

# Factors Influencing the Adaptation of Telecommunication Technology by ICT Companies in Malaysia

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## ABSTRACT

In the global world plenty of companies admit that telecommunication is the prominent source which must be arranged with same focus and loyalty as many other major expense areas such human, material, and financial. It is also being difficult as per the nature of industry with new emerging technologies, features and services rapidly. In order to enumerate and determine the adaptation of telecommunication technology, particularly VoIP service by ICT companies in Malaysia, qualitative and quantitative results are to be provided in accordance to the set of extensive questionnaire developed. Approximately 80 employees of working class from ICT companies were targeted at the main cities in Malaysia while the collection of data in this study, where different modeling techniques have been applied in this study. From the evolution of telecommunication technology, significant impact caused of especially the emergence of VoIP service, while an apparent positive response have been indicated towards the adaptation of new telecommunication technology by ICT companies in Malaysia.

**Keywords:** financial, telecommunication, industry, technologies, Malaysia, companies.

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## INTRODUCTION

In the techno world, telecommunication is considered as strong tool of the century which will be managed in some way that the business can be done. There is plenty of telecommunication advantages whether competitive or other via which it can be used as a prominent source of using from different locations and is also an innovative application for the organizations. Basically telecommunication is also considered as a virtual key which enables networks of communication from far distances and which is declared effective, efficient, affordable and reliable source. Enhancing Networks of corporate data has been wider by the internet (Tigre & Dedrick, 2004; De Silva et al., 2018a; De Silva et al., 2018b; Nikhashemi et al., 2013). The enhancement of services offered beyond the networks has convinced companies which need to prevail in competitively in the networks that are more powerful. It is understood since the standards and wireless networks were modified, implemented and adapted distribution from analog to digital communication gave opportunities to the new requirements of business (Mandato, 2006). As we interact with the system, we hear different messages and can even program some of the features by the intelligence to be transmitted over the link. For example, users can easily change the language of communication for interaction.

## Telecommunication Industry

The industries are growing while the industry of telecommunication is rapidly growing with certain expansions, where some constraints prevail in such atmosphere regarding the policies and procedures which needed to be fixed. The main method is still unclear pertains to the regulation particularly in the tariff area. There are no methods fixed neither for the tariff nor for the other parts of telecommunication, while STM sets the

tariff after when telecommunication minister approves such (Buhalis, 1999). There are certain prominent factors that prevail, where the process of licensing is not defined with ultimate criteria and such fixation period of license is also not clear, the compatibility, policy of interconnection, sharing of revenues and quality of network standards are also not regulated, and the favor is pertaining to the government in accordance to the "carrier of last resort". The telecommunications industry in Malaysia has been undergoing tremendous change especially the evolution of the telecommunication technology (Esliger & Say, 2004; Dewi et al., 2019; Pambreni et al., 2019; Tarofder et al., 2017). The control over the enhanced cost is also considered a challenge by the companies (Sendin et al., 2015; Doa et al., 2019; Maghfuriyah et al., 2019; Nguyen et al., 2019). Some diversities and complex procedures have made companies to find some access to choose the best telecommunication services for more cost effective solutions. The justification for the adaptation of new telecommunication technology and services is ROI. The study also hopes to shed some light on the dilemma of ICT companies in Malaysia in adapting the telecommunication technology to achieve a successful business operation. In the networks of telecommunication development, applications and networks have come up as critical factors in the information technology. Therefore, extensive knowledge and experience in conducting and interpreting telecommunications needs some improvements via some functions of business globally which can be attributable.

## Telecommunication Technology

In 1974, AT&T introduced the Dimension PBX telephone switch, a programmable private telephone system designed to handle the voice telecommunications needs of medium to moderately large organizations. This switch

was the first truly programmable telephone system that the Bell System offered to its customers that was software driven, meaning it could be programmed on-site to perform certain functions. In every telecommunications system, no matter how simple it is, there are three essential elements - the transmission medium, the intelligence itself and the program control structure. For a simple example, let's look at a call from New York to Malaysia (Grover, Purvis, & Segars, 2007; Pathiratne et al., 2018; Rachmawati et al., 2019; Seneviratne et al., 2019; Sudari et al., 2019; Tarofder et al., 2019). The transmission medium is the collection of circuits and transmission paths that allow the electronic signal that represents the voices on the call to be sent from one end of the call to the other and vice versa. Some changes and fundamental enhancement in the projects of telecommunication could satisfy some needs of business like improvement in productivity of employees, service enhancement to customers and reduction of cost and expenses. It is also necessary to check why these attribute are being elected for the needs of business. It is necessary to check the possible ways and check the improvements which can result in the future advancements for the ongoing network transformations and infrastructures which can be ultimately be used by the end user in accordance with demand (van Kranenburg & Hagedoorn, 2008; Nikhashemi et al., 2017; Tarofder et al., 2019; Ulfah et al., 2019; Tarofder et al., 2016; Udriyah et al., 2019).

#### LITERATURE REVIEW

With the advanced new technologies, the sector of telecom cannot be considered as a revolution but the advance and new upcoming technologies can be far better for the organizations. One of the first practical telegraphic electrical was developed. It started operation in 1837 on the railway line between Euston and Camden Town. It was used for signaling the presence of trains going through the single line tunnel between the two stations (Brennan & Turnbull, 1999). A more sophisticated version was installed two years later on another railway line between Paddington and West Drayton. Besides its primary use for signaling the presence of trains, the public were allowed to send messages for 1 shilling (5 pence) (Bigliardi, Dormio, & Galati, 2012). Many of the same structural elements of the legacy networks have also been incorporated into the VoIP structure, for the simple fact that VoIP is an emerging technology and it will have to co-exist with legacy systems for some time to come (Sadjadi & Omrani, 2010). When certain constraints in telecommunication technologies like time and cost were involved and becoming large factors, some new inventions and technologies came up due to the single channel of communication over the wires singly. The competitiveness than came when the large ways of technologies tried to overcome the single path line via multiple ways of technologies. The path of transmission was shared via multiple calls (Mu & Lee, 2005). It is given that large number of telecom providers carries traffic of voice calls in packets. This procedure is done at the greater qualities (Aleke & Nhamo, 2016). Refile is a method of bypassing existing operating agreements, putting further downward pressure on accounting rates. Today, it is very easy to confuse refile with other offerings, since it is often done without a lot of fanfare. The fact that a carrier is actually offering a refile product is often obscured, intentionally or otherwise. Today refile is a real product, and represents another step in the evolution of competitive telecom services (Fontane & Houdayer).

The internet was as compared to the form of providing services not only prevail in the paradigm of communicate but it has now become a more enabling new inventions to the people via communicating ways and with certain changes, the people are now enable to making solutions of different problem through the internet into the very know mean of telecommunication industry. the communication means via telecom company has been joint with the internet services while considering the globalization of this world (Williams & Mitchell, 2004). The enhancement of internet services not only serving people from different origins but also enabling plenty of opportunities to the global economy with greater advantages and more incentives in the succession of new technological advancements (Glukhov, Ilin, & Lepekhn, 2018). Many small telecommunications carriers are now attempting to carry all or part of their traffic over the public Internet by connecting routers to the Internet in one country, and connecting VoIP to routers in another country, thus transferring international voice traffic. The reliability of these schemes is very much in question (Genschel, 1997). Anyone who has watched a streaming audio or video presentation on the Internet and has seen it jitter, halt or stop, with a little sign at the bottom of the screen that says, "network connection buffering," will understand the difficulties of using the Internet as free bandwidth. But this "free" bandwidth is not guaranteed, so reliability is an issue even in these high volume routes.

The efficiency of VoIP is being controlled and managed by certain improvements in the data and services of voice calls through management and development (Dias & Galina, 2000). It is further increasing reliance on the network services by overcoming the complexities in it in accordance to the usage of such data which is feasible for the department of IT. In addition to the significant advantage that VoIP has in regard to offering a considerably lower price for a basic telephone call, there is also the tempting promise of enhanced services (Winner, Shivananda, & Sripathi, 2009). Apart from that, the increase in VoIP has driving positively in the revenue and productive environment via flexible approaches of integration with the other systems of enterprises. The real promise of VoIP lies in its innate ability to converge the power of the traditional telephone network with the unlimited potential afforded by a global Internet and computing power. This may sound like a line from a vapid dotcom prospectus, but that is the reality of the next generation telecommunications company.

By the management in infrastructure of networks, the costs can be reduced was an imagination but the enhancement of management in combination of data and voices into the same single network is a promising factor to overcome the issue (Adenle, Azadi, & Arbiol, 2015). While focusing the same since it was hard to combine the same factors into single mechanism but the advancement of new technologies have eliminated the prevailing issue, the focus and mechanism have tried to improve the quality while entering the same factors into single line which has not only reduced the cost and time but also helped to strive better performance and reliance on such network. There is plenty of networks that have reduces the timeline of same voice data due to the load of such elements. Systems of VoIP are also subjected to viruses, electronic surveillance, assaults eavesdropping and many other issues. This issue not only brings reduction in the performance but also makes the performance and efficiency standstill. It is also predictable to manage the IP

of phone while making and receiving calls that is being someone else intended things (Ishii, Lamberton, & Molinengo, 1994). Such threats are being protected by the firewalls of such companies of VoIP which are aimed to provide these services while many other measures are also considerable and designed to protect so (Adede, Kibera, & Owino, 2017). The reforms in the act of telecommunication have not only restricted the companies for adopting any measures that disturbs competitively managed organizations but also restricted many companies to act in the markets as adopting monopolies. The universal changes not only bring positive change to the people of different countries but also enable them to avoid affordable services in the market competition (Pieper & Hermsdorf, 1997). While certain acts also required the companies to open within the competitive environment.

It is generally accepted that innovations of commercial, financial and technology were through the reforms of telecom companies of Malaysia the main reforms were done in 1987, while the competitive environment begun in the 1994 which enabled different organizations of telecom sectors to start services in the competitive environment (Overå, 2006). The government also strived hard to perform the betterment of telecommunication industry of Malaysia through STM organizations which also resulted satisfactory from far end. The virtue of STM was purposely and identically a corporation of public without private capital infusion, while there was absence of services of networks in competition (Khosrowpour & Stahler, 1997).

The policy of liberalization not aimed and objective to form reduction in the foreign debts (Kiyama, Ishiuchi, Ikeda, Tsujimoto, & Fukuhara, 1997). The deeper concerns of the government in "liquidity of the Malaysian market through the flotation of Telekom Malaysia's shares", while the attraction of wide capital depends upon the policy of competitive environment in which the companies strives in the cases of uncertainty of Malaysia. On other end of the rate spectrum are those who offer a basic service and whose main attraction is their very low rates.

The act eliminated the constraints towards the monopoly environment which was the effective mean to control organizations from acting as a monopolistic way (ADEKOYA, AJILORE, & TEJUOSO). The enactment of telecommunication act included the technological improvements via signaling and fiber optic. Many companies of foreign telecom services tried to provide wide ways to enable interstate long distance companies' sales to the local calling of customers largely, while the increasing demand by customer for telecommunication services to carry data, voice and video. The efforts made by different companies towards the betterment of telecom organizations in Malaysia have better resulted.

Following are the hypothesis of this study;

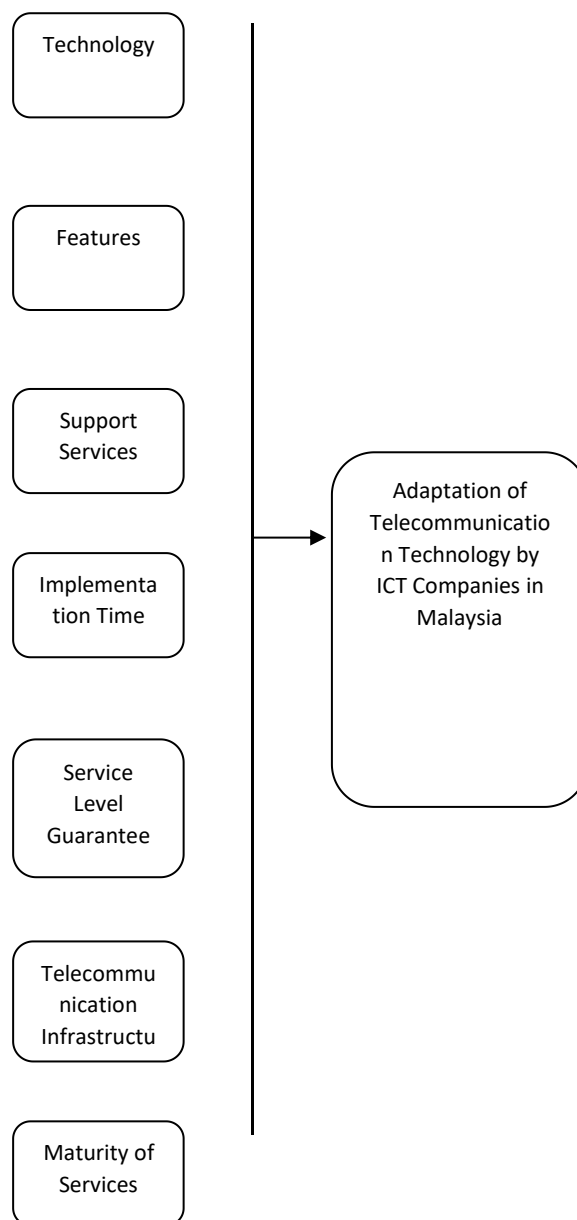
H1: Technology, features, support services significantly effects the adaptation of telecommunication technology by ICT companies.

H2: Implementation time, service level guarantee, telecommunication infrastructure, maturity of services significantly effects the adaptation of telecommunication technology by ICT companies.

## METHODS

The objective of this chapter is to discuss the methodology adopted to gather, analyze and interpret data from the questionnaire survey on adaptation of

telecommunication technology by ICT companies in Malaysia. We identified the Adaptation of Telecommunication Technology by ICT Companies in Malaysia as a dependent variable. The independent variable on the other hand can be identified as Technology, Features, Support Services, Implementation Time, Service Level Guarantee, Telecommunication Infrastructure and Maturity of New Services.



**Figure 1: Research Framework of the adaptation of the telecommunication technology by ICT companies in Malaysia**

Therefore, the review of this study will serve as a framework for this study concerning the factors that affect the adaptation of telecommunication technology by ICT companies in Malaysia such as higher speed, improve reliability, better performance, cheaper cost, etc. The data of secondary purpose was take in the form of journals, public records, articles, newspapers, letters and the Internet which reflect the evolution of telecommunications technologies as well as its adaptation to telecommunication technology have been conducted

for data collection. Apart from that, informal (focus group) discussions with IT manager, IT consultant and business leaders have been conducted to gather data regarding the impacts of evolution of telecommunication technology and its adaptation to the new telecommunication technologies by ICT companies in Malaysia. A representative random sample selection of 80 ICT companies in Malaysia from various states such as Kuala Lumpur, Selangor, Melaka, Penang and Johor Bahru will be drawn in this research. Probability sampling gives more results that are valuable after conducting the research.

### ANALYSIS

The values of descriptive analysis have been presented by value of mean and standard deviation in accordance to the types of communication which are given below about the elected questions.

**Table 1: Descriptive Statistics for Type of Communications**

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Fixed Line Telephone	80	1	2	1.30	.461
Mobile Telephone (HP)	80	1	2	1.45	.501
IDD Call	80	1	2	1.76	.428
E-mail	80	1	2	1.13	.333
Facsimile	80	1	2	1.76	.428
Postal Services	80	1	2	1.94	.244
Other	80	1	2	1.86	.347
Valid N (listwise)	80				

In the descriptive statistics certain ways of communication have been defined, where the standard deviation value of Fixed line telephone is enumerated as .461 with the mean value of 1.30. The Mobile telephone standard deviation value is given as .501 with mean value of 1.45. The mean value of IDD call is given as 1.76 with standard deviation value of .428. Email standard deviation value is enumerated as .333 with mean value of 1.13 where the postal service's standard deviation is given as .244 with the value of mean as 1.94, while the value of other is .347 in standard deviation with the value of mean as 1.86

**Table 2: Descriptive Statistics for Type of Telecommunication Services**

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Dial-up MODEM	80	1	2	1.78	.420
ADSL	80	1	2	1.21	.412
ISDN	80	1	2	1.78	.420
Digital Leased Line	80	1	2	1.76	.428
Frame Relay VPN	80	1	2	1.93	.265
IP-VPN	80	1	2	1.91	.284
ATM	80	1	2	1.98	.157
VoIP	80	1	2	1.79	.412
VSAT	80	1	2	1.96	.191
Wireless	80	1	2	1.65	.480
Hosting services	80	1	2	1.79	.412
Valid N (listwise)	80				

The results from descriptive analysis have been declared as the highest value of standard deviation which linked with wireless, while the lowest value of ATM is stated with the standard deviation value of .157 with the mean value of 1.98 whereas the highest value of standard deviation in the statistics is .480 with the value of mean as 1.65. There are many other services of telecommunication where the maximum value is 1 in all sort of services while the maximum value is 2 which is also still in providing the total services 11 in numbers. While reviewing overall statistics, medium value is noted with Frame Relay VPN with the standard deviation value of .265 with mean value of 1.93.

**Table 3: Descriptive Statistics for Type of Business Applications**

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Voice over IP (VoIP)	80	1	2	1.76	.428
Video Conferencing	80	1	2	1.64	.484
Internet Access	80	1	1	1.00	.000
E-Commerce	80	1	2	1.46	.502
E-Mail	80	1	1	1.00	.000
Voice Mail	80	1	2	1.84	.371
Bulletin Board	80	1	2	1.83	.382
Telecommuting	80	1	2	1.76	.428
Interactive Television (ITV)	80	1	2	1.94	.244
Digital Video Surveillance System (DVSS)	80	1	2	1.85	.359
File Sharing / Transfer	80	1	2	1.30	.461
Intranet / Extranet	80	1	2	1.51	.503
SAP	80	1	2	1.95	.219
ERP	80	1	2	1.89	.318
CRM	80	1	2	1.91	.284
HRM	80	1	2	1.93	.265
Valid N (listwise)	80				

While analyzing the business application in the course of telecommunication services, it is interpreted that Intranet and Extranet have higher values of standard deviation which is .503 while giving 1.51 as a value of mean whereas the lowest value have been highlighted in standard deviation of Email which is .000 with 1.00 value of mean.

**Table 4: Results of Chi-square for Technology**

Test Statistics		
	Features	Technology
Chi-Square <sup>a</sup>	33.700	15.025
df	2	2
Asymp. Sig.	.000	.001

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 26.7.

**Table 5: Chi-square Test Statistics**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.755 <sup>a</sup>	.569	.514	.879

While reviewing the Chi square test analysis, it is considered to analyze the best fit of goodness between features and technologies by the companies of ICT. It is interpreted that features while reviewing the table 4 giving lower standard deviation value of .569 with lowest value of mean 1.68. It is further analyzed that technology testing via Chi square is at highest value with the standard deviation of .684 while giving the value of mean with 2.01 where the significance of the test is analyzing the value significant of the Chi square hence interpreted the lowest value of technology as compared to features which is linked in the Table 5 respectively.

### Multiple Regression and Correlation Analysis

For the purpose of checking relationship between dependent and independent variables and their effects among them, regression and correlation analysis are performed.

**Table 6: Model Summary of Regression Statistics**

ANOVA <sup>b</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.577	9	7.953	10.288	.000 <sup>a</sup>
	Residual	54.111	70	.773		
	Total	125.687	79			

a. Predictors: (Constant), Maturity of VoIP Service, Quality, Cost, Access Speeds, Security, Support Services, Performance, Features, Reliability

b. Dependent Variable: Level of Interest Towards VoIP Service

As given in the model summary the elected variables are significantly elaborating the impacts of technology,



features, support services, implementation, service level guarantee, telecommunication infrastructure and maturity of service on the adaptation of telecommunication technology of ICT companies. The selected variables of this study enumerating R square value of .569 which is a clear view of the impact while giving the value of R as .755 where the Adjusted R square is positively enumerating the value of .514 with the impact of these variables. This also denotes that the elected variables are positively and more than 50 % are elaborating the dependent variables where the F factor in ANOVA is enumerating the value as 10.288 with the significance of .000 while giving the value of mean square with value of 7.953. It is important to elaborate the interest towards services of VoIP for the overall significance.

Based on the study it is interpreted further that the independent variable and dependent variables are positively linked with each other. Therefore, the above results positively enumerate the impact of such independent variables on the dependent variable. The results of mean and standard deviation of such factors further describing the lowest value of cost saving by standard value of .702 with mean value of 1.84. while reviewing the overall results of this analysis it is also indicated that by the overall review of standard deviation the highest value is enumerated as 1.261 of level of interest towards VoIP service whereas the lowest value of mean is given as cost saving as defined above.

The study has declared the positivity of elected variables, while the impacts are widely clear. It is clear that there is significance of relationship amid the variables. It is further enumerated that the variables are elected seriously via collection of data on the questionnaire basis. Accreditations have to be given to all respondents for their time and effort in representing ICT companies in Malaysia as a whole. One of the reasons being the high credibility of the respondents is due to the screening process where all respondents must be from IT Department or have technical knowledge in regards with telecommunication services being used in their company currently.

## CONCLUSIONS

There is high level of risk in the industry of telecommunication worldwide like in Malaysia in respect of markets and technologies. ICT companies view telecommunication services in a very positive light in one of the main surveys. Some forces and trends shaping the industry include both technology issues whereby internet service providers are subject to a plethora of choice regarding how to best access and serve their customers and new services. Enhancing of achieving information and communication technologies have been grown results in enhancement of growth. Results show that, fast speed of internet has grown the demand of broadband due to its sharp increase. According to ITU report, allowing the users to deploy business applications such as ERP, CRM or SAP and use other business services such as video conferencing, e-commerce, sharing of files and information access can be faster and effective than before. Enhancing Malaysian telecom carriers' in assisting and access of decision making companies by offering the most appropriate telecommunication services. The research findings also able to identify strategies for VoIP service market development. Findings also show that telecommunication services have improved in the region; whereas major issue constraining the provision of VoIP

services in Malaysia is mainly Cost factor. As a matter of fact, the adaptation of telecommunication technology in Malaysia particularly VoIP service have indicated positive responses. More attention and focus should be given to this matter on making available the benefits on new technologies.

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