate. According to MCMC regulations ASP license holders are bound to buy minutes volume either TM or any other local incumbent operators. Price could be less if the volume of usage increased but normally ASP service providers cannot increase volume usage at the starting of their business because of not having huge clients. However, in order to reduce the rate, IP telephony companies are highly suggested by TM to increase the volume of minutes. Nevertheless, service providers are not able to increase the volume usage with a high rate because of the global price differences with Malaysian incumbent operators. Another issue is toll free-number which is used for calling card and call back services. Unlike Japan, in Malaysia toll-free is allowed only from fixed phone numbers. But if there is an opportunity to use toll-free through hand phone, public phone, any booth or university booth foreign companies can get at least marginal profit from their service.

So due to the enormous encounters and not having sufficient facilities, IP telephony service providers are declining from the market or switched to other services, or even totally washout from the marketplace. In this regard, this paper tried to find the ways to overcome all these problems.

1.3 Scope of Research

At present, Malaysia is enhancing their capabilities to create unique opportunities to be a part of the global information society. ICT development, innovation, economic incentive and information structure are the main factors for advancement. Moreover, in the expansion of the ICT, competition appears in the global market and countries are shifting from old paradigm like physical and monetary asset to the new information age. So ICT along with telecommunication sector opens up the new horizon of opportunities and attract foreign companies to invest in this country. Malaysia invites foreign investors in ICT sector by providing secure place which will be the rapid revenue generating source towards the development process. If, foreign companies come to set up their IP telephony business, massive employment opportunities will be created and country will be achieving a developed nation status.

1.4 Research Questions

- What are the obstacles to run IP telephony business for foreign companies?
- To what extend Telekom Malaysia Berhad can take initiative to solve the problem as TM plays an important role regarding IP telephony business?
- Should new rules for ASP license holders adopt by MCMC to give more facilities to the foreign as well as local companies?
- The topic raise the important questions "obstacle and survive" and what are the necessary steps need to measure MCMC to make it easier?

1.5 Significance of the Research

The tremendous use of Internet Protocol (IP) networks for communication service, especially, in telephony become essential part for the telecommunications industry worldwide. The major key issue appears into spotlight for ICT policy maker and regulatory authority that, IP based network communications reduced the cost thus it becomes the technology of choice.

So the growths of IP telephony networks around the world are becoming popular and bring broaden implication in the telecommunication industry. Consequently, the major international Public Telecommunications Operator (PTOs) has taken initiatives to migrate all their international traffic onto IP platforms and made a substantial investment in this sector. It is evident that, IP based network will reduce quarter of cost than circuit switched networks. So the issue of cost reducing and less infrastructure cost are the predominant part in IP telephony sector. Malaysian government has taken initiative on the way forward to the IP based platform as it is highly increasing and lower cost of IP networks for communications.

Though Internet protocol (IP) telephony is rapidly reaching at the top of the agenda in the telecommunication industry worldwide, there are relentless problems are facing ASP license holder companies, such as; pricing, volume usage, toll free from mobile, direct competition with local incumbent operator and others. So, in Malaysia, this research will help to create the awareness of the Malaysian Communications and Multimedia Commission to take initiatives for the ASP licensed companies so that, they are able to run their business effectively and initiate to protect them from declining or scrub down from the telecommunication market and contribute to continuous economic development in Malaysia. This research will help to think to the government about VOIP service providers in Malaysia which will brings potential benefit

for the country. This Research would be the supporting tool for adapting new laws in favor of foreign IP telephony companies which will increase the usage of IP based networks in the long run and will help ASP license holders companies enhancing their business industry in IP telephony networks. It will also help foreign people/investors to increase overall performance. Finally this research would change the attitude towards IP telephony companies which will have a positive effect towards its adaptability and manage VoIP companies effectively.

2. Background Study and Fundamental Changes of IP Telephony

Internet Telephony or Voice over Internet Protocol landscape is rapidly changing in the telecommunication industry. It is a fundamental archetypal shift from traditional PSTN (Public Switched Telephone Network) Circuit –Switched Voice Networks to Packet Switched Data Network where Internet protocol is predominant. After the invention of IP telephony, its popularity in the world of voice communication is fast and reliable. It meets the higher performance with lower voice networking cost. As revenue generating business source IP telephony can meet the service providers as well as user's expectation. So IP telephony is able to prove its capabilities of delivering service to the end users and increase business opportunities in the world telephony market because of its lower voice, equipment and administrative cost. So over the time IP telephony is becoming the driving force of IP based communications. According to the Malaysian IP Telephony Industry Report 2007,

"*Operators of IP telephony are 'widening' over time – from the circle of pure VOIP players who do not own a network and offers a voice call service to the larger arena of incumbent operator offering broadband access over which IP telephony can be offered free or at lower charges in combined packages''* [1].

However, IP telephony is putting forward of innumerous possibilities of the fixed line operators towards the new revenue tributary of telecommunication industry. As fixed line revenue landscape is declining and IP telephony networks are generating more revenue that's why alliance with service providers and content providers are increasing. Consequently, it becomes the stronghold of the commercial as well as business world through IP telephony business enterprise. Thus, IP telephony appears as a continual and prospective threat for the fixed line operators. So, in order to exist in the world market, migration towards next generation network followed by IP based network technology is absolutely desirable.

To meet the expectation of customer demand and reliability, network infrastructure must provide high performance with low cost. IP telephony is providing high quality of voice transfer using low bandwidth. Therefore it gives high priority of usage affirmation. As a result end-users reliability is increasing to meet expectations of clients.

In addition, regulatory issues of IP telephony create problems for the service provider in certain countries in the world where some are facing the banning to provide services. Though there is no banning or license restrictions in Malaysia on providing services but few regulatory issues need to acclimatize favoring to Application Service Providers, so that they can continue their services without any difficulties. In effect of regulatory issues along with TM high pricing matter for call termination and provide same service in identical destination especially in South Asian Countries in a form of direct calling with promotional offers, ASP holders faces threat and plunge in a disastrous situation to continue their IP telephony services in Malaysia.

Even the new market of IP telephony is not expanding due to the extreme competitive attitude of incumbent operators. Usually competitive phenomenon helps to enhance the market growth but, if competition appears through local incumbent operators then ASP holders will face more difficulties.

Moreover, few issues are highly notified in terms of VoIP enterprises, such as, problems in network and security factors especially for callback and callshop solutions. A report stated that, about 27% of Asia enterprises are worrying about the security issue because of using public networks where packets pass through by any router and anyone can access easily [2]. So, in terms of call back and call shop solutions it is the main concern to provide services. Service providers may face severe hacking problem and loss huge amount of purchased call volume due to the security issue.

The report again focuses on the converged IP network that, though 55% of Asian enterprises have embraced this network, it is critical for the networking environment. It assumes that, converged voice, data along with video will be the attractive features of future telecommunications industry.

In order to build a good business environment, call availability in VOIP services is mandatory. Besides, consumer protections, security along with universal service provision are also important for building the VoIP infrastructure. Giving the broad idea of IP telephony or

Voice over Internet Protocol this chapter addressed the overview of IP telephony, IP Telephony architecture, fundamental change in the communication, the growth of IP telephony and its development over the time, IP telephony growth in Malaysia, revenue trends, business value, issue and challenges, market drivers in IP telephony, fundamental process and finally business and economic importance of IP telephony.

2.1 IP Telephony Overview

The term "IP Telephony" can be defined in different way as there is no exact definition of it. It is a service for international call or international bypass or it is a network for the '*next generation signaling and multimedia connectivity'* [3]. IP telephony includes a set of technologies that allows data to transmit and collaborate with IP based network such as LANs (Local Area Network), WANs (Wide Area Network and Metro Area Network) where broadband connection is prerequisite. This term also been used interchangeably with VoIP (Voice over Internet Protocol) which offers cost effective technique of communication. According to William A.Yarberry,Jr**.;** 'IP telephony is a (i) set of standards for packet transmission;(ii) ability to commingle various media such as voice, data, and video, on LANs, WANs and the internet; and (iii) the flexibility with regard to physical media-IP telephony works over twisted pair, fiber, xDSL, ISDN, leased lines, coaxial cable and others [4]. Moreover, IP telephony uses IETF platform (The Internet Engineering Task Force) whose main concern is to provide smooth operation work of the internet in order to make internet exertion better by ensuring the high quality of service, and ITU (The International Telecommunication Union) whose main intention is to improve the telecommunication infrastructure and establish high standard of service. Hence, in 2001 ITU make a distinction of IP telephony and VoIP. IP telephony is a *"voice over IP based networks irrespective of ownership' and VoIP is a –'Voice service over networks competing with incumbent operator''* [5].

Although ITU distinguishes between the two, IP telephony is also known as VoIP, mostly use for communication because of its cost saving, flexibility and lower management cost. Vendors or service providers are interested in VoIP business because of its less financial investment and cost effective services. It also provides the 'wider and diverse range of multimedia services and innovative applications and particularly to be able to compete effectively in future E-Commerce markets' [6]. ITU defined IP telephony in such a way that;

''The Internet and IP based networks are increasingly being used as alternatives to the public switched telephone network. Internet Telephony service providers (ITSPs) can provide voice and fax services which are close to becoming functionally equivalent to those provided by public telecommunication operators (PTOs). However, few ITSPs are licensed by national authorities and they generally do not have any universal service obligations. Many countries ban IP telephony completely, yet IP calls can be made to almost any telephone in the world. Many PTOs are establishing their own IP telephony services, and/or using IP-based networks as alternative transmission platforms. In the longer term, as more and more voice traffic becomes IP data traffic, there will be little to distinguish between IP telephony and circuit – switched telephony. However, many telecommunications regulatory schemes depend upon such a distinction, both physically and as a matter of policy and law. As these trends continue, the telecommunication framework will come under increasing pressure to adapt'' [7]

There is an assumption that, the whole world will be turning to the IP telephony platform due to its innovativeness, dynamism and the great source of revenue generating phenomenon.

The anticipation of ITU is absolutely true about IP telephony. Japan reported that, about 60% subscriber using VoIP for personal communication as well as corporate use and its best example is Skype. Presently, VoIP is enormously using in Small and Medium Size Enterprises (SMEs) to enhance them. However, IP telephony is using extensively in IP-PBX, unified communication, contract centers and carrier services. Packet Switched Connection from the internet to exchange voice, fax and data transfer as an alternative of PSTN is called dedicated circuit switched connections.

IP telephony or VoIP also called peer to peer VoIP which '*gets the strengths from each individual node, adding bandwidth and processing power with each new member for the good of the many'* [8]. Garrie & Rebecca Wong (2009) defined VoIP, as a "conveyance of voice, fax and unrelated services publicly or wholly over packet switched IP-based networks including peer to peer VOIP and VOIP service connected to PSTN"[9]. It also refers to the telephony application 'that are enabled in a homogeneous IP environment as well as the integration of these applications with mainstream business process' [10]. Sangoma Technologies Corporation a Canada based company is providing voice and data connectivity components for software based communication applicant.

Though variety of new technology in telecommunications begins with a wide range of commercial services in a form

of IP telephony or VoIP, regulatory issues has been grappled up with a broad implications in VoIP market.

2.2 IP Telephony Architecture

Looking at the IP telephony architecture, there are few important features are significant as William A. Yarberry, Jr. Stated;

1. Bandwidth is used more efficiently
2. Components are more evenly distributed
3. Growth is incremental
4. Port limitations are reduced
5. The architecture are less proprietary
6. Fewer single points of failure
7. Potential for lower cost
8. Single wiring

In IP, telephony packet based voice transmission can be used efficiently and at the same time number of conversation can pass through dedicatedly. Even bandwidth requirements are possibly can be reduced while the voice and data pass through. IP telephony architecture is linked with the local area network where servers are distributed in different segments. Besides, the growth of IP telephony is incremental.

In traditional PBX system users need to add additional hardware whereas in IP telephony, extension of the switch is needed and it is connected with Ethernet followed by RJ45 connectors. If it is connected to any types of devices of IP telephony port limitation issues can be reduced.

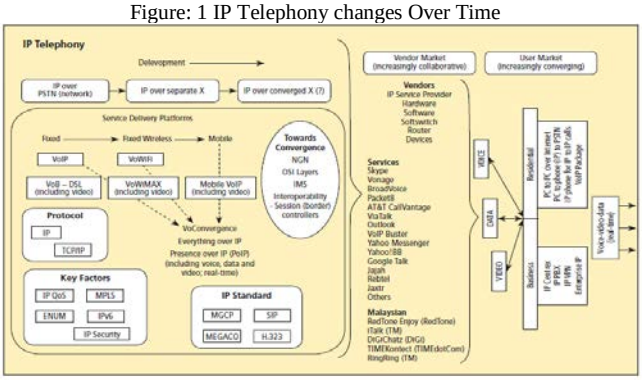
But IP telephony with TDM architecture port limitation can solve by upgrading the system. In Traditional PBX architecture is proprietary based which is complex but the IP telephony architecture less proprietary and vendors are being pressured to its standard services. TDM based PBX, backup system is very expensive and it always involves in advance cross wiring but in IP telephony architecture servers and switches can be allocated within the organization and it is practical to use in this system. So there is no problem for backup system and its maintenance cost is low.

The infrastructure and operation cost of IP telephony is not much expensive as PBX system or traditional system has. According to William A. Yarberry, Jr (2000), *"IP telephone can run Linux as an operating system and use off –the –shelf Hewlett –Packet or Dell boxes, the price wars begin.. 'Frank and Bill' can build a un-PBX in a garage and sell the "Frank and Bill Telephone system'' over the internet next day'* [11]. Besides, in IP telephony system data and voice can possibly send through in a single wiring infrastructure though sometimes can create problems if network failed.

2.3 Changes of IP Telephony

The rapid transition of all networks in the 21st century is digital or packet based architecture from analog or traditional network based communications. However, change has been started since 2000 where VoIP expanding dramatically and which can be integrated in all websites including email or social networking, call recording, conferencing as well as data transfer. So, VoIP established itself as a mainstream to the telecommunication industry. Skype is the best example of its type and over the time it becomes the market leader. So *'VoIP has been the harbinger of convergence between voice and data/IP networks, facilitating a growing range of unified communication and collaboration services'*. This is because of its cheapest call rate and reliability of the service. Moreover, change to IP telephony is deep-rooted because of few reasons such as; toll bypass, data voice resources, convergence everything over IP, presence over IP including voice, data and video; real time, centralized management system and remote site management. Hence, IP telephony opens broad market for vendors to provide services along with hardware, software, soft switch and router devices for business purpose. It also facilitates Skype, Vonage, ViaTalk, Yahoo Messenger, Google Talk, Jaxtr, VoIP buster to provide services. It observes that, Skype dominates the independent cheap calls VoIP markets. People are always looking for free calls if any service provider offers. Thus Skype does. That's why it is becoming the most popular in telecommunication sector in the world. On the other, Vonage policy is quite different to Skype though they have 1.6 million customers worldwide. They are not willing to give the free calls to the consumers. So the momentum of IP telephony is fast growing. Besides, Google is also planning to enter into the Mobile VoIP market.

Figure: 1 IP Telephony changes Over Time



[Source: Company websites Informa Telecom &Media, Juniper Research, IEC, Telecom Asia, News report as cited in Industry Report Volume 3, *IP telephony*]

[Figure: 1], clearly shows the changes of IP telephony and its solution for service providers.

2.4 Growth of IP Telephony over the Time

It is obvious that, new technology always takes over the old technology. So internet telephony takes over the place of circuit switched network or traditional PSTN network because of technology of choice in ages. Internet telephony offers cheapest long distance calling card and international telephone calls with much wider and diverse range of communication service for the consumer. Consequently, over the time IP telephony gained the interest of the IT and telecommunication industry, policy makers and regulatory board- as an alternative choice of IP infrastructure deployment. The International Telecommunication Union (ITU) found that, the liberalization of the market contributed a broad range of migration from traditional to IP-based network. Besides, international Public Telecommunication Operators (PTOs) have migrated all their international traffic to the IP based network and started to huge invest. Moreover, the growth of IP telephony networks is creating wider implication for the telecommunication industry along with national and international agencies and it's being viewed as a fundamental competitor among the countries in the telephony market worldwide now. It is considered as the spur of dynamic economic growth.

During the period of mid-to-late 1990's IP based network accelerated in the telecommunication industry and internet was offered over public internet like Free World Dial-up. During the year of 2000 and 2002 "VoIP was a discounted telephony over IP based networks" [12]. The best examples of its type are Net2Phone and IBasis. Over time VoIP gained popularity and become most competitive place in the telecommunication industry all over the world. Besides, Voice over broadband also enhances their service to provide free or sometimes flat rate along with the reducing calls rate to PSTN mobile users. Skype and Vonage are the best examples. Now IP telephony shows the strong market growth due to its fast growing phenomenon. Even in the enterprise voice market it grows rapidly and it includes converged IP/TDM PBX phone system along with IP phones. [13].

This paper also presents the data that, in 2009, there are 70% of the total telephony market has been represented by IP telephony. Besides, if we have a look on the vendor in the Western Europe, there is a tremendous competition observed. Jeremy Duke, a principal analyst and founder of Synergy Research Group says, *"In looking at the vendors in Western Europe, we see an extraordinary tight race for the first position. It could be argued that 3 vendors tied for the second position''* [14]. Following this [table: 1] shows the clear picture to get clear idea about it.

Table:1 IP telephony line shipment market share

Vendors	Market Share
Alcatel –Lucent (France)	17.67%
Avaya (UK)	16.94%
Aastra (UK)	16.93%
Siemens (Germany)	16.54%
Cisco (UK)	15.41%
Nortel	5.96%
Mitel (UK)	5.82%

Besides, Cisco, Clarent, Nuera, Sonus, Unispere, Convergent Networks are also getting popularity for the IP Public Switched Telecommunications Networks gateway vendor. Alongside as a carrier ITXC, Genuity, Net Voice, Net2Phone, IBasis are getting place in a competitive market arena. Though there are innumerous networks operator are providing their service worldwide, Concert, PointOne, China Telecom are into the edge of the market. As a carrier Net2Phone has an excellent marketing power to control the VoIP market place and therefore they formed a strategic alliance with Yahoo, AOL and MSN.

For the growth of VoIP there are so many predictions that have been projected by the researcher. For example, "By 2008, wholesale VoIP traffic in Europe, Middle East and Asia reached 57 Billion minute [15].

On the other hand, IDATE one of the Europe's leading market analysis and consulting firm estimate of the VoIP subscribers, total and as a proportion of mainlines worldwide during the period of (2005-2011) would be 300 Million. IDC also views; IP telephony, the next generation technology and over the time it changes the telecommunication landscape where the growth is exponential. They predict; only in USA, residential subscriber of VoIP will grow from 10.3 million to 44 million within the year of 2006 to 2010.

Graph: 1 Estimates of VoIP Subscriber

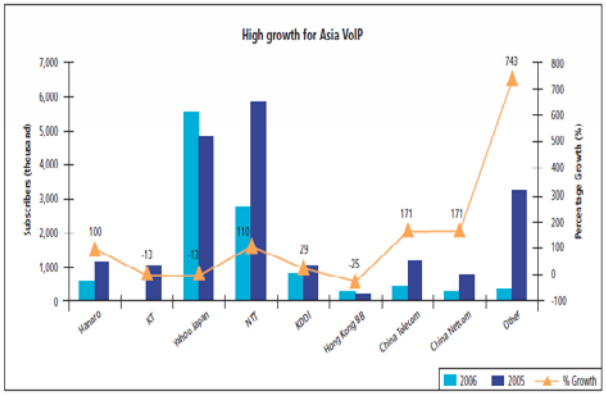
Estimates of VoIP subscribers, total and as a proportion of mainlines worldwide, 2005–2011

Source: IDATE as cited in ITU

Tom Evslin, the chief Executive Officer of ITXC remarks that; *"By 2010, all voice traffic will be over IP networks''* [16]. In china IP Telephony Lunched in 1999 then within short time China Unicom become the world largest VoIP network platform and the daily usage over 2.5 million. Ten million calling cards is sold and revenue comes Two Hundred Thousand US Dollar a day.

In the Asia Pacific Region Avaya Inc., is a leading global provider of communications networks and their strategy is to provide service based on innovation and IP telephony applications applied in banking sector, finance, insurance, retail, manufacturing, and travel and hospitality industries. Hence, it contributes a lot for economic growth in this region. Thus, Avaya is becoming the leader of IP telephony market in Asia Pacific Region. Recently a report published by the Asia Pacific Technology Market CY 2007 that; Avaya is in the leading position in IP telephony Market share in this area; for example, in China 30.7%, Singapore 33.8%, Hong Kong 33.7%, Philippine 57.9%, Indonesia 30.9%, Taiwan 28.8%, Thailand 29.8%, Vietnam 31.5% and Malaysia 27.7% [17]. Their main service is to focus on the customer need and demand. Avaya apparition is to make a new world of opportunities for the business and enhances customer satisfaction as well. Following this [graph: 1] shows the high growth of VoIP market in Asia and NTT is in the leading position for VoIP traffic.

Graph: 2 High Growth of VoIP



[Source: In-Stat, May 2005 as cited in Industry Report 2007, Volume 3]

The vision of NTT is to create a 'new value in communication and partner with customers to *"bridge their present and future potential''*. NTT clearing house provided around 220 countries all over the world with local access along with speedy IP telephony services. It also provides 'the single point of contact to its customers with global coverage, low cost and high quality service and makes entrance barriers to this market lower'. NTT is delivering high quality of voice, data and IP services to the service providers all over the world and building a new business model through the power of communication. Providing dedicated and quality of service NTT became the world ranked 31st in the Fortune Global, 500 list in 2010. Nevertheless KDDI, Hong Kong BB, China Telecom, Yahoo BB, KT and others also helps to expand the VoIP market in Asia.

2.5 IP Telephony Growth in Malaysia

VoIP first introduced in 1995, when internet appears into the world of communications and started to use at home basically PC-to-PC connection that are connected to the same telephony software users and connected with each other. It is free of cost that's why voice quality was very low and feedback is not satisfactory. Then in 1997, PC-to-Phone system has been incorporated with a bit improved sound quality but this method was inconvenient because of its one way of communication. After that, in 1997, VoIP or IP telephony is being introduced as a form of voice and data communication and through the government agency. Various types of service provider came into the Malaysian IP telephony market including local as well as foreign companies. VoIP market came into the highlight when Cisco System and Nortel started to produce hardware for VoIP equipment. As a result VoIP become more attractive and profitable business sector in the world. Then it implements as a main source of data communication of VoIP platform on their domestic as well as international IP networks for communication. Gradually, VoIP starts to use as a business source. In 2000, VoIP usage increased rapidly in Malaysia. Then, in 2000, there are 53 IP telephony license had been given in Malaysia but now around 400 companies are holding IP telephony license.

There are several types of services are offered in a VoIP, such as; prepaid, posts paid and call back where the target groups are foreign workers, students, professionals and immigrants.

These cards are available in different retail shops all over Malaysia. Another type is post-paid account is mainly using as a corporate account .Call shop is another type of VoIP service and the target groups are foreign workers, immigrants, teachers staff and others. This type of service

also provides the long distance calling card that can be used-using local telephone number. Malaysia is strategically a good place for VoIP market, so the growth of VoIP is significantly uprising and over the time it is becoming the mainstream of economic development and incorporating the new type of communication method.

Previously, in Malaysia fixed phone telephone companies were allowed to offer VoIP service to the consumer. However, with the advancement of technology, VoIP market policy has been reviewed and extend supports to all types of service providers those are interested. There are two ways that VoIP service can be provided;

1. PC-to-PC based, that is known as an Internet Telephony and
2. Phone-to-Phone based, that is using Public Switched Telephone Network (PSTN) where multi stage access dialing are allowed. This type of service is called Voice over Internet Protocol (VoIP) or Internet Telephony (IP).

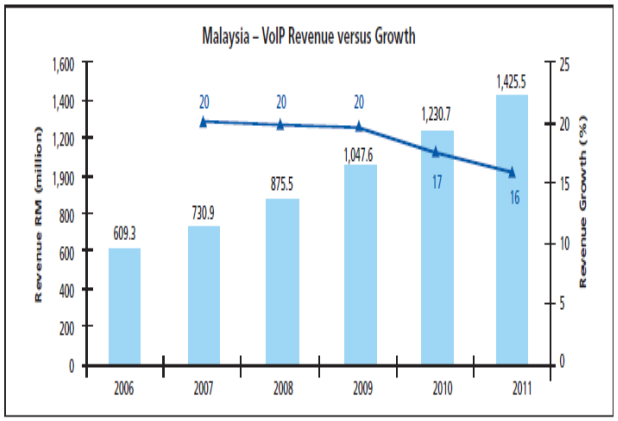
As PC-to-PC phone does not require any PSTN as a prerequisite, so regulatory commission is not imposing licensing restrictions. But, in VoIP services, regulatory authority imposed licensing order because it's originated and terminated through the PSTN in VoIP mode. So effective from 1st April, 2002, companies those are providing VoIP service is required to an Application Service Provider (ASP) license for domestic as well as international service. Service providers are not allowed to buy minutes from overseas carrier without having NSP license or Individual license [18].

The Internet Protocol Telephony (IPT) market looks very impressive in Malaysia. IDC reported that, in 2005, local VOIP market was worth RM 645.9 million and the industry is expected to the annual growth rate is 18% for the year of 2005-2010. However, in 2005, the annual growth was reduced 19.4% whereas previous year it was 67.2%. The report says also noticed, in 2005 IP telephony service was not profitable and declining due to repatriation of foreign workers from Malaysia. Another reason is increasing competition among the incumbent service providers and decreasing call tariff rates both in domestic and international destinations. Senior Analyst of Enterprise Networking and IP Communication Researcher of IDC Malaysia, Lincoln Lee says;

"The IP telephony services market is evolving away from a discounted call services model to that of a pure IP telephony service. Service providers who do not adapt their business models to meet market demands will face further erosion of revenue and profits. Technology disrupters such as WIMAX, WIFI, unified Convergence and Mobility are acting as a catalyst of change in the IP telephony market. Growing market demands for such services and technology adoption are forcing service providers to evaluate such technology an alternative means to provide IP telephony services".[19]

IDC made another research on the IP telephony Top Service Providers market share by revenue in financial year 2005. There were five major service provider doing their service and the contribution were as follows, Redtone 22%, Telekom Malaysia 12%, Nextel 12%, Nation Com 12%, Extive 4% and other service provider was 40%. Over the time contribution from Application Service Providers are declining. This is possibly due to strong competition among the service providers and regulatory issues. Following this [graph: 3] shows VoIP revenue versus growth from 2006 to 2011.

Graph:3 Malaysia- VoIP revenue vs growth



[Source: IDC as cited in Market and Financial Review Q3, Communications and Multimedia Malaysia]

This graph shows, Malaysian VoIP revenue vs revenue growth comparatively. Revenue growth is gradually declining compare to previous year.

However, PCCW Global and Telekom Malaysia extended their VoIP platform for service providers and enterprise markets. PCCW is a Hong Kong based communication solutions for global businesses and service provider's solutions robust and dedicated TDM/IP and high quality of voice termination. PCCW also serves service providers all over the world by providing domestic and international switches. Service provider's solutions including IP and MPLS transport, satellite based video transmission, cellular backhaul, international voice termination, toll-free service and mobile messaging, high definition video conferencing, VoIP switch partitioning along with equipment services. Malaysia is getting advantages of having the regional office in Kuala Lumpur and VoIP service expanding very fast. Telekom Malaysia Berhad is the largest incumbent operators in Malaysia also providing

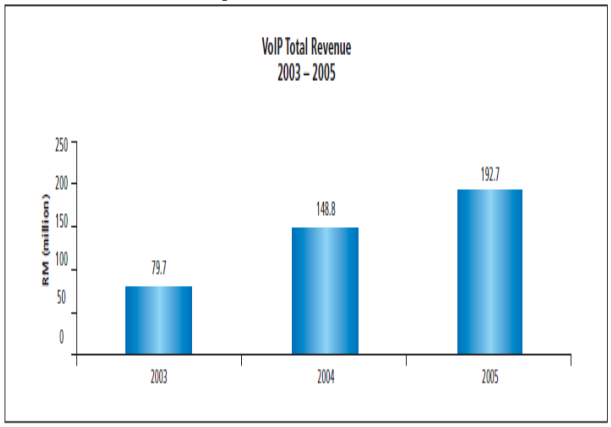
cost effective calling card services all over the world. There are different types of card are providing to the customer such as; iTalk, italk Whoa, italk Mobile Dialer, TM calling card, iTalk international Airtime Transfer and others. iTalk have over two million subscribers worldwide. Telekom Malaysia also focused on value added service to existing and growing clients like iTalk Buddy which is highly demanding as TM claimed. ITalk Buddy users are able to send messages, make PC-to-PC calls, share files and folders, able to share blogs, upload and share photos as well. Thus an online community grows and connected with each other.

As a market leader, TM is also providing wholesale service such as; transportation, origination and termination of calls anywhere in the world. Thus, TM is working as an ideal partner for domestic network operators.

2.6 Revenue Trends

SKMM report stated that, Malaysian IP telephony services is a combination of incumbent and small players in the market and provided under Class License which has to obtain from SKMM. Licensing is required for providers under the Communication and Multimedia ACT 1998 for the provision of VoIP service. In 2003, only seven operators offered VoIP service in Malaysia and total revenue was 79.7 million whereTelekom Malaysia Berhad was the highest contributor from the incumbent player and it was 81.3%. Next year revenue grew in 86.8% and total revenue was 148.8 million. However, in 2005 revenue increases to 192.7 million, though only ten service providers offered IP telephony services. Following this [graph: 4] shows more clearly about the revenue growth in Malaysia;

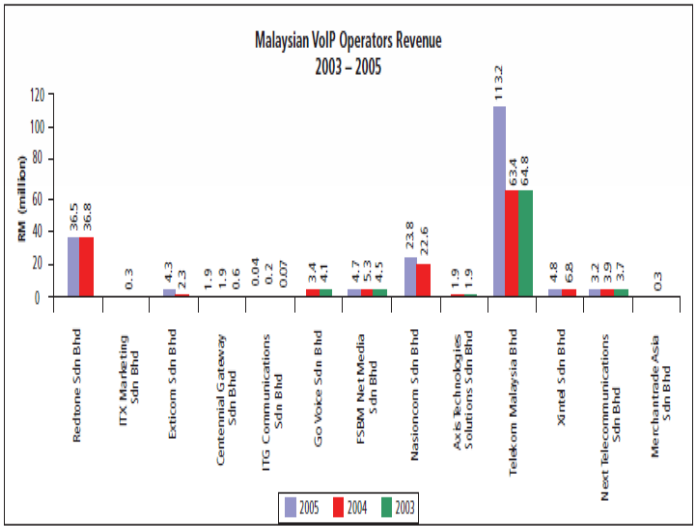
Graph: 4 VoIP Total Revenue



[Source: SKMM as cited in Industry report 2007]

Another study shows Malaysian VoIP operators Revenue from the period of (2003-2005) where TM is on the leading edge. In 2003, TM revenue was 64.8(million) followed by the year in 2004 63.4 (million) and in 2005 it was 113.2 million. But over the time, TM revenue on VoIP is declining due to the strong competition appears in the voice market. Besides, Redtone Sdn Bhd is in the second position and its revenue in 2004, 2005 were 36.8 and 36.5. [Graph: 5], shows it clearly.

Graph: 5 Malaysia VoIP Operators Revenue

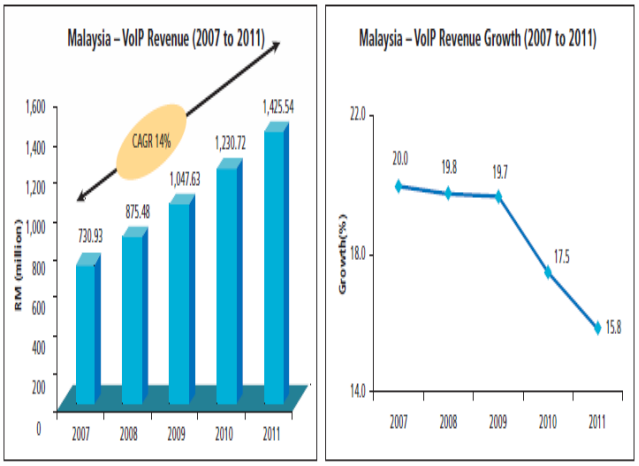


[Source: Industry SKMM, Note: 2003 -2005 revenue is based on the operators that have reported revenue as cited in Industry Report 2007 volume 3]

others service providers, such as; Nasioncom Sdn Bhd, FSBM Net Media, Next Telecommunications Sdn Bhd, Exticom Sdn Bhd, Marchantrade Asia Sdn Bhd are also contributing revenue growth. All data shows in the graph that, VoIP revenue trend is declining.TM Market share is 81.3% in 2003, 2004 it was 42.6% and in 2005 58.7% also gradually declining too. However, statistics shows that, on the following year 2006 and onwards it is promising but the revenue growth between 2004 and 2006 is only 4%. In spite of the forecasted revenue growth it is declining. There might be a reason of SKMM legislation issues or involvement of the network service operators in the local market. Previously, local incumbent operators were not interested or not aware of this type of service. Once local incumbent operators came into VoIP market the competition heats up as a trend of the voice market but foreign companies are declining edge because of not having popularity and large market coverage. DIGI is the third largest Malaysian operator has launched at a preferential rate and good voice quality on the international termination and VoIP service as a means of direct calling method. Below the graph clearly stated the forecasted VoIP revenue from 2007 to 2011 as IDC did so and in 2011 the VoIP revenue will be increasing 1,425.54 million RM as the previous year was 1230.70 million RM. Despite the forecasted growth, the revenue growth is declining year by year. In 2007 the growth rate was 20.0

and in 2008 it was 19.8. So the downturn affected to the VoIP revenue growth in 2010.

Graph: 6 Malaysia VoIP Revenue



[Source: IDC as cited in Industry report 2007]

2.7 Business Value of VoIP

If we simply think about the VoIP business value and its advantages, first thing will be appearing to us that it is the demand and the perfect time to enter into the market.

IP telephony is a fast growing and dynamic technology and it helps to access to the information age which eliminate the boundary of the communication. VoIP deployment facilitates to build the revenue growth in 21st century information age as it is new service for call transit through the VoIP gateway along with unified messaging service, virtual private network and others. It also facilitates to develop the distance learning, e-government, telemedicine as well as economic growth of the country where IP integrated network works as a catalyst for development. The most eye-catching issue of VoIP is huge cost savings for long distance calling card, new features and converged network [20]. However, the cost saving can be quantify but the productivity improvement will be very tough to enumerate. Getting a benefit from the VoIP implementation it is absolutely needed to invest in a long term period because it will *"provide returns in capital and productivity savings, and help avoid additional security risk"* [21]. Nevertheless, for productivity improvement end users and service provider needs to implement news features of VoIP, which will enable to get update and advance service like integration of Voice Mail, Email, and fax etc. that can be accessible in any places and any time. It also helps to improve the customer relationship and management system and quick virtual solution if needed.

Capital and expense saving are also important on the VoIP platform where in case of long distance calling card can vary on the distance an time period in which time end-users are calling.

The writers also mention about the productivity savings on the VoIP implementation. Thus he focuses three main issues (i) management and support savings, (ii) enhance and support mobility, (iii) and reduced site preparation time. Besides security is another challenging issue for the VoIP business implementation where security should the main concentration to prevent the server hack or damage along with service quality, user's acceptance and reliability, user and staff training on the administrative level is significant. Moreover, as the technology is always dynamic there should be the adaptation of new technology with a competent use as the VoIP market is always challenging and critical.

IP networks can be designed in order to provide the quality of service. It is consider the core of voice telephony. There are so many issues are related with the service quality including reliability and security. As Konrad L. Trope (2006) stated,

"Managed 'IP' networks support the capability to prioritize the voice and ensure prompt and consistent communications regardless of how congested the network. In that environment the user does not distinguish a difference in quality between a managed VOIP call and a traditional POTS call''. [22]

VoIP enhances and facilities the interconnection and eliminates the boundaries between wireless and wireline devices .even VoIP secured the geographic interdependence as Konrad stated. In other words it can be said that IP eliminates the physical boundary as well as geographic arena. So, deployment of the VoIP there is no need to set up the own dedicated telephony systems. There is only needed to access the IP WAN (Emerson). Besides, IP telephony help IT department to manage voice and data together. As it can handle from anywhere in the world or in a sense virtually it can be settled if problems occurred. IT manager can sit anywhere if WAN is available and take necessary steps for changes or solutions. However, there is innumerable business value of IP telephony or VoIP deployment there are few more advantages can get from the IP telephony services such as free inter office calls, voice mail, auto attendant, home working, flexible console, disaster recovery, database integration etc.

In IP telephony services calling card providers are fast growing. Even most of the fastest growing IP telephony carrier also provides pre-paid telephone card services. As it is fast growing there is a possibility to gain the market share rapidly and the new entrants of IP telephony services. This service is based on Packet based network

helps which cost effective and scalable services, so, it brings the high revenue growth. Another important issue on IP telephony is that, ISP's service onto the calling card. Davidson & Peter (2000) says;

"Lower-cost IP infrastructures enable ISP's to pass savings on to customers in the form of lower tariffs. In international markets, where long- distance rates are high, ISP's can offer competitive services while still maintain high profits."[23]

So ISP offers cost effective services to the IP telephony platforms. In this case, end user those are subscribing into the ISP's can use Voice over Internet protocol service. On the other hand, operators may upgrade existing network based on IP networks. BT's 21st century network is the best example on this type of network.

VoIP over the internet also brings the new business opportunities which is fully internet based and users can download free voice telephony software then installed into their PC's to make free calls worldwide. Skype is the best example of this type of free software. However, PC to phone calls also possible but it chargeable [24].

2.9 Issues and Challenges

However, there are few issues and challenges of IP telephony service identified by the ITU for the developing countries are below;
– Its impact on their revenue streams, resulting from lower-priced "IP telephony" tariffs compared with their PSTN tariff schemes
– How not to place any additional requirements on PSTN networks when interconnected to IP-based networks
– How to meet the performance metrics and traffic identifications when IP-based networks interwork with PSTN
– How to generate the necessary funds to invest in IP-based networks
– How to deal with numbering and addressing issues.

2.8 Economic Aspects of IP Telephony

IP telephony implementations or adoptions have a significant prospect for the economic and social development which would lead to the country for sustainable nation. World Telecommunications Policy Forum found finds four major economic as well as social aspect of IP telephony. These are as follows;

1. By using IP – based network for electronic commerce, firms can widen their potential customer base and reduce transaction costs while national economic can benefit from new trade opportunities;
2. By using IP-based networks to retrieve information, health care professional can keep up to date with developments in specialist area and can pass on their knowledge to others;
3. By using IP –based networks as research media, schools and universities can greatly expand the range of information services available to their students and ensure that teachers remain abreast of the latest developments in their fields;
4. By using IP- based network as communication tools, governments can make their services more accessible to their citizens and can establish website to promote events provide information.

2.10 Market Drivers for VoIP

There are so many reasons to drive the IP telephony service instead of TDM service. The most important issue is cost effective and possibility of high revenue growth passes up the international regulatory fees. An integrated service offers IP telephony system. Besides, there is a possibility to outsource (VPN) which is allowed remote access service and addressed simple gatekeeper issues along with integrated voice and data services as well. In Malaysia there are various factors lead to the age of IP telephony services such as; deregulation and no barrier entry and liberalization of the market. Besides, dynamic and low cost voice service enhances to enter as an alternative voice service both consumers and the corporate market. However, as a new business model, individual and wholesale IP telephony creates new opportunity to enter into IP markets. Besides, IP telephony services offers value added services which will drive the development of IP telephony services and "*increasing numbers of service providers will be bundling together a range of IP services including VoIP with IP-VPN and other services, packaged as a total IP communications service offering*"[25]. Moreover, service providers are adopting this service because it is high revenue generating source along with value added telephony services for the SME and residential broadband service market.

3. Literature Review

This chapter reviews the literature on issues and challenges of the foreign companies those are investing in Malaysia in the fast growing service sector of IP telephony. From the trends of empirical and theoretical observation, this chapter elucidates MCMC legislation and service provider's access to the market which brings difficulties to implement and run the IP telephony service

in Malaysia. It examines also the role of TM and restriction issues along with pricing challenges. In the competitive and fast growing telecommunication market, Internet Protocol or VoIP is being enormously adapting for transferring the data and voice communication. It will also examine pricing issues of PSTN and VoIP in Malaysia and pricing differences with other countries. This chapter illustrates a depth analysis of licensing restrictions and Malaysian regulatory issues which affect IP telephony market and its growth.

Having low cost facilities and favourable investment opportunity, IP telephony business structure helps to generate more revenue sources. It creates opportunities to consumers, enterprises, and SME's an alternative business field.

The telecom industry critical regulatory dilemmas are somehow badly affected in IP telephony market. So this paper analyzed the VoIP network access with legislation issue. In telecom industry critical regulations issues hindered the growth of world IP telephony market.

In this area regulation is the main driving force as it tightly regulated[26]. Problems are arisen due to regulatory attempt especially in the developing countries, where IP telephony leverages the prospective of the telecommunication sector for data and voice transmission. Besides, strong competition appears between incumbent and entrant where incumbent is balancing with PSTN and VOIP telephony and entrant is struggling for market entrance where regulatory issues intervenes or restricts upon their services [27]. Legislation issue supposes to appear to put off the anticompetitive attitude towards the service but not for prohibition. If it happens in other ways, innovation and development process will be affected. Refers to Ebril and Slutsky, 1990; and Lewis and Sapington 1990, Paul de Bejl & Martin Peitz remarks;

"If in a particular, the regulator can set different rates for a bottleneck owner and a non-integrated competitor; the regulator may want to subsidize the competitor at the margin to increase competitive pressure".[28]

Due to the access price of VoIP, ASP license holder's especially foreign entrants are facing severe problems to launch their services and confront challenges with local network service providers in Malaysia.

Global access price for the entrant should similar with incumbent operators. If not then, only existing market players will get benefit and no market entrants will survive in this market especially in Malaysia, because incumbent operators has a large local and international subscribers. On the other hand, large volume of usage is another reason for growing market as price is determined by the volume usage.

Nevertheless, regulatory issues can be imposed in the retails IP telephony market to foster competition. But incumbent operator or the existing network service providers gaining market advantages in every aspect and getting privileges when they provide services.

3.1 Regulatory Issue and Market Information Worldwide

In IP telephony services, regulatory issues varied country to country. The purposes of regulatory issues are to intervene or to control or to regulate the services. However, regulatory issues also use to ban or disallow the service in different countries in the incumbent market. ITU Telecom Regulatory questionnaire shows, fifty seven countries are allowed to provide VoIP service, and 26 countries are required to have license to provide the service and 23 countries banned VoIP service explicitly [29]. In a number of European countries, VoIP is seen as a *"light regulatory approach"* where they viewed, VoIP is not a main part of the telecommunication network and data service over internet are mostly unregulated [30]. The *"light Touch"* approach of EU regulation is using to expand the broadband access and persuade the competitive attitude between traditional carriers with IP based carriers.

So, regulatory approaches are helping to promote rapid innovation and determined the customer's interest. So, distinctive telephony regulations apply in different countries based on the type of services is offered. ITU report shows that, most of the national policy of IP telephony focuses phone-to-phone service. Table: 1 shows the regulatory treatment of VoIP worldwide.

Table: 2 Regulatory Treatment of VoIP

Regulatory Treatment of VoIP, 2006	
Treatment	No. of Countries
Explicitly banned	23
Public consultation	22
Under consideration by government or regulator	30
Licence required	26
Explicitly deregulated or "light regulatory touch"	19
Explicitly legal	57

[Source: ITU telecom regulatory questionnaire 2006]

On the other hand, 'PC-to-Phone services tend to be prohibited in those countries that prohibit IP Telephony

generally, while they tend to be permitted without condition in countries that permit some or all forms of IP Telephony' [31]. In Australia there are no specific policies that can regulate IP telephony or VoIP though Australian government has *"long considerate loosening their licensing regime to encourage broadband network rollouts and increase consumer take up of VoIP"* [32]. In 2008, $412 million achieved at the VoIP services in Australia and $187 million revenue accounted in the residential VoIP service sector. Compare to business VoIP, residential VoIP is not fast growing where business VoIP services grew to $225 million where 270 companies are providing their service in Australian local market. One of the famous Research group Market Clarity estimated that, from July, 2007 to June, 2011 VoIP subscribers will be increased 1.4 million to 4.8 million. In local SME, VoIP have good opportunities to extend their market for business solutions. A recent survey conducted by Sensis that, only 13% SME are using VoIP service but within the twelve months' time, 70% of total market will be VoIP marketplace. So it is identical that, the expansion of VoIP in local as well as foreign market will be covered a huge area because of its easy access system.

Like Australia; Japan, Korea, Taiwan, Hong Kong, US, UK, EU and Singapore didn't impose strong regulation on VoIP services. As a result VoIP is fast in these countries and become the leader of the world market. In Asia Pacific region Japan, Korea and China expected higher VoIP growth. In 2007, there were 21 million subscribers but at the end of 2011, subscriber will be 42million [33]. Countries like Finland, Iceland, Norway, Sweden, Denmark, Malaysia, Spain,

Table: 3 A comparative Regulatory Issues

A Comparative of Regulatory Issues In Selected Countries**											
Issue/ Countries	Legality of VoIP – market entry	Licensing regime	Not regulated to limited regulation	Inter-connection	Numbering*	Universal Service contribution	Emergency call obligations	QoS	Number Portability	Provide clear consumer info	Protect consumer interest
Japan			x			x	x	x			
Korea					x						
Taiwan							x			x	
Hong Kong*1			x				x		x		
Australia											x
US			x			x	x				
EU			x				x				
UK							x			x	x
EU			x				x				x
Finland*2		x									
Iceland*2		x									
Norway*2		x									
Sweden*2		x									
Denmark											x
Spain		x						x			
Canada						x					
African countries	x	x									
Pakistan	x										
India*3								x			
Malaysia		x		x	x						
China*4	x	x									
Indonesia*5		x									
Philippines*6		x		x						x	
Singapore*7											x
Vietnam*8	x										

- *Include specific numbering using and geographic numbering
- ** Indicates reference in the country's context
- *1 Plus back up power supply for "lifeline" devices
- *2 PSTN regulations
- *3 Distinction between toll quality and below toll quality in Nov 02
- *4 Skype is deemed illegal
- *5 Consideration to re- formulate regulatory issues like numbering, access code, routing and interconnection when VoIP growth goes from service based to facilities based operator
- *6 VoIP is treated as a value-added service; registration required but not authorization; interconnection intervention If need be by regulator
- *7 Technology neutral approach; no obligations except to inform users of service information and clear information about service capabilities (emergency service access and quality)
- *8 Subject to price regulation

[Source: "The Status of Voice over Internet Protocol Worldwide", the of Voice Workshop, 15-16 January, 2007 as cited in Industry report 2007]

China, Indonesia and Philippine are required to have license to enter into the VoIP service. In Japan, there are no specific laws for VoIP. IP telephony has become the preferable voice service and estimated that, 80% of total VoIP subscriber of the world in Japan. The VoIP market in Japan is much competitive as the market is privatized. Best example is Nippon Telegraph and Telephone (NTT) whose main slogan is "Creative life for everyone''. It gives access to its high speed internet network along with related feasible supports to its client. Due to the lower cost, IP telephony market changes considerably and market size has increased enormously. The best examples are KDDI and NTT. In 2007, KDDI replaces all the networks to IP telephony structure and NTT replace 30 million of metal subscriber's line to FTTH by the year of 2010 [34]. VoIP market stands astride in between traditionally regulated and relatively unregulated voice and data service market in EU. Presently, EU telecom regulators are grappling the challenges of regulated VoIP market. Besides, European Commission divided VoIP service into four categories. These are; PC-to-PC where everyone uses software based system; VoIP within private corporate network; public operators use of VoIP over the PSTN traffic on their core

network; fourth is publicly available VoIP services which covers by the New Regulatory Framework for Electronic Communication (NRF), though they are not still decided how to apply rules upon it.

In Finland, Telecommunication Market Act does not cover voice transmission in a data transmission network as it is not considerable part of the networks functions. Thus, they don't have regulation on transmitting voice and data over IP based network and this service is free for all internet operators. In near future, they don't have any plan to impose regulatory issues on it. However, in Germany, 'VoIP, with its different technical possibilities (PC-to-PC, PC-to-Phone, and Phone-to-Phone) is seen both as a telecommunications service from the technical point of view and, so-called tale-service from a content point of view' [35]. Nevertheless, VoIP is still undecided to identify as voice telephony and would be controlled by the Telecommunication Act. It is allied with competitive carrier in the world market and French Telecom appears as a largest consumer VoIP provider in Europe even though British Telecom and Telecom Italia are considered the top ten VoIP operator in Europe. VoIP market in Europe is highly diverse and remains fragmented due to its different regulations along with wide range of business model adopted in different types of service providers. VoIP adoption differs from country to country. For an example, there are 34% household subscribed VoIP, though they are new entrants for providing the IP telephony or VoIP service [36].

In Canada, VoIP is allowed and declared by the Canadian Radio Television and Telecommunications Commissions (CRTC) in May 2005 that, the regulatory issues will be impose "only when it is provided and used as a local telephony service'' [37].

In Hong Kong, office of the Telecommunication Authority regulates the Telecommunication Industry but there is no regulation of VoIP technology. So, it assumes that, "Hong Kong Government is technology neutral'' and it does not favour any sorts of telecommunication technology. In 2004, the decision of OFTA that, not to impose levy in local access on VoIP calls. Providing VoIP Service in Korea, there is no license required from the regulatory authority. Thus VoIP is booming in Korea overtime. The Korean Times reported that, VoIP subscribers are increasing rapidly, and at end of the 2009 subscribers increased 5 million, but in 2008 it was 2.5 million. KT Corp is the dominant traditional fixed line operator in Korea. At the beginning they were unwilling to migrate from PSTN to VoIP. As a result, it was affected severely in their business where revenue declined. Finally they felt, here is way to improve the revenue without VoIP, and then finally embrace VoIP to survive and compete in the market.

Though, VoIP regulation and the policy are distinct from one country to another, unregulated country are in the competitive edge comparing to the regulated country. Besides, an efficient regulatory regime can assist to develop the IP telephony service for all communications based service including voice and data transmission.

3.2 Malaysia Legal Framework

Though IP telephony or VoIP service proliferate rapidly in the world, regulatory debate came into the spotlight nationally or globally. There are a large number of issues raise in the VoIP service that are significant such as; allowed to provide IP telephony service or not, what type of regulation will be imposed, market entry barrier, customer protection, privacy and technical safeguard, technical attribute of VoIP and others. At present, there are large numbers of countries unregulated VoIP services and few others countries imposed regulatory issues similarly to PSTN regulation on VoIP.

Based on the regulatory regime of relevant to internet service, Communications and Multimedia Act 1998 and Communications and Multimedia commission Act (1998) are the main source for legislation. So, Malaysian Communications and Multimedia Commission (MCMC) is the regulator for the converging Communications and Multimedia Industry and Communication. Besides, Multimedia (licensing regulation 2000) and Communications and Multimedia (licensing) amendments regulations 2001 are issued as a subsidiary legislation. The primary role of the Communications and Multimedia Act is to implement and promote government's national policy objectives for the communications and multimedia sector. The commission is also issued the new regulatory framework which has been categorized as social, economic and technical regulation and consumer protection. These all are used for converging industries of telecommunications, broadcasting and online activities. Economic regulation takes an account of the promotion, competition and the prohibition of anti-competitive conduct, enforcement of access codes and standards along with the "*licensing, enforcement of license conditions for network and application providers and ensuring compliance to rules and performance/service quality*'' [38].

The Ministry of Energy Communications and Multimedia had issued a policy that, PC-to-PC phone is not subject to regulate for licensing. However, VoIP service provider is required to have an individual license under the Communication and Multimedia Act1998 for the provision

of VoIP service. Besides, the existing telecommunications operators are allowed to provide VoIP service as it issued under repealed Telecommunication Act 1950. According to the pursuant to Section 44,126 and 127 of the Communication and Multimedia Act 1998, there are several types of services which are, Application Service under ASP license and Application Service under Class License are being implemented and subjected from the first April, 2005. In respect of the provision of Application Service Providers, following these services is offered to the incumbent and entrant operator. These are;

i. PSTN telephony,

ii. Public cellular services,

iii. IP telephony,

iv. Public pay phone services,

v. Public switched data service,

vi. Audio text hosting services provided on an opt in basis,

vii. Directory services,

viii. Messaging services, or

ix. Such other applications service are not exempted under the Act or not listed in this sub regulation [39]

3.3 Reason for Licensing and Its Framework in Malaysia

Communication and Multimedia Act 1998 is basically undertaken the activities which are market oriented and creates opportunities for expansion the market area. Under the Communication and Multimedia Act, four categories of license are activated for regulating the market. These are NFP, NSP, ASP and CSP. Within four categories of license, two types of license are given for business, one is Class license and another is Individual license where individual license is required with very strict criteria and controlled by regulatory framework. However, four types of service providers offering distinct type of services. For example, satellite earth stations, broadband fiber optic cables, telecommunication lines and exchanges, radio communications transmission equipment, mobile communication bases station and broadcasting transmission towers and equipment are being offered by the Network facilities providers. Network Service Providers offers services like, basic connectivity and bandwidth and it helps to connect different networks for enhance the service. Furthermore, in ASP several types of function is allowed such as data and voice transmission, content based service and others for end-users.

The purpose of the licensing regulation is to promote fair competition as well as enhance the market development process where regulatory authority will monitor all activities like transparency of the services. If anything needs to solve or any new resolutions appears or any other disputable issue comes, licensing authority will solve those. As it is said, service provider and licensing authority would be transparent, so, it will help to form effective regulation and monitor all the matters relating to service and performance indicator submit to the Ministry at the end of each financial year.

So, the issue of market stability and sustainability come across with the licensing issues. If rules create only for imposing without observing the market, and giving priorities of service providers stability it will be vain at the end. Besides, high degree of regulation control possibly affected badly for the market growth and economic development.

3.5. Licensing Restrictions and Market Fostering Framework:

Licensing is one of the key factors for the telecommunications authorities in IP telephony service providers worldwide. So, licensing can be either presumes prohibiting or permitting the service that offered for the new market entrants [40]. This section tried to bring out the worldwide licensing regulation and restriction especially in China, Australia, UK, Malaysia and Japan and the way they enter into the competitive edge in VoIP market. VoIP growth is descending overtime in Malaysia but Japan, Australia, China and France are ascending and leading the market. In VoIP services, rules and regulation could be dynamic and market oriented. In order to protect ASP holders from the monopolized market, MCMC can take initiatives market-driven approach as Japan follows currently where no electronic surveillance and VoIP service provider is not subject to buy the volume minute from any local incumbent operators.

Experience of Japan shows with the government initiatives that, how much market progress achieved where policy is observed as an interactive ‘guiding process’. Without government initiatives new technology can be proliferated significantly as a substance of innovation process. Unlike other countries, Japan does not have legal challenges of VoIP service. Before 1 April 2004, telecommunication authorities categorizes two types of ‘telecommunication business law’ such as; type 1 and type 2.Type 1, does have own facilities to provide VoIP and type 2, does not have their own facilities instead of leasing their lines to

provide services [41]. Later on in 2004, few amendments come out into Japanese telecommunication law which is stated below;

"Any person who intends to operate telecommunications business by installing telecommunications circuit facilities on a scale exceeding the standard specified in the applicable Ministry of Internal Affairs and Communications (MIC) ordinance shall obtain registration from the Minister for Internal Affairs and Communications'' [42].

Any person can apply to get a license and can offer IP telephony service as well. However, in Australia there are no licensed required for service providers but for the carrier service must have individual license. The Telecommunication Act 1997 stated that,

"*The regulatory framework under the Act [The Telecommunication Act, 1997] differentiates between service providers and carriers in terms of their legislative rights and obligation'' service providers are not subject to any licensing requirements but are required to comply with a range of obligations including standard service provider rules set out in Schedule 2 of the Act''*. [43]

Like Japanese legislation, in Australia any person or corporation or partnership can apply for license to provide VoIP service. According to the MCMC rules, any public body or joint venture with the proportionate of securing local share holder along with confirmation of buying volume of minutes from any local network service providers are acceptable to buy minutes volumes. It is well known that, due to the fewer infrastructures cost, VoIP pricing is always less than PSTN pricing. But if it is being imposed to buy with high price from local incumbent operators definitely Application Service Provider will no longer sustain in their VoIP service market. However, in Singapore, the Telecommunication Act where in Section 5 (1) and 5(2) issues license to "…any class of persons…." an provide the service and can get a class license [44]. In Malaysia,

"…both the Malaysian Communications and Multimedia Act 1998(the MCMA) and the Communications and Multimedia (licensing) Regulations (the 'MCM licensing regulations'') contain important information about the regulatory framework for the issuance of the registration for class licenses. For example, regulation 17 of the MCM licensing regulations provides that the minister may decide that a service or any activity will be subject to a class license. However, the minister's authority to make such a determination is established in section 44 of the MCMA''. [45]

In addition, there is no licensing regime for VoIP service providers in UK, but in July 25, 2003 has implemented a new EU framework for the directive of electronic Communications network and Service Providers called the Communication Act, 2003.

"The Framework sets out a harmonized and technology neutral regime for the regulation of communications companies across the EU, which will provide industry with greater certainty and a transparent more uniform approach across the members states .the regime is based on five EU Directives that cover interconnection and access, data protection, universal service, authorization of electronic communications networks and services and a common regulatory framework. the requirements of four of the Directives have been taken forward in the communication Act 2003, and following the enactment of the communications Act and the change in regulatory regime certain parts of the Telecommunications Act 1984 have been repealed.'' [46].

So, the regulatory process is transparent and neutral. Regulatory towards four of the directives in EU and the regulatory authority Ofcom sets seven principles which are most effective for policy implementation and market growth. If market cannot achieve alone, Ofcom will intervene towards the public policy goal and will operate a bias against market intervention. But, if any case, intervention needs to impose, regulatory authority will come out with a firm decision where applicable.The most efficient principle of Office of Communications (Ofcom) is about the intervention which is *"evidence based, proportionate, consistent, accountable and transparent"* [47]. This type of regulation undoubtedly fosters the market growth because of its practical implementation and effective use of the principles. In a sense, there should be the monitor groups of market observation that, if market fall down due to regulatory reason; so it ought to change where applicable. Otherwise market cannot be achieved alone and foreign joint venture will be facing problems of continuing IP telephony service in any place in the world. In Malaysian context there are no regulatory principles have been set to protect the market entrant and existing service providers. As Raslan says,

'There is no specific authority to in Malaysia to regulate competition or anti competition conduct general in Malaysia. But the MCMC empowered to regulate competition and market conduct in the telecom and broadcasting sector' [48].

As a result market becomes monopolized and Application Service Providers are not getting the benefit from IP telephony service. As a result, contribution of foreign

investors in this sector is decreasing over the time and switching to other business.

3.5 Private Sector Participation

According to the ITU report, there are few category have been identified where the highest participation is allowed. These are facilities based operator, spectrum based operator, local service operator, long distance service operators, international service operators, value added service providers, internet service providers and others categories. Among the Asian countries Japan, Jordan, Pakistan, Cambodia, Bahrain and Singapore allowed 100% foreign participation in all types of sectors. Besides, Thailand and china allowed 49% foreign participation but only for internet service providers sections China allowed 50% of foreign participation. In Korean Republic 49% foreign participation is allowed but in case of value added and other categories they allowed 100% participation. Nevertheless, considering on the domestic regulations, 'Malaysia has reclassified its communications service sector on the basis on provision of Network Facility Service (NFP), Provision of Network Service (NSP), and Provision of Application Service (ASP). For NFP (Individual) and NSP (Individual), foreign shareholding is up to 30%. For ASP's foreign shareholding of up to 49% is allowed' [49].

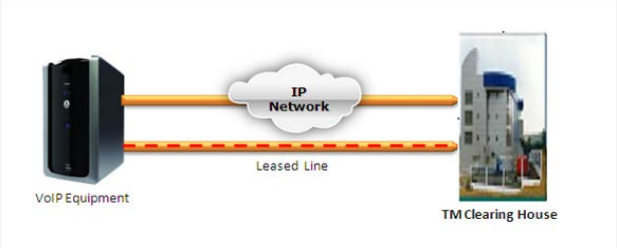
3.6 Role of Telekom Malaysia

TeleKom Malaysia Berhad is the incumbent telecom operator in Malaysia where Malaysian government is carrying extensive share 43.25% [50] through various agency [51] and facilitating the key figure of the VoIP termination in Malaysia which is being proposed as a prioritized termination, though there are few network service providers exists in Malaysian Telecommunication market. Applications Service Providers (ASP), Network Service Providers (NSP) and Network Facility Provider (NFP) are being purposely continuing the IP termination though TM Clearing House (TMCH). Meanwhile, Application Service Providers are directly controlled and monitored by the regulatory authority in Malaysia. But for if service providers have Class License, Application Service Provider may allow terminating their calls from outside Malaysia but Providers are bound to buy volume minutes from at least one local service providers though the minute volume price is higher than the global carrier. So as defining the VoIP IP termination by *TM*,

…… "Is a service that enables the Customer to terminate their fixed and mobile voice traffic to worldwide destinations via TM Clearing House (TMCH). At present, TM has two platforms of TMCH, that is VoizBridge located in Putrajaya, and Nextone, which is physically located in Berjaya'' [52].

Bellow the diagram [6] gives the clear picture of VoIP IP termination through Tekekom Malaysia Berhad.

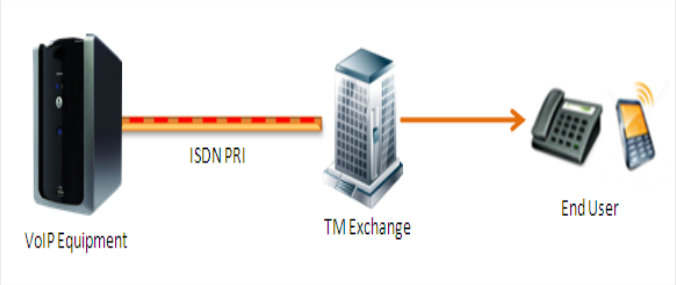
Fig: 2 VOIP IP Terminations



[Source: TM website]

Besides, for VoIP premium termination there is needed to pass through ISDN PRI and the diagram shows clearly.

Fig: 3 VOIP Premium Terminations



[Source: TM website]

From these two diagrams it is clear that, there are two types of route are to use for call termination, one is Premium route and another is VoIP route and there is a choices of being connectivity with TMCH such as, AIMS POP, leased line and public internet**.** There are several types of benefits have been identified for VoIP IP termination which are fully dedicated and extensible use all over the world by TM. These are as follows;

i) Extensive network of providers and partners located all over the world.
ii) Ability to adapt cost-saving measure by having two routing options (premium/VoIP route)
iii) One –stop solution for customer to gain access to worldwide call termination.
iv) Extensive network of providers and partners located all over the world

v) Ability to adopt cost-saving measure by having two routing options (Premium/VoIP route)
vi) One-stop solution for Customers to gain access to worldwide call termination [53]

On the other, previously mentions above that, there are two types of termination are currently available for the TM. So VoIP Premium Termination allows the Customer,

….. *"To terminate their fixed and mobile voice traffic to destinations within Malaysia via TM's ISDN PRI. The service allows Customer to utilize TM's PSTN/NGN infrastructure to make premium domestic telephone calls, hence ensures a high quality of call and is equivalent to normal PSTN telephone calls"*[54].

According to VoIP Termination rules, IP telephony International access is not allowed. Even incoming to ASP server also prohibited. Besides, VoIP IP termination towards international is allowed or in another way having VoIP IP termination permission incoming to TMCH as well as outgoing to TM fixed line, TM fixed CDMA, Mobile and international access can be possible through TM.

These issues are being appeared as a main focus point because of ASP service Providers are needed to require individual license if they want to start their service internationally. Otherwise they are not allowed to enter the VoIP market to provide IPT service. IP termination, redundancy and quality of the service are questionable. Above and beyond, the price rate of IP termination is high and service providers are not willing to buy from TM because of high price and lack of rapid technical support when necessary.

3.7 Pricing Issues on PSTN and VOIP Service Provider

Pricing issue on PSTN and VoIP service providers plays crucial role as it differs one to another and in IP telephony network it is very difficult to categorize the cost on local or long distance call because of its connectionless and in some cases "*Closed User Group*".

Though the price of PSTN termination and origination is less than the IP termination but PSTN costing and pricing model is more efficient and widely used. Unlike PSTN pricing and costing where price is determined by the miles and minutes, IP telephony pricing mostly determined by the Minutes of Use (MOU), or volume usage which can turn into the leading service provider in anywhere in the world.

In general, IP telephony is fully competitive and market driven forces. There is an important role for the regulatory interventions on price to give to motion of competition and protect the market both in local, domestic, long distance and international calling cards or call back cards. Beside, tariff rebalancing also may plays the vital role for market growth as Hong Kong adopted in their country. The Essential Report on IP Telephony stated that;

…… *"A market driven approach whereby individual public telecommunication operators would, according to their business incentives and market competition, develop and implement the required IP telephony services and networks to cater for the market demands''*[55].

For the tariff rebalancing approach India Telecom Regulatory Authority practices the "*transparent Tariff Fixation"* practice to fix the tariff for different service providers. So;

"The basis of fixing such charges was the underlying cost of the network elements involved in setting up for a local call, a national long distance call and an international call, in addition to cross- subsidization. Since the network elements are fixed and identifiable as Local Loop (LL), Local Exchange (LE), Transit Exchange (TE), Transmission System (TS), etc., such an exercise has been relatively simpler" [56].

However, Cross Subsidized of pricing for long distance and international call for service provider there might be bad effect on the market and competition would be decreased. Even without the prior notice Service providers both in entrant and existing may disappear on the VoIP market, because one group pay relatively low price and another group pays high price of minutes volumes for termination. Due to strong competition of this service it will be tough to get even marginal profit if service providers buy with high price. The efficient and liberalized market entry and no cross subsidy's availability can foster the market growth in Malaysia.

Further, this price differentiation may create dilemmas to the Service Providers as well because cost may hinder market share and market expansion.

3.9. National Policy objective:

The significant changed has been go through in Malaysia when the Communication and Multimedia Act (1998) (CMA) appeared in telecommunication, broadcasting industry and computer network. The Act established the regulatory framework to give supports to reach the target of the "*global centre and the hub for communications*" of the National Policy Objectives [57]. CMA plans to set a

common regulatory provision to foster the market growth. Besides, building a development nation status within the year of 2020, Malaysia initiated and planned to implement equitable digital opportunity as internet is commenced in all areas of communication. At the same time, expanding the growth of ICT and Multimedia industry, Malaysian Communication and Multimedia Industry set up the Ten National Policy of objectives. These are;

1. 'To established Malaysia as a major *"global centre and hub for communications"* and multimedia information and content services'
2. 'To promote a civil society where information based services will provide the basis of continuing enhancement to quality of work and life';
3. 'To grow and nurture local information resources and cultural representation that facilitates the national identity and global diversity'
4. 'To regulate for the long term benefit of the end user'
5. 'To promote a high level of consumer confidence in service delivery from the industry'
6. 'To ensure an equitable provision of affordable services over ubiquitous national infrastructure'
7. 'To create a robust applications environment for end users'
8. 'To facilitate the efficient allocation of resources such as skilled labour, capital, knowledge and national assets'
9. 'To promote the development of capabilities and skills within Malaysia's convergence industries'
10. 'To ensure information security and network reliability and integrity'. [58]

These national objectives strengthening the pro competition, then it allows for the direct competition and it is technologically work as neutral.

"The CMA also aspires to flexibility and contains few definitions and few proscriptions. IT therefore enables ongoing reform without changes to the legislation as the implications of a converged environment emerge and evolve" [59].

Though CMA addresses the competition in the marker, it did not introduce liberalization. On the other, in 2002 report, the foreign investors, they are allowed to be the ownership as a percentage of 61% while 49% will be reverts after five years. In the context of market entry and growth, Malaysia opens IP Telephony Market earlier than any other Asian countries and became the ICT hub in developing countries.

4. Research Methodology

The research goal is to discover new knowledge of IP telephony and different regulatory issues worldwide along with Malaysian IP telephony licensing regime and its solution. IP telephony fosters the economic growth and explores new opportunities and protecting the existing market. This research will explore 'solving problems' method by exploring new dimension of licensing regime. In this regard both primary and secondary research has been conducted.

The location had been chosen Malaysia because, strategically its market place is robust, competitive and dynamic where multicultural and multi types of working forces are living in Malaysia. During the research, the researcher did not get copiousness of materials though the researcher had collected materials from MCMC, IDC website, ITU website, International Islamic University Malaysia library, company published information, Application Service Provider's information, online journal, Telekom Malaysia Berhad website, internet access as well as relevant IP telephony service provider's empirical documentation.

This study has conducted also the participation of different IP telephony providers including TM and MCMC licensing and universal service provision department. In this research, data has collected both individual and organizational level. Besides, this research also conducted interview of the TM Wholesale carrier service manager and SKMM licensing department. However, the research tool also gives strength to the researcher focusing the primary research which is basically based on interview and the secondary research focusing on the textual analysis, journal and articles, documentation and report analysis along with practical observation of working place and the survey of IP telephony Company. The reason of these data sources to observe market growth and real condition of these companies. So, the research is based on "what is observed" and its difficulties as well as market opportunities. Practical observation and document analysis reveals the reality of the research.

4.2 Primary Research

The researcher visited in different sectors of Telekom Malaysia Berhad especially in wholesale Carrier service department, The manager of ASP/ISP in Telekom Malaysia Berhad, TM wholesale billing management, licensing department of the Malaysian Communications and Multimedia Commissions, Universal Service Provision Divisions of MCMC, Aims Data Centre, Global Transit Communication Sdn Bhd, TIMEdot com Berhad and few others Application Service Providers corporate offices. Due to the inter-link with each of the company researcher had to visit them. In order to provide VoIP service agreement is pre-requisite with TM wholesale carrier, for international and domestic termination via THCH normal and premium route. TM provides ISDN PRI for international and local access. However, TM testing procedure is too long and sometimes access route testing is not satisfactory because of low sound quality. Another issue of testing is only performing during working hours and availability of the TM technical Team. Installing toll-free is a crucial issue for the service providers that, if the redundancy of calls is not good and if interrupted then it will create a severe problem for the service providers.

4.3 Secondary Research

When the researcher conducted this research, extensive assistant has received from the MCMC library where innumerous data had collected. So, whole scenario of IP telephony market is reflected on this research. Even, extensive knowledge of market strategy and the growth of IP telephony market in Malaysia have reviewed.

As a secondary data, different types of book related to pricing issue, licensing regime, growth of VoIP along with MCMC journals and articles, internet search, confidential documentation analysis and practical observation help to proceed for further development of this writing.

There are several books of IP telephony about VoIP deployment and the regulation worldwide extends the area of this topic. The book *"privacy in Electronic Communications: the regulation of VoIP I the EU and the United State"* published by 2009 and few more books assisted to know about depth knowledge of the regulatory issues worldwide and differences from one country to another as well. Writing this paper, Industry report, role of MCMC statistics report and how regulations evolve over the time has given wide area of analysis. In this regard "IP Telephony Industry Report, 2007" along with quarterly Published report on "Selected Facts & Figures'', Q1 (2010), Q1 (2007), Q1 (2008) Q2, (2008) which are focuses on Malaysian ICT indicator, broadband usage, penetration rate, national policy objective and the communication and Multimedia helps a lot. Unfortunately, in the last quarterly, 'Facts and Figures' did not focus growth of IP telephony and number of license increase; rather it focuses the basic indicator of Malaysian ICT and licensing information. Nevertheless, "Market & Financial Review" Q3, 2007 provides statistics report and comparative analysis with other Asian Countries. Another significant report, on telecommunications which has been initiated and published by the International Telecommunications union "World Telecommunication Policy Forum (WTPF 2001) Geneva 7-9 March 2001 help researchers to broaden the knowledge of telecommunication law worldwide and VoIP status all over the world.

Besides, IDC report provides the snapshot of Malaysian as well as other countries VoIP market growth and status. However, Business Overview of VoIP in Malaysia, Vocial Scape Report (November 2004) also helps to conduct this research.

5.1 Data Collection Procedure

Time constraint has affected a lot to get more access and collecting data. Researcher's practical experience and different interviews along with official meeting of these issues helped a lot to expand knowledge in this field. Moreover, co-operative attitudes of interviewees from different companies are substantial source for the research. However, the researcher's past working experiences of Japan based Application Service Provider's joint venture helps to get details information and few questions need not ask for conducting the research.

The researcher takes note while interview session held on. The starting points of data analysis are from primary sources like TM, MCMC and other involving companies. However, the researcher conducted interview at licensing department Malaysia, about licensing procedures for the Application Service Providers, return of net revenue and other issues. Here researcher managed to get fluent and co-operative response.

On the other hand, researcher's direct involvement or access through the root and confidential level of data further helps to proceed. In the process of ongoing topic, researcher took face to face interview of different Application Service Providers Managing Director, CEO, company owner and Marketing Manager. Besides, the researcher also got chance to ask random questions of related to the objective, market analysis and research questions.

There few others interview and practical observation was done in the issue of wholesale carrier and toll-free access at TIMEdot.com, sells department in Global Transit Communication and Aims Data centre for dedicated Internet Service.

As toll-free is important for Application Service Providers, so providing service, easy access and redundant channel are important. Toll-free number is needed for calling card solutions which could be reachable from any telephone booth, public phone, mobile, land phone, university booth through U1 channel. The interesting issue of the service provider's expectation of toll-free is to get access from mobile but TM is not offered for the Application Service Providers.

According to the practical experiences of IP Telephony Service Providers that, getting free access from mobile toll-free will gain market advantages. They remarked that, In Japan toll-free is free from any public booth, telephone, mobile or any other types of calling system. As a result, they are doing well in their business and continuation of business is very smooth and profitable. They also expressed their thought that, there is a possibility to switch their business off in Malaysia and start in Japan.

5. Data Analysis and Research Findings

Data is analyzed visually related to the findings and solved research questions of IP telephony in Malaysia. Researcher approaches to analyze data in a chronological sequence where practical observation, answer to open ended questions, face to face interview session, licensing authoritative body, IP telephony providing companies specially, the foreign joint ventures with a broad coverage of long distance calling card, call back, and call shop solutions are focused. Besides, other sources such as; text books, statistics reports, annual report of IP telephony, facts & figures, graph, articles, documentation, journal, ITU website, TM website and various IP telephony service providers website helped to analyses data. During the research it is very obvious that, in IP telephony services-Telekom Malaysia Berhed and Malaysian Communications and Multimedia Commissions are the main authoritative body.

The most problematic situation that faced entrants in IP telephony market is licensing issues. If the interest foreign venture wants to invest in IP telephony sector, they are required to have a license first. MCMC normally did not allow foreign entrant if they don't have PRI access and non-disclosure agreement with Telekom Malaysia Berhad. Concurrently, when service providers proceed to do non-disclosure agreement with TM, to terminate call through PSTN, ASP license is required to show them to process. Logically, it is necessary to have a license first, as legislation formatted in this way, but it is really impossible to do non-disclosure agreement with TM before getting an ASP license from MCMC. So, this issue can be the first obstacle of starting business for the foreign investors in Malaysia which supports the first questions of this research.

Information gathered from interview where various issues appeared is directly related to research questions and research objectives as well. In the first official meeting conducted by the researcher about the processing of getting license and PRI access at TM where get details information about it along with the role and function of TM wholesale domestic as well as international access regulations and its requirement.

The essential matter of getting PRI and international access is, pre-requisite of bank guarantee to any local Malaysian bank. In this regards, few things need to submit such as; certified copy of NIC of FD depositor, certified copy of board of regulation, bank guarantee form, and letter of award or contract from TM. Due to pre-requisite and obligatory matter of licensing, Application Service Providers have to terminate through TM or any other incumbent operators at Malaysia. Telekom Malaysia offers two types of TMCH termination package (flat rate access/usage base access) where providers can access.

There are few issues appeared while the interview session was going on with manager of TM wholesale carrier, such as;

1. Pricing imbalance with others incumbent operator in the world. Minute charges are higher for VoIP service and service providers can buy easily from overseas carrier cheaply.

2. Volume base price rate is another risky issue for VoIP providers. Due to the strong competition, market entrant or existing companies could not afford with high price minutes charges. High volume Usage Company will get more privilege than low volume usage. In this case, there is risk for the low volume of Usage Company washing out from the market.

3. Quality of service for termination in all countries is not satisfactory.

4. Testing period is sometimes too lengthy though it depends on the schedule.

5. There is very limited follow up approach about the call service, quality of service and redundancy. Rather it mostly focused on rules, regulations and pricing.

6. There is no protection law for the Application Service Provider.

7. Service Providers have to deposit huge amount as a bank guarantee. After confirmation of BG, traffic transmission over TMCH to destination country will allow. So, during interview session, researcher gets to know approximate amount of BG for termination access that is mandatory for ASP. But such type of rules is not following other countries like Japan, Australia, and South Korea. As they don't follow any typical rules which are disfavoring for the providers, so they are becoming the market leader in the world.

However, there are many concepts and ideas had shared during interview and the official meeting, TM officials knows well about their shortcomings of usage base pricing and failure to keep their clients. Furthermore, Application Service Providers are switching into different network service providers to get cheaper price mostly, from Japan, Australia, France, UK, and USA, though officially is not allowed without having individual license. As a result Application Service Providers are not transparent with TM. The researcher found, ASP license holder somehow earning money by using outside carriers volume of minutes as a cheaper and quality of sound, MCMC and TM will never know their original condition of their service. So, they might not take any initiatives to take care of them. But if rules and regulations are favoring the service providers', transparency will be appearing like other EU countries.

While the researcher managed to take interview from licensing department of Malaysian Communications and Multimedia commissions, there are certain matters revealed which are undoubtedly complicated for the ASP license holder. Licensing issue, monitoring, limitation, market entrant flexibility along with pricing issue have identified. MCMC determines licensing regime to foster the market growth and to reach target of the "National Objective". Secondary data proves the purpose of licensing, is to promote fair competition and development the IP telephony market. But the researcher's observation shows, though there are few technical and diplomatic method give the impression during the licensing procedure that, somehow, it appeared "easy to get license but difficult to survive" in the competitive market. The data shows that, licensing areas of four categories of services. In 2007, there were 64 Network Facilities Providers (NFP) and 26 is under class license; Network Service Providers is 69 where 28 is under class license; Content Application Provider (CASP) was 20 in numbers, but the Application Service Providers was 370 though they all are not providing IP telephony services. In 2010 only Application service Providers are 490. So, data shows that, license holder is increasing over the time but the market stability and sustainability is not achieved due to the high degree of regulation and not having protection law for the ASP Service Providers. Unlike UK market strategy, where Ofcom intervene towards the public policy goal to implement the efficient principle of consistent and transparent regulation for market intervention if needed to apply. But in Malaysian regulatory body does not have any principle to protect the market entrant. Ofcom sets the seven principles which helped to growth of the market and policy implementation as well.

Furthermore, the researcher obtained data from IP telephony service providers, mostly from the foreign joint ventures; of how is the business process and rules affect to foster the market growth and their benefits. So, during the attachment of the researcher in IP Telephony Company observed that, the most competitive and strategic market environment which is rapidly expanding due to lower price and less infrastructure cost. It is observed that, few company have the powerful billing capabilities, scalable and cost effective calling card services but failed to survive due to regulations and huge price difference between global pricing with TM price. However, few reasons are being exposed for market loss and switched to other business from the Service Providers point of view;

i. It is well known that due to the less infrastructure cost VoIP pricing is always less than the PSTN pricing. But, if it is being imposed to buy with high price, definitely Application Service Provider will no longer continue and sustain in their VoIP service market.

ii. Very tough to get access in the market place and after incorporating difficult to sustain.

iii. Imbalance competition in this market due to the direct involvement of local network service providers. The assumption of IP telephony companies are that, existing network service operator can get more privileges as they have a strong local market and huge subscriber to get involve into the VoIP arena easily to cover up the market. In a sense, few operators are accessing through direct calling system.

iv. The issue of global access price is another factor for entrant and the IP telephony service providers. It is expected that, price should be similar with local PSTN price though volume usage is another key factor

where price is determined by the volume usage.

v. The researcher get to know from few of the IP telephony service providers that, as an incumbent operator TM is the driving force for selecting pricing issue. TM itself doing VoIP service as a competitor of the IP telephony service providers.

vi. Due to the large volume of usage DIGI is able to offer cheap price rate with a form of "promotional offer'' to turned into them and getting the market lead but IP telephony service provider is not able to do so, as they don't have large market and popularity.

vii. In Malaysian IP telephony market, the target group is illiterate working class, student, and immigrant mostly from South Asian region. Among them, illiterate working class is the majority. So, if any promotional offercomes, incumbent operator easily can divert them.

Another issue came into the spotlight when the researcher took interview of one of the IP telephony service provider's CEO that, the restrictions of toll-free number from mobile which affect the market growth. Unlike Japan, Malaysian Authority is not allowing toll-free from mobile which is more convenient to users and easy to maintain for service providers. These all issues are influenced the growth of the IP telephony market. As a result, they are switching in different business or investing another country where plenty of opportunities are giving available for them.

However, the researcher also analyzed the secondary data from the MCMC publications, company records, and industry analysis; annual report, articles and journal, ITU website source along with practical observations where IP telephony status can see, regulatory issues and market information worldwide, pricing challenges, Malaysian legal framework, national policy objectives, licensing restrictions and market fostering framework all are relating to the research objectives and research questions as well.

5.2 Findings/ Issues in Brief

The major issue appears in primary research is pricing with "DIGI's promotional" offer in a mode of direct calling system with cheaper price. This is the first barrier to continue the IP telephony service in Malaysia. The target of DIGI's business is mostly in South Asia. At the same time foreign joint investors are also choses the same region, so the imbalance competition raised as the method of calling is different.

1. Calling card and call shop platform is still in a good position in the market but direct calling method can deter to the IP telephony service growth.
2. PC-to-PC, PC-to-Phone call has a strong demand because of its less call rate compare to PSTN call. But, this service is not convenient for all types of users.
3. To some extend DIGI's way of offering low cost is a new policy to lead VoIP market. So the protection rules can be implemented by MCMC towards anti-monopoly market to foster competition and invite more foreign investors in IP telephone service.
4. Celcom and Tunetalk also became the barrier of IP telephony service. Like DIGI, celcom has a large local market, so that, if they offer any type of service for international long distance calling card and IDD service, clients are interest to receive. Though they offer with low price or same price compare to the IP telephony service providers, clients are divert to them only for direct calling method of the promotional offer though it is not permanent. Call back approach is lengthy process to get connection, first have to make a call to toll-free number, and then it will answer from the system, then have to enter destination number followed by #. Calling card approaches is a bit different then calls back system. But if, people get access to the "direct calling method", certainly they will divert to easier way of use method, because by instinct people are always chose easier method. But after a certain period, DIGI and Celcom have reverted in the previous price system. For e.g. calling to BD through DCampus was only 20 cent per minute but suddenly they reverted in 40 cent after few month, that is higher than IP telephony price. So, the ways incumbent operators enter into the market causes the block for IP telephony service provider's service and drag them in a disastrous situation.

There are few more issues appeared from the secondary data analysis.

5. Regulatory issue can either promoting the market or prohibit to entering the market or even if they enter could make difficulties to survive. Even it can be foster fair and competitive market.
6. TM price is an imbalance with global price. But in order to promote more investment prices

should be efficient and equivalent to global access price.

7. One of the national objectives for Malaysia is become a "global centre and hub for communications".So, fostering the market growth foreign investment is necessary.
8. The data show the worldwide regulatory issues and challenges as well as differences from one country to another where few countries are gaining advantages and some other declining. Besides, some countries follow market-driven approach which brings positive impact to IP telephony services and its growth.
9. ITU World Telecommunication Policy Forum (WTPF) provides a policy forum, where ITU member states can share and discus the regulatory challenges and emerging telecommunication policy for changing telecommunication environment over time based on their need and demand. So, WTPF helps to know the telecommunication regulation worldwide with appropriate opinions, market structure, and leading force of the IP telephony service which are reflected throughout the paper.

6. Conclusion and Recommendations

From the analyses of IP telephony perspective, it is anticipated that, as rapid revenue generated source, IP telephony becomes the key technology in compare to the Circuit Switched Network to Packet Switched Network and opens up a new opportunity for voice and data communication all over the world. Besides, IP telephony in its way forward is expected because of its less infrastructure cost and quick return on investment. It also found that, this sector is full of competition whoever grabs this opportunity gains the market strength and access to the new area of competition. So, this paper highlighted that, as a new technology, VoIP takes place in an approach of alternative voice calls capable of provide the higher efficiency of services with high level of service commitment. As revenue generating source, there are several countries gaining the extensive market access with a broad geographical coverage.

So, the issues of pricing and regulatory challenges affect the growth of the market and sustainability of IP telephony business environment. The reason of declining IP telephony market has critically analyzed through the practical observation with the issue of "obstacle and Survive". Accessing into the Malaysian IP telephony market is somehow difficult but after entering it is also very tough to survive due to strong competition among the IP telephony service providers. Furthermore, service providers wet to backward or fall in a disastrous situation in the market by facing challenges of several incumbent operators which have been clearly stated throughout this research.

This research also finds out the limitations of regulatory authorities where no protection rules been imposed. On the other hand, IP telephony service providers are declining because of not having the protection rules but several countries have a protection rules and they apply when needed. This paper also suggests to reforming and adapting new law followed by the other successful countries like Japan, Australia, UK and South Korea. So, ASP could contribute to grow the economy and can reach their expectation to become the "global hub" in the world of communications. In this study, it is significant that, the world leading service providers and operators focus point is to meet the customer's needs and demand with full of satisfaction and creates the new opportunities worldwide. Besides, this research focused few issues and challenges of IP telephony, business value, market driver and economic aspects.

Apart from these issues, this paper clearly stated the MCMC legislation and its impact upon the service providers. Besides, the role of TM and the issue of PSTN pricing challenges clearly identified. Alongside, the role of ITU also indicates the issue of pricing and regulatory framework worldwide. Finally this paper concluded by giving the few possible solutions to revert the IP telephony market growth and its expansion.

6.1 Recommendations

Due to the low infrastructure deployment cost, IP telephony service is still considered as a driving force and reliable for the voice and data communications whereas revenue generating business opportunities service provider can generate more revenue to contribute the economy. So the well-planned and regulatory reform in favor of service providers will attract more foreign investment to expand the market.
Besides, in order to sustain and growth of the market, it is needed to maintain licensing regime which would be the neutral and easy access along with minimum licensing condition and protect consumer interest to proceed to the fair and competitive market. For this government initiatives would implement which would be updated and similar to other successful countries model.

There is another issue concerned for IP telephony service (providers) that, in order to proceed IP telephony service, providers must be allowed to access to PSTN with lower price, so that they can continue buying from Telekom Malaysia Berhad. The flow of the market would be constant and rising which will determined sustainability of

the market and on the way forward to the further development in this sector. So the accurate and low price will increase more investment in this sector and no subsidize will be occur to control over the market from the single incumbent providers. TM should offer new price scheme followed by global price which will stimulate the market demand and will protect from decline of IP telephony service provider's ratio.

Furthermore, VoIP will face more challenges of regulatory issues that directly affected the economic feasibility. If the regulatory authority does not fix price to protect the Application Service Providers from declining especially foreign joint or foreign individual investment market will be unstable.

However, the rise of IP telephony all over the world brings the revolutionary changes of communication but regulatory issues and policies are needed to reform and set principles to meet the economic challenges as this sector offers huge commercial opportunities for the service providers. Regulatory reformation will facilitate the IP telephony market place. Besides the adaptation of the "market-driven" approach will ultimately lead to efficient and fair competitive market place for the IP telephony service providers. There is a hope of reformation of the regulation, foreign investment in this sector will increase and will contribute to the Malaysian economy as well.

Hence, the major issue appears as one of the National Objectives of Malaysia to become a "Global Hub". The suggested idea can possibly be applied if foreign investment as well as building the local infrastructure in this sector will contribute more one to build the national economy. So, market observation policy by the MCMC and TM need to implement to protect them from declining.

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