Problems in mobile communication industry – sri lanka

SummaryTechnologyis an essential part of any business and hence enterprises should have very clear understanding of their technology needs and opportunities. Sri Lankan Mobile Operators are in a better position in term of technology. Objective of this report is to analyze current technology level of mobile operators, their problem and the way of finding solutions using technology. Currently mobilecommunicationindustry is in a hazy situation. Although technology levels of mobile operators are comparatively high certain technologies can be used to get rid of present problems of the industry.

Under a misty global economic cloud Sri Lanka's economy grew in recent couple of years, but at a modest rate. The economy having achieved sustained growth over three decades averaging nearly 5% per annum, in conjunction with a modest population growth in comparison to other South Asian countries crossed the USD 2000 mark in per capita income. Notwithstanding conditions of uncertainty, investment in infrastructure development continued at the macro level and Mobile Communication industry has achieved a considerable growth.

The economic realities and new market developments during the last year turned out to be astresstest for all mobile phone operators in Sri Lanka. Ruptures emerged and the industry had to search for quick but durable fixes to remain viable. The entry of the fifth mobile phone operator, early in the year set the new reference price and forced a downward revision of pricing by all mobile operators. This caused a sharp reduction of the reference price by approximately 50%. Further to cutting prices, competition in the industry

intensified and this resulted in a sharp rise in advertising and promotional activity.

The combined effect of a significant drop in prices and high promotional costs compelled most industry players to consider serious adjustments to their business models and structures, a process that led to job losses in the industry. Leading operators recorded some growth in business volume in a growing market, but declining margins eroded revenue bases leading to operating losses.

Objectives Main objectives of this repot are;

1. Assess Technology Level of Sri Lankan Mobile Communication Industry
2. Identifying main technology issues in the industry
3. Proposing technological solution for those issues

Methodology

Literature survey was done regarding the Sri Lankan and world Mobile communication industry. In the second step responsible staff members were interviewed representing all five mobile operators. Their views and information collected from literature survey were analyzed. In addition to above Mobile communication equipment vendors were contacted for gathering information about new technologies and trends. Mobile Communication Industry in Sri Lanka.

Technology Level of Mobile Industry

In order to examine the technology level and capability, framework developed by Panda and Ramanathan (1995) can be used. This framework is

based on the value chain concept, which identifies the primary and support activities of a telecommunications service provider, and uses step by? step procedure to analyze the technological capability needs in these activities and to develop indicators to measure the extent to which such technology capabilities have developed.

History

Although telecommunication has a history of more than 150 years in Sri Lanka, the island's mobile communication history extends to less than 25 years. Mobile phone technology first evolved in 1946 after the Second World War. The first Mobile network was established in North America. After 42 years, mobile technology was introduced to Sri Lanka. The first private mobile operator to enter the market in 1989 was Celltel Lanka Limited, which was later known as ' Tigo'. In 2009 Tigo was acquired by Etisalat; Middle East telecom giant. The first mobile operator based its services on the E?

TACS technology which offered basic voice services to Sri Lankan subscribers. Between 1989 to 1994 the Government took measures to introduce competitive cellular services by granting license to three mobile operators; OTC Australia (Pvt.) Ltd, presently known as Mobitel (Pvt) Ltd, MTN Networks (Pvt.) Limited, commonly known as Dialog GSM, and Lanka Cellular Services (Pvt.) Limited currently known as Hutch. In 2009, the Government introduced more competition to the market by granting license to a fifth mobile operator, Bharathi Airtel which is an Indian telecommunication giant.

From 2004 to 2010 Mobile communication industry in Sri Lanka had an annual growth of around 35? 40%. 2. 2 Assessing Technology Level World Technologies in Telecommunication is shown in Table 2. 1. It can be seen in the world still there are network operating mobile technologies of 1st generation, 2nd generation and 3rd generation. By looking at the subscriber percentages belong to the networks it can be concluded that 1st generation technology networks will not last much longer as already it is 0. 01 percent of world subscriber base.

It has been introduced in 1992 as a 2nd generation technology but by 2010 it's enhanced with development of GPRS and EDGE technologies. As still GSM technology has more than 80% of world subscriber base and GSM is enhancing with support technologies it is expected to last more years. 3G/3. 5G (WCDMA/HSPA) are most modern commercially available technologies. It's seen that these technologies are capturing the market rapidly. According to related surveys, more than 96% of WCDMA networks have deployed HSPA, with the majority (over 52%) supporting a peak downlink data capability of 7. Mbps or higher. With 22% of HSPA network operators committed to HSPA Evolution (HSPA+).

Bench Marking

Technologies used by Sri Lankan Mobile Operators and the world technologies are mentioned in the following Table 2. 2. According to the table Dialog and Mobitel have latest technologies comparing to other operators. When comparing with the World status Sri Lankan Operators are

using state of art technology. Sri Lankan Operator Airtel Dialog Etisalat Hutch Mobitel

Technologies used GSM/GPRS/EDGE WCDMA/HSPA GSM/GPRS/EDGE WCDMA/HSPA/HSPA+ GSM/GPRS/EDGE GSM/GPRS/EDGE GSM/GPRS/EDGE WCDMA/HSPA/HSPA+ World Status GSM/GPRS/EDGE are 2G/2. 5G popular technologies in world WCDMA/HSPA are growing 3G/3. 5G technologies HSPA+ is commercially available now LTE is emerging as a 4G technology in the world Table 2. 2: Technology Comparison of Sri Lankan Mobile Operators Sri Lanka is the first country introduced GSM, EDGE, WCDMA (3G) and HSPA (3. 5G) technologies. Also Sri Lanka is the first country which demonstrated HSPA+ in South Asia.

Technology Problems

Recent years were probably the most challenging for the mobile communication industry in its history. Economic and industry turbulence heightened and industry leaders were forced to absorb the shocks in telling proportions while weaker operators were rendered vulnerable. The mobile communication industry deserves commendation for surviving trying economic, industry and regulatory challenges and for riding the tide. However, the cumulative effect was an entire mobile communication industry reporting operating losses.

Following are some performance data of Mobile Operators in year 2009. Dialog Group reported negative NPAT of 1159 mill. Without recurring costs. In operation Etisalat reported a loss of approximately ~1600 mill. Hutch turn over was decreased by 61. 9% Mobitel reported a net loss of Rs. 395 mill. As

margins become narrower and narrower operators are needed to find new opportunities in order to enhance revenue. But several technological problems are there as barriers for growing

Capacity Limitations

In Mobile communication data traffic demand is rapidly increasing.

Major bottle neck in providing higher data rates is limitations in transmission networks. Currently Mobile operators have not island wide optical fiber networks in order to provide higher capacities. Also to provide higher capacity at low cost, traditional TDM based access networks are a barrier. So IP based networks need to be deployed. For this huge investments are needed but current financial status of all mobile operators is not healthy enough for that. Currently it is not possible to provide higher data rates when users move from UMTS (3G) coverage area to GSM/EDGE coverage area.

Currently the number of users can be catered by one cell has become a issue in mobile industry, because if there are more than possible no of users in the same cell, Users experience the congestion situation and as a result this cell need to be further brake in to two cells or covered by an umbrella cell to cater the capacity. When doing so different frequencies need to be assigned to the different cells and this will increase the interference to the users and quality would be dropped. 3. 2 Energy Issues

In rural villages in Sri Lanka, electricity is either not available or is available only in limited quantities. As a result, even if battery backup is provided for the Base Stations (BTS), the batteries do not get fully charged. Further, due

to frequent interruptions in the power supply, the life of these batteries gets shortened, which in turn increases the operational cost to run services in rural areas. Unavailability of reliable power in semi? urban, rural and remote areas increases operational costs further because sufficient backup systems have to be maintained.

Therefore sustainable green energy sources are essential to have need in future. But still in Sri Lanka Green Technologies like solar energy and wind power energy are not popular in Mobile industry. Also existing such technologies are not capable of successful operation of base stations. Unavailability of commercial power in rural areas is also affected to mobile operators to expand their coverage. Optional power sources are needed to expand coverage in small time duration with minimal cost. 3. 3 Frequency Spectrum Issues In Sri Lanka Super High Frequency (SHF) Band is highly polluted.

SHF band includes frequencies between 3GHz and 30 GHz. In this band more than 10000 Microwave Links are currently operating. Especially in urban areas it is difficult to deploy new back bone microwave links due to interference. This has highly influenced for providing enough data capacity for Mobile Broad Band customers. TRCSL has not allowed Point to Multi? Point backhauling technologies for telecom operators. With this technology number of microwave links need to be installed can be reduced and operators can easily deploy their back hauling networks. 3. 4 BSC/MSC Boarders

In early mobile systems, remote base station sites were controlled by the MSC or mobile switching center. But with current systems under 2. 5G GSM network BSC Base station controller controls the remote Base stations and under 3G network RNC Radio Network controller controls the remote node B sites, because of this scenario, It is a must to have several BSC/MSC boarders in the network and when users are moving via this boarders, the probability of drop of the calls are vey high reducing the network quality in those areas. For example, people in the boarder areas always experience call drops and bad call quality etc.

Therefore improvement for this is necessary via the advancement of the technologies. It may be high capacity MSCs or BSCs or some other solutions. 3. 5 Tower Loading Microwave links are used as the main means of backhauling in mobile industry in Sri Lanka and these microwave links need to be fixed on towers with having line of sight. Usually each tower connects with more than one tower therefore always several links are need to be installed on a tower top. If its a hub site this number may increase to 10? 15 even more than 50 sometimes. Microwave antenna comes with 0. 6/1. 2/1. /2/2. 5m diameter; therefore this is a big equipment. Also it has a larger wind shield area, because of this big size and area and weight operators need high strength large towers to be implemented. If the antenna sizes and weight of this microwave links can be decreased it would be quite advantageous for the operators. Else new technologies like laser links, IR Links or smaller antenna sized IP links technologies can be developed to be able to guarantee the same level of availability. Then operators would be able to replace heavy microwave and use light equipment types.

Proposed Technologies 4. 1 Fiber Based Transmission Fiber based transmission is not a new technology in the industry. In Sri Lanka SLT and Dialog have their own fiber based networks. Fiber based transmission can cater quite high capacity data transmission. It can be used to implement either TDM/SDH based network or Packet/IP based network. Although SLT has a island wide fiber network, Dialog fiber network is still not widely spread. In fiber based solutions fiber cables are drawn from core network sites to the remote Node? B/BTS sites.

Usually a ring topology is used and it goes via hub sites, from hub sites fibers are drawn to remote sites. Figure 4. 1: Typical Fiber Based Mobile Network The problems with Fiber based transmission is the high initial capital investment cost and the time taken for the implementation. Most of the operators are not capable of affording such investment for their own fiber based infrastructure. If a fiber network can be used for providing transmission for base stations, increasing data traffic demand can be easily fulfilled.

Another option is to lease fiber network's capacity from already deployed SLT or Dialog network. But leasing cost need to be highly considered.

IP RAN

Implementation of IP RAN (IP Radio access network) is the key to provide higher capacity. An IP ran with higher capacity to remote sites can reach higher speeds with currently available HSPA+ like technologies. Figure 4. 2: HSPA Technology Roadmap According to the roadmap shown in Figure 4. 2,

with the enhancements of HSPA+, Wimax /ADSL speeds can be passed or equalized with HSPA in the years to come.

The IP radio access networks (IPRAN) consist of end to end (Remote sites to the core network nodes) transmission with IP/Ethernet networks. Easiest way to implementation of such a technology is fiber based IP network where higher capacity and less complexity can be achieved. EDGE Evolution for GSM Current 2G networks are inadequate for providing data speeds of GSM/EDGE networks. EDGE Evolution quadruples standard EDGE network speeds, promising downlink data rates of 1. 2Mbit/s, though the standard has headroom for up to 1. 9Mbit/s.

Similarly, uplink data rates of 474kbit/s are expected, although the standard specifies 947kbit/s. 3GPP standardized EDGE Evolution in 2007 (3GPP Release 7). Green Technologies Maintenance costs of networks in rural areas are high compared to urban areas, because of several factors such as poor transportation systems, difficulty in supply of spare parts and non? availability of skilled manpower. Due to lack of reliable power in rural areas, there has been a substantial increase in the usage of diesel for running engine alternators to keep telecom switching centers, transmission equipment and BTS s up and running.

Currently more than 5000 Communication towers are there in Sri Lanka. This increases costs substantially. In spreading the reach of telecommunications in remote areas, renewable energy should be used to power relay towers in remote areas. By replacing diesel generators with solar panels in cell phone towers, tons of carbon emissions could be prevented from entering the

atmosphere. Global Telecom emission in 2002 and estimated values in 2020 are shown in Figure 4. 3. Figure 4.

Global Telecom Emissions 2002 – 2020 Source: The Climate Group and Global e?

Sustainability Initiative Solar is a clean and effective way of harnessing energy. Also, the maintenance cost for the operation of solar equipment is comparatively lower as compared to diesel generators operated BTS towers. Solar generators have no carbon emissions and also help in preserving theenvironmentfor sustaining life on earth. It reducesglobal warming, as carbon emissions are null in solar devices. The manpower needed for the operation and maintenance for solar equipment do not require extra skill.

The telecom majors in world have started operating mobile repeater and relay stations, which harness solar and wind energy with the wind turbines foisted on the telecom towers. The hybrid systems, involving solar photovoltaic systems and wind energy installations for this application assure uninterrupted supply of 2. 8 kilowatts of power daily. A master control installed at the site acts as a voltage stabilizer, while a generator has been kept as a back? up for charging the batteries in case of emergency. Though the diesel generators are the lifelines of telecom towers, they contribute to significant carbon emissions.

Going green and pushing the use of alternative energy sources like solar, wind and bio? fuel is the need of the hour; the government should provide high subsidies to help the telecoms taking this step, quickly and easily. Going solar is the way forward. Therefore as we can see above technologies

are the candidate technologies for future enhancement of Mobitel network. According to the study these technologies can solve the main issues that were identified in this chapter. Therefore a strategy and a roadmap are required for timely implementation of the technologies in the network.

LTE

LTE (Long Term Evolution) is a 4G technology which is emerging in the world now. When existing technologies are becoming obsolete, investments need to be done on new technologies. It is assumed that 2G will become obsolete in near future. Figure 4. 4: Envelope Curve of Mobile Technologies Figure 4. 4 shows the envelope curve of mobile communication technologies. It can be seen the technology is mainly improved focusing the deliverable capacity. See Figure 4. 5. Figure 4. 5 Expected Growth of Mobile Data Industry Mobile broad band services provide new opportunities for Mobile Operators.

With LTE customer demands can be satisfied easily. Future Industry of Mobile Communication Current monthly operational cost of Mobile Networks is several folds higher than revenue which is the case in many technology introductions. By introducing green technologies operational cost can be reduced. Therefore a huge advantage can be taken in current price war. With low cost IP based technologies and Point to Multi Point Backhauling technologies can be reduce operation and maintenance cost also.

Going for Fiber Networks can help to reduce operational cost by reducing huge TRCSL license charges need to be pay annually for Microwave Links. With those technology improvements turn over can be improved and hence investments can be encouraged because huge investments are needed in

near future as Core Mobile Technologies are evolving day by day. Government need to be given intensives for investments in Mobile Technologies as it can energize the economy in return. Above mention technologies can reduce the environmental problems raised by Mobile Industry. Some of such issues can be listed as follows.

Carbon Emission of more than 5000 Base Stations island wide Radio FrequencyPollutionCurrently Mobile Industry has influenced inculturealso. Wide spread of pornographic contents is a major issue. Now recently all mobile operators have been agreed to implement technological measures to filter out such contents. Therefore by introducing mentioned technologies mobile operator will be able to overcome technological barriers as well as financial issues, marketing issues and environmental uses etc. Although Sri Lankan Mobile tariffs are the lowest in the region, customers are not satisfied with the service in general.

Mobile Communication Industry in Sri Lanka regarding mobile operators can be eliminated from the heart of the customers by introducing state of art, sustainable and low cost technologies.

Conclusion

Technology plays a vital role in any industry in today's world. Mobile Communication industry is not an exception. Mobile Technologies are evolving very rapidly and customer expectations are also at sky level. Mobile Players are operating in the industry and they use most popular and