Strategies for Transition to Third Generation Cellular Communication in Sri Lanka

M. R. M. Hazary and A. T. L. K. Samarasinghe

Abstract: The mobile market is currently in the phase of being restructured. The introduction of third generation (3G) networks incurs to high expenditure. These expenses have to be compensated with revenues from successful applications and mobile services, which contribute to a positive Return on Investment (ROI). Researchers' ultimate objective is to understand the user acceptance of 3G services in Sri Lanka and formulation of strategies to make 3G a reality in Sri Lanka. Research findings shows that there is a market acceptance for 3G services in Sri Lanka and the service providers are technically capable of absorbing the technology in to their systems. Further implementation should prioritize on the delivery on benefits to customers rather than clever technology.

Key Words: Third generation (3G), Mobile market, restructuring, Return on Investment (ROI), technology, Strategies

1. Introduction

1.1 Background

Economic growth, the pace of technical change, and the element of mobility in modern lifestyles, will continue to drive demand for mobile services. Mobile services will grow in number and variety, and will come to include most of that is mainly available from fixed access today. In the year 2001, number of mobile subscribers exceeded the number of wired subscribers in the world [1]. Due to the comparatively low cost of the mobile communication equipment and the service availability while on the move the digital communication is expected to be the most accepted method of communication.

The Third Generation (3G) technologies are turning phones and other devices into multimedia players, making it possible to download music and video clips. It uses Wideband Code Division Multiple Access (W-CDMA) technology to transfer data over its networks. W-CDMA sends data in a digital format over a range of frequencies, which makes the data move faster, but also uses more bandwidth than digital voice services.

3G is considered, high-speed or broadband mobile Internet access, and in the future 3G networks are expected to reach speeds having more than 2Mbps.

In Sri Lanka there are five mobile operators. All existing operators started their business

operations in late 1980's or early 1990's, but some are still new to the business with regard to the new technologies. But within few years some operators were able to reach the standard of developed country operator's technology.

It is decision time, as many mobile operators must now commit to 3G rollouts and launches. Operators need to beware of simply following the launch strategies of others, many of which may have serious consequences.

1.2 Research Problem

Research problem specifically is for "strategies for transition to third generation cellular communication in Sri Lanka". The mobile market is currently in the phase of restructuring. The introduction of the universal mobile telecommunications system (UMTS) network was related to high expenditures. These expenses have to be compensated with revenues from successful applications and mobile services, which contribute to a positive return on investment (ROI) in the nearest future. History reveals many successful and non-successful mobile services. On the one hand, mobile services like traffic navigation or video conference services are still waiting for their economic breakthrough. On the other hand, multiple mobile services like SMS (short message service), ring tone and logo download services can be found, which have not

M. R. M. Hazary BSc Eng., AIESL, MIEEE, Programme Manager, - Access Network, Dialog Telekom PLC.
Eng. A. T. L. K. Samarasinghe, BSc Eng., (Moratuwa) M.B.A. (Sri) C.Eng., MIE (Sri Lanka), Head of Department, Dept. of Electronic and Telecommunication, University of Moratuwa

It is predicted to have a strong economic success. It becomes obvious that one of the most important factors for the success or failure of mobile services is the user acceptance.

In order to minimize the barriers to success, a substantial and in-depth consideration of the critical factors for the user acceptance is necessary.

1.1 Project Objectives

Objectives of the project are identified by considering industry background and research problem.

1. To assess the market acceptance of 3G services in Sri Lanka
2. To identify best practices for absorption and adaptation of 3G services
3. To assess the conduciveness of Immediate Environment of Transferor and Transferee for Smooth Transfer of 3G Technology
4. To recommend strategies for transition to third Generation Cellular Communication in Sri Lanka

1. Literature Review

1.1 Introduction to Mobile Communication Evolution

Cellular mobile communications is an indispensable tool for everyday lives of millions of people throughout the world. Mobile telephony has undergone several evolutionary stages from a technical perspective. In the beginning, first generation (1G) mobile technologies formed the available service provider networks. These include Advanced Mobile Phone System (AMPS) in North America, Total Access Communication System (TACS) in the United Kingdom, and Nordic Mobile Telephony (NMT) in the Nordic countries [2]. In the first generation network, the dominant application was speech. Apart from this no other service was available for its users. Due to each system being proprietary, there was no common approach to support roaming between these systems. Subsequently, under the patronage of the European Telecommunications Standards Institute (ETSI), the second generation

(2G) mobile telecommunication system, namely the Global System for Mobile communication (GSM) was introduced. This technology paved the way to introduce in addition to voice telephony, text messaging and international roaming services. It also introduced circuit switched data as well. While GSM was widely accepted in Europe, Asia, Latin America and Africa, North America came up with its own technology standards for its 2G rollout. These were the Code Division Multiple Access (CDMA) based IS-95 and the Time Division Multiple Access (TDMA) based IS-136. Japan also came up with its own 2G standard, namely the Personal Digital Network (PDC) network. Some enhancements were made to complement GSM later on, namely the General Packet Radio Service (GPRS) and Enhanced Data rates for GSM Evolution (EDGE) to avail Internet Protocol (IP) based packet switched data over GSM networks. While GPRS was designated as 2.5G, EDGE was considered as 2.75G. With the advent of 2G networks throughout the world, 1G network ceased to exist [2].

2.2 Mobile Communication Market

According to the statistics from International Telecommunication Union (ITU) the world telecommunication market for W-CDMA and GSM is depicted below in Figure 1 [3]. There has been a clear growth for W-CDMA, in other words 3G, from Q2 2006 to Q2 2007. The absolute value for the number of subscribers for W-CDMA subscribers is very low as W-CDMA is at inception level (lowest line).

Figure 1: W-CDMA and GSM Growth-World Wide

The Asia Pacific region takes the second highest share of world 3G market as per the Figure 2 below. The Cellular Operators Association of India claims that for every one percent increase in telephone penetration there is a three percent increase in Gross Domestic Product (GDP) [4].

Figure 2: Regional WCDMA Subscribers-Q2 2007

2.3 Higher Bandwidth Application Usage

ABI Research, forecasts that by 2011 global revenues from Over The Air (OTA) downloads of full-track music will be US\$9.3 billion, a healthy jump from worldwide revenues of US\$12.4 million in 2004[5].

Figure 3: Ring Tone Revenue

However, ABI warns that those interested in gaining a share of these revenues will need to be aware of five Pre-requisites. One of the Pre-requisites is "A 3G network capable of delivering the product."

According to a recent survey, 80 percentage of mobile phone users played games at least once a week, while 34 percent indicated they played every day [5].

Figure 4: Gaming by Region

While these strict guidelines might be applicable to regions where PC-based fixed Internet access is already widespread, emerging markets could well follow the i-mode model that NTT DoCoMo pioneered in Japan, where fixed Internet penetration is 67 percent, while mobile Internet penetration is over 73 per cent, according to the MIC White Paper 2006.

Figure 5: Internet Users by Type of Device in Japan

Today, over 90 percent of DoCoMo's 52 million users subscribe to its "i-mode" mobile Internet service, and over 60 percent of them access the mobile Internet on a daily basis, with the PC being the secondary preferred platform.

2.4 Sri Lankan Telecommunication Context

The constant improvement in the country's socio economic well being together with liberalized policies of telecommunication sector in Sri Lanka has made the telecommunication market attractive. Introduction of competition, careful selection of investors, better policies governing the distribution of service and investments to cover most of the country map has taken the telecommunication service up to rural area.

Table 1 : Subscriber Penetration for Fixed and Cellular Telecom Industry in Sri Lanka

Total number of Fixed phones	2,086,774
Tele-density (Fixed Phones per 100 inhabitants)	10.0
Number of Cellular Mobile Subscribers	5,958,685
Mobile Phones per 100 people	30.0
Total Telephone Subscribers (Fixed & Cellular)	8,045,459
Total Tele-density (Fixed & Cellular)	40.0
Internet & Email Subscribers	150,000

As per the Telecommunication Regulatory Commission of Sri Lanka (TRCSL) statistics mobile penetration is very high compared to the fixed line.

Figure 6: Internet and Email Growth 1996-2006

As per the TRCSL records the subscribers for Internet & Email is very less counts to 150,000, which itself communicates the potential for the data services in the Sri Lankan market. The Figure 6 illustrates the growth of internet and e-mail user from 1996-2000 [6]. Local mobile and fixed line penetration is shown up to 2007 as illustrated in Figure 7. The comparison between fixed and cellular subscribers is also described. The significant observation made from the above graph is the approximate exponential growth in cellular subscribers in Sri Lanka. The fixed line subscribers are saturating, while cellular subscribers are increasing exponentially [6].

Figure 7: Fixed mobile penetration Sri Lanka

In a very short span of time GSM (Global System for Mobile Communications) technology has played an important role, and it has surpassed the fixed telephony subscribers in end of year 2002 [6]. The supporting factors for the exponential growth of mobile subscribers would be the increase in per capita income as illustrated in Figure 8 and 9 below and the drop in call charges over a period of time (International Direct Dialing and Local) due to the fierce competition and liberalization of monopoly with Sri Lanka Telecom (SLT) on International Direct Dialing (IDD).

Figure 8: Per Capita income compared with South Asia region

Figure 9: Price of Call to US

Even the Sri Lankan national economy is influenced by the mobile telecommunication development. Sri Lankan economy has recorded a growth since year 2001 as shown in Figure 10. The main driving force behind this growth is the growth in service sector in Sri Lanka. As in the previous 4 years, growth in 2005 was driven by that part of the services sector not related to tourism (i.e, import-related trade, mobile telephony, and financial services) [7]. The telecom sector is the largest in terms of Foreign Direct Investment (FDI) and moreover the sector has made over 20 percent contributions to GDP growth since 2001 and made up 6.6 percent of total economic growth in Sri Lanka in 2005 [8].

Figure 10: Contribution to GDP Growth-Sri Lanka

With the major milestones of the telecommunications industry in Sri Lanka, some mobile operators in Sri Lanka have implemented new technologies and applications first time in South Asia. One classic example is implementing GPRS network first time in South-Asia by a Sri Lankan mobile operator- Dialog Telekom Ltd. Another example is trial launch of a 3G mobile technology by the same company for the first time in South-Asia. Other than major technologies, local operators have contributed to major advancement of the mobile applications industry.

2.5 Benefits of 3G to Sri Lanka

Consumer Perspective

Even though it may seem that direct benefits of 3G would flow to the top end of the market, a careful evaluation shows that majority of the existing and potential consumers would benefit from 3G. Some of such benefits are listed below;

- a. 3rd Generation services involve Multi Media Communication (Voice, Picture, and Text) and this would help to enhance the quality of communication, commercial efficacy and standard of living of the Sri Lankan consumer.
- b. Sri Lanka is lagging behind in regional benchmarks in terms on internet penetration mainly due to poor Personal Computer (PC) penetration and high cost associated with telecommunications services required for internet connectivity.

National / Industry Perspective

Following benefits would accrue to the country as a result of proposed Implementation of 3G services in Sri Lanka.

- a. 3G licensing will attract FDI to the country. 3G will facilitate network expansion and growth in telecom penetration. Increased penetration & excellent communications infrastructure would help attract new investments to the country.
- b. Deployment of 3G would help to enhance Public Infrastructure and standard of Living of Sri Lankans. For example Video Calling would enable use of TELE MEDICINE by

rural hospitals to conduct surgeries whilst distance learning centers could be set up in remote villages and connected to educational institutes/universities via video telephony and broadband technologies. Use of 3G as an enabler to provide E-Government Services, and thereby cut down on travel time and costs of the Sri Lankan public [6]

2.6 Acceptance Model for the Analysis and Evaluation of Mobile Services

The user acceptance is more and more regarded as a critical success factor for mobile services. According to the frame work developed for user acceptance, Michael Amberg, Markus Hirschmeier and Jens Wehrmann (2004) [9]. Compass Acceptance Model (CAM) helps to verify the perception concerning user acceptance or to understand the user (types of users and behavior patterns) and the implication of service design better. The insights assist in considering explicitly the user acceptance in the design of a mobile service. Most acceptance models concentrate on some aspects of user acceptance and provide a detailed analysis structure for these aspects. An analysis is very time-consuming and the in-depth results are not adequate to improve application design. The existing models were also not designed to integrate the acceptance analysis and evaluations into an overall methodical approach for the development of services. COMPASS (COoperation Model for Personalized And Situation dependent Services) is a methodological approach that specifies a conceptual framework and the fundamental requirements for a service platform to cooperatively develop and provide situation dependent mobile services. This approach pays attention to the special market situation and considers legal, economical and technical conditions, which are relevant for developing and providing mobile services. Such specialized approaches may affect productivity and service quality positively and finally lead to higher usage intensity of mobile services and increase the revenue of service providers and mobile network operators.

The Compass Acceptance Model

The Compass Acceptance Model is an instrument designed for the analysis and evaluation of the

user acceptance of mobile services. The Meta structure (Figure 11) of the Compass Acceptance Model consists of the complementary and orthogonal categories *Benefits and Efforts* and *Service and General Conditions of Services*:

Benefits and Efforts: Which include all positive and negative aspects for the user acceptance. The categorization in *Benefits* and *Efforts* is confirmed in many models for user acceptance as a fundamental cognitive consideration in human decision processes.

Service and General Conditions of Services: The product specific aspects of user acceptance are subsumed in the category *Service*. In the complementary category *General Conditions of Services*, all surrounding social, cultural, economical and technical conditions are considered, which also play an important role for the user acceptance of a service.

Figure 11 : Dimensions of the Compass Acceptance Model

These categories lead to four dimensions that are relevant for an in-depth analysis of user acceptance:

Perceived Usefulness, Perceived Ease of Use, Perceived Mobility and Perceived Costs

(Perceived) Usefulness: The dimension build by the categories *Benefits* and *Service* describes the perceived usefulness of a service. Indicators measuring this dimension might be perceived information quality and quantity or conformity of expectations.

(Perceived) Ease of Use: The dimension characterized by the categories of *Service* and *Efforts* can be identified with the perceived ease of use, the degree to which a person believes that

using a particular service would be free of effort. In this context, the ease of use can be interpreted as an effort for the use of a service. Indicators measuring this dimension are for example the ease of configuration or first log-in, overall handling and menu navigation.

(Perceived) Mobility: The categories *Benefits* and *General Conditions of Services* lead to the dimension of *Perceived Mobility*. The consideration of the general conditions of a service is important in the context of mobile services as their acceptance highly depends on the economical, social and technological perspectives. Indicators measuring this dimension might be network coverage, accessibility, technological infrastructure etc.

(Perceived) Costs: This dimension is formed by the categories of *Efforts* and *General Conditions of Services*. Mobile services can lead to profound changes in technological and social systems causing monetary and non-monetary costs. Costs transparency, data security and health risks are considered as appropriate indicators. These four dimensions focus on the subjective perception. This emphasizes the valuation of a service by the end user's subjective point of view.

Researchers have adopted all four variable of Compass Acceptance model namely[9];

- Perceived Usefulness*
- Perceived Ease of Use*
- Perceived Mobility and*
- Perceived Costs*

Researchers are strongly agreeing with the Compass acceptance model and have added two more variables to make the framework more acceptable, in Sri Lankan context.

Customer attitude: There are some characteristics that are specific to the Nation, values, which will decide the success or failure of certain changes to the society. Customer attitude towards change is one such criteria and researchers have investigated into the variable from the point of view of willingness to change, learn and experience new services.

Income level: Similarly, the income level is also another important dimension for the developing countries. The Compass acceptance model was developed in the European region and the

developers might of least concern about the income level of the potential end users. From Sri Lankan context the income level and expenditure pattern are equally important when a new product or service is introduced to the market.

3. Conceptual Framework

The research methodology that best supports this study is, perhaps obviously, opinion research. This is accomplished by asking them via questionnaires. This research has used opinion poll based survey in order to collect primary data for the study. User questionnaire was used to collect primary data from a random sample of mobile users. This user level questionnaire was focused only on market acceptance of 3G mobile services. The questionnaire designed "To identify best practices for absorption and adaptation of 3G services" and "To assess the conduciveness of Immediate Environment of Transferor and Transferee for Smooth Transfer of 3G Technology" was distributed among the 3G project managers. In summary following methodologies were used to achieve the research objectives.

Sub objective 1 ~ "Market acceptance of 3G services" - is achieved through a questionnaire survey.

Sub objective 2 ~ "To identify best practices for absorption and adaptation of 3G services" - is achieved through questionnaire survey with 3G Project Managers and interview with 3G project managers.

Sub objective 3 ~ "To assess the conduciveness of Immediate Environment of Transferor and Transferee for Smooth Transfer of 3G Technology- is achieved through questionnaire survey with 3G Project Managers

Main objective ~ is achieved through amalgamating the three sub objectives.

3.1 Research Model

The conceptual model for the research was developed to achieve the research objectives. Part of the model is derived from "Compass Acceptance Model". Compass Acceptance Model is designed for the analysis and evaluation of user acceptance of mobile services. Compass Acceptance Model is used mainly to identify the variables related to the market acceptance. To the

first sub objective, Market acceptance of 3G services, following variables were applied;

- a) Perceived Usefulness
- b) Perceived Ease of Use
- c) Perceived Mobility
- d) Perceived Costs
- e) Customer attitude
- f) Income level.

Explanation of the Compass Acceptance Model is discussed in literature review.

To the second and third sub objectives, a questionnaire is circulated with 3G project managers. The variables for the above objective were identified as follows;

- a) Financial
- b) Marketing
- c) Regulatory
- d) Technology
- e) Project Implementation

Amalgamation of results of first three objectives will lead to the achievement of main objective of the research, "To Recommend Strategies for Transition to Third Generation Cellular Communication in Sri Lanka".

Figure 12 : Conceptual Model

Researchers have developed a conceptual model described in Figure 12, to achieve objectives of the research.

3.2 Sources of Data

Data collection for this research take place with two questionnaires prepared for the mobile phone users in Sri Lanka and 3G project managers.

The population for this research for the first objective is all the mobile phone users in Sri Lanka. Therefore sample is selected randomly. Survey questionnaires were distributed via emails and printed format. Random sampling was used to select samples for the survey. More than 500 questionnaires were distributed among the mobile phone users via both distribution channels. Hard copies were distributed among participants for the survey and responded questionnaires were collected individually. The population for the second objective of the research is the 3G project managers from telecommunication equipment vendors, namely, Ericsson, Huawei, Alcatel and telecommunication service provider, Dialog Telekom PLC.

Secondary data sources were also used to get relevant data for this research. For secondary data sources such as reports and some publications are used on the chapter 2- literature section. On this most of global information was gathered through the Internet sources.

3.3 Limitations of the Study

There are few limitations that can be identified in achieving the objective of this research project.

Difficulty in gathering information as the Mobile sector is having competitive information. The initial research methodology for the second objective, "To identify best practices for absorption and adaptation of 3G services", was through case study method and due to lack literature available the research methodology was changed to questionnaire based method.

Non availability of comprehensive literature on this topic for Sri Lanka, as 3G technology is very new to the island. Literature survey was done in international context, due to lack of local facts. Further, the importance of factors in Sri Lankan point of view may be different to that of global. As mentioned earlier, the amount of literature available is very minimal in local for this field of study. Though some research papers were available on the Internet, they are only available at a cost.

Knowledge of mobile users for high end services is very limited. Sri Lankan market is very widely used for basic telecommunication services and found difficulty in filling the questionnaire.

The user questionnaire was distributed among more than 500 users, but final feedback was only 212.

Although literature review provides many factors that are affecting the market acceptance of 3G services and best practices for absorption and adaptation of 3G services, only the most important factors were considered in the analysis for Sri Lankan context.

Researcher has prepared questionnaires in all three languages. The translation of technical words from English to Tamil and Sinhala was a limitation. For the words that are difficult to translate researchers have applied the English words. Understandability of the translated words and English words is limitation to the research.

4. Survey Data Analysis

4.1 Sub Objective 1

"To assess the market acceptance of 3G services in Sri Lanka". Researcher has used SPSS tool to carry out the data analysis. All the responses were given weightings as mentioned below for analysis. Below weighting is used to calculate the mean values.

4 - User strongly agree with the statement

3 - User agrees with the statement

2 - User partly agree with the statement

1 - User disagree with the statement

Table 2: Mean Value for Market Acceptance of 3G Services

		Mean Values	Priority	Weightings
Market Acceptance of 3G Services				
1	Perceived Usefulness	2.9975	1	0.29
2	Perceived Ease of Use	3.2720	4	0.14
3	Perceived Mobility	2.3296	6	0.05
4	Perceived Costs	2.2579	2	0.24
5	Customer attitude	2.8922	3	0.19
6	Income Level	1.4652	5	0.10

These six variables will jointly build the "Market Acceptance of 3G Services". Contribution of each variable (weightings) was decided by an Industry expert from Dialog Telekom PLC. According to the expert view order of priority and weighting for each variables are as depicted in the Table 2.

The weighted average mean for "Market Acceptance of 3G Services" is 2.6628. Therefore it can be concluded that the Market acceptance of 3G services in Sri Lanka is at Moderate level.

4.2 Sub Objective 2

"To identify best practices for absorption and adaptation of 3G services"

Based on the questionnaire and interview with industry expert following best practices were identified in following areas.

4.2.1 Finance

a. Minimize cost of ownership (Maximize returns with minimal investments)

1. Common core network (Switching network) for 2G and 3G for packet and voice
2. More efficient Spectrum usage as large sum of money spent on 3G license
3. Increase usage by changing the visage pattern
4. Price 3G voice calls at a lower price than 2G and thereby inducing the subscriber to experience other services available in 3G network. This will result in increase Average Revenue Per User(ARPU)
5. Provide a common platform to integrate all new services (future proof)
6. 3G technology should be built on IP MPLS (Multi Protocol Label Switching) plat form to save transmission

b. Minimize costs of technology deployment

1. Implement softswitches to save power, space and implementation time
2. IP backbone to increase the bandwidth efficiency.

c. Payback period for 3G investment

1. 3G investment should be planned with 5 year payback period due to high license cost

4.2.2 Project Implementation

a. Best practices to accelerate time-to-market (Bypass the learning curve and speed up ability to generate revenue)

1. Outsource Implementation of 3G network to expedite network development.
2. Managed services for 3G networks from 6 months to 1 year period. Managed services is where complete development and management of the network is contracted to the vendor with Service Level Agreements (SLA)
3. On the job and off the training of technical and customer care staff while the network is being implemented
4. Hosted models for Value Added Services (VAS). Hosted model is where the server or the system that provides the VAS is located in within the premises of service developer or another service provider, locally or internationally.

b. Best project management practices-Specific to 3G

1. New technology management principle need to be integrated to Project management practices.
2. Interworking with multi vendor arrangement need to be given high priority

c. Recommended procurement method/process.

1. Most recommended procurement method would be to implement few pilot networks with selected vendors and move towards the normal company accepted procurement procedures and policies

4.2.3 Marketing

a. Best practices to Sustain competitive advantage with 3G

1. Pricing for 3G services should be competitive as Sri Lankan market is price sensitive.
2. Pricing for data services should be same 2G and 3G network as subscriber does not see the service difference other than data rate.
3. Portfolio of VAS, video, high speed data and contents should be available to attract the market.
4. Good customer service and specially trained staff to support 3G related services
5. Marketing activities to educate customers
6. Seamless migration process for subscriber to move to 3G services.

b. Target market

1. Target market at the initial stage is Enterprise users, high-end customers and Small and Medium Enterprises
2. Youth segment can be targeted once more content and VAS are developed

4.2.4 Technology

a. Best practice in terms of technology and infrastructure for 3G

1. Transmission backbone should be developed with IP MPLS capability to gain bandwidth efficiency
2. The network nodes that should be procured should be supporting 3rd Generation Partnership Project (3GPP) R5 or above with radio network with High Speed Packet Access (HSPA) capability

b. Best practices for service development with 3G

1. The best practice for new service development is to outsource as most of the operators does not have the core competence on the service development

4.2.5 Regulatory

a. Best practices to overcome the pricing and coverage controls imposed by regulatory

1. In Sri Lankan context the coverage controls imposed by TRCSL is to cover three main cities in the country. Whereas some other countries have imposed country wide coverage. Hence in Sri Lanka 3G service providers are more or less relaxed from coverage controls.
2. There is no specific price controls imposed by TRCSL.

4.3 Sub Objective 3

"To assess the conduciveness of Immediate Environment of Transferor and Transferee for Smooth Transfer of 3G Technology"

Table 3: Mean Value for Conduciveness of Environment of Transferor and Transferee

		Mean Values	Priority	Weightings
1	Knowledge and capability of Vendors	2.5600	2	0.26
2	Knowledge and capability of local staff	3.1700	3	0.24
3	Experience of service providers in the industry	3.5000	1	0.27
4	Infrastructure Flexibility	2.3300	4	0.23

Four variables depicted in Table 3 will jointly build the "conduciveness of Immediate Environment of Transferor and Transferee for Smooth Transfer of 3G Technology". Contribution of each variable (weightings) was decided by an Industry expert from Dialog Telekom PLC. According to the expert view, order of priority and weighting for each variable are as depicted in the Table 3. The weighted average mean for "conduciveness of

Immediate Environment of Transferor and Transferee for Smooth Transfer of 3G Technology" is 2.9073. Therefore it can be concluded that the conduciveness of immediate environment of transferor and transferor in Sri Lanka is at a better level.

5. Strategies for Transition to Third Generation Cellular Communication in Sri Lanka

5.1 Corporate Strategy

The decision to implement 3G services could be identified as corporate strategy for the company. The revenue made from 3G services will assist the organization to bridge the strategic gap, from a long term perspective.

Investment on 3G will pave the path to new business avenues and thereby adding value to the company. For example Mobile TV broad casting.

When the mobile service provider is making strategic shift in to new business areas with 3G technology the core competence in that business area might be lacking. Hence the strategy is to make strategic partnerships or acquisitions.

5.2 Marketing Strategy

Survey reveals that;

Market acceptance for 3G services in Sri Lanka is at moderate level. At the same time 3G awareness among the Sri Lankan mobile users is at the level of 67 percent. An effective advertising awareness campaign should be launched to create the need for 3G services for prospective corporate and non corporate customers. The advertisement and promotions should have following features.

- a. Creating the need for 3G among mobile users
- b. Creating awareness on 3G services. It should explain the services and educate the prospective 3G subscribers on how to use the services.

73.7 percent of the mobile users believe that the charges imposed by the operators for VAS is high. As the focus of 3G is more on data services the

negative belief on charges on data services will get further strengthen, if the charging method is not transparent to the customers and reasonable consideration is not given. As the data rates are higher in 3G, service providers could implement low price high volume pricing strategy for data services. This pricing strategy will create a win-win situation as number of internet users is increasing in Sri Lanka (As per the literature review). Also the 3G voice calls could be charged at equal or lower price than 2G to attract more customers to 3G network.

Portfolio of VAS, Video, high speed data and contents should be available to attract the market and the best practice for new service development is to outsource as most of the operators does not have the core competence on the service development. The service providers should search for creative VAS developers in local and international market and to deliver fast hosted services could be launched.

64 percent of mobile users do not have handsets which support 3G. At the same time 88 percent of the mobile users in Sri Lankans are with the opinion that 3G handsets are expensive. 3G service providers in collaboration or individually should introduce 3G handsets at a reasonable price to Sri Lankan market.

Interview with project managers reveals;

Good customer service with specially trained staff to support 3G related services is essential. Service providers should focus on developing highly trained staff dedicated for 3G customer support and the customer service centre should be placed in location with more convenient access and attractive. Also the customer service centre should be a sophisticated high tech show room where customers can experience and feel 3G services.

Target market at the initial stage is Enterprise users, high-end customers and Small and Medium Enterprises. Youth segment can be targeted once more content and VASs are developed. Hence existing corporate customers can be targeted by the service providers at the initial stage and then move to attract the youth segment once the fair number of VASs are developed.

To • unless migration process for subscriber to move to 3G services as an important factor. The service providers should find ways to minimize effort taken by the customer to migrate from 2G to 3G.

5.3 Technology Strategy

Survey reveals;

82 percent of the mobile users in Sri Lanka believe 3G will add value to the life. At the same time 86.5 percentages of the mobile users are concern on data security when using mobile applications and 95 percent of the mobile users believe that user friendliness of services is of most important for them to use new services. Following features need to be given high priority when developing new services or applications to increase the probability of success.

- a. User friendliness
- b. Data security
- c. Value for money

Transmission backbone should be developed with IP MPLS capability to gain bandwidth efficiency. 3G service provider could initially lease IP MPLS network from existing telecommunication infrastructure business companies. But they should make sure that they are developing their own network as the medium to long term strategy.

The network nodes should be supporting 3rd Generation Partnership Project (3GPP) R5 or above with radio network with High Speed Packet Access (HSPA) capability. Service providers should give more emphasis on the version release of the equipments that they are procuring. Also they should be very concern on the road map of Research and Development of vendors, with time lines, to be ahead of leadership in the market.

The best practice for new service development is to outsource as most of the operators does not have the core competence on the service development. When selecting service developers more priority should be given on capability on developing services with User friendliness, Data security and Value for money.

To outsource implementation of 3G network to expedite network development. The service providers could outsource the network development to equipment vendors as they are much aware of their equipments and also they know better how to integrate their systems to other network elements. Further options such as managed services with agreed SLAs for a period of six month to one year is recommended.

On the job and off the training of technical staff are required while the network is being implemented. Proper technology transfer should take place in order to manage the 3G network after implementation. Hence the service providers at the stage of negotiation should pay more attention on knowledge transfer process and should specify the required training programs.

Interworking with multi vendor arrangement need to be given high priority. The providers should give more weight to the interworking criteria during technical evaluation of solution proposed by each vendor. They should investigate in to number of interworking successfully carried out in real networks and lab testing results.

Most recommended procurement method would be to implement few pilot networks with selected vendors and select based on performance. Service providers could mitigate the risk of selecting the wrong vendor by implementing a Proof of Concept (POC) before launching the commercial network. POC should be carried out with few selected vendors and need to carry out a detail technical analysis on successful completion of project. And this networks need to be benchmarked against commercially available networks globally.

New technology management principles need to be integrated to project management practices. The project managers selected for 3G project should have fair knowledge on 3G technology or project manager should be given sufficient training on technology to handle the project.

5.4 Investment Strategy

Common core network (Switching network) should be used for 2G and 3G. Service providers could increase their ROIs and make use of the resources available to optimum level by adopting common for core 2G and 3G.

Large sum of money spent on 3G license. Service providers should take more concern on usage of spectrum to the optimum level. This could be achieved by careful selection of geographical areas where prospective 3G users are densely populated.

Survey reveals that a very low percentage of mobile users (13.4 percent) are satisfied with 56 Kbps. 23.9 percentage of mobile users are requiring 512 Kbps while 22.4 percentage mobile users are with very high expectation of 2Mbps data rate requirement. Hence, the service providers could customize data rate according to the customer requirement rather than providing a flat rate to all the customers. This way investors could make maximum use out their investment.

Implementation soft switches will save power, space and implementation time. By procuring soft switches service providers could maintain the system at lower cost.

6. Conclusions and Recommendations

6.1 Conclusions

This research has been carried out with the intention of finding the strategies to successful implementation 3G cellular communication projects in Sri Lanka. Selected population for the study is mobile users in Sri Lanka and 3G project managers.

Market acceptance of 3G services in Sri Lanka is at moderate level. But this condition will change over period of time with demand for bandwidth hungry application. There is positive growth in internet users and this will have positive impact on demand for 3G services.

New product or service will succeed or fail depending on the customer experience. It is what they feel or think matters. The implementation should prioritize the delivery of benefit rather than clever technology.

Conduciveness of immediate environment of transferor and transferee in Sri Lanka is at better level. Hence Sri Lankan mobile service providers are technically in a better position to absorb the technology.

3G for Sri Lanka is best suited at this time to reduce the digital divide and to use as a tool to fill the strategic gap by service providers. The best practices were derived from industry experts (3G project Managers) and these guidelines could be practiced by any of the mobile service provider in Sri Lanka as well as international operators. The strategies were formulated based on the survey results and interview with industry experts. The strategies were developed from four perspectives;

- a. Corporate Strategy
- b. Marketing Strategy
- c. Technology Strategy
- d. Investment Strategy

6.2 Recommendations

Though the strategies are listed with four perspectives, during the implementation phase all four categories of strategies need to be integrated as strategies listed are linked to each other.

A strategic partner for network implementation is essential for the delivery of reliable network on time. Following factors need to be considered in selecting the vendor [10].

- a. Long-term support for lifecycle cooperation and continues innovation
- b. Flexible customization with cost efficiency
- c. Execute and finish strategy on time
- d. Decrease the risk of system integration
- e. Successful experience sharing to reduce the business risk

Project management is crucial in telecommunication business to be in the market leader position. A dedicated project management team should be formulated to deliver the scope of the 3G project on time.

A Study from National Technical University of Athens reveals that following migration path is suited for 3G service migration.

Step 1 - Common backbone network

Step 2 - Some voice and more data

Step 3 - Everything over data

Craig Scollick, Cerillion Technologies Implementation director recommends that once the ideal 3G products have been designed, building blocks needed to bill these correctly must be properly defined. Working closely with the billing system supplier is a key in making this a success

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