Investigation of Factors Affecting the Service Provided by Sri Lanka Telecom PLC at Kurunegala

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ABSTRACT

The research study was carried out with the aim of investigating of factors affecting the service provided by the Sri Lanka Telecom PLC at Kurunegala. One of the major problems of the most of telecommunication industry is the reduction profits. The profit is highly affected by the quality of the service and the competition between services providers. The main activity of this organization is to provide fixed and mobile telephone services (Code Division Multiple Access (CDMA), Public Switching Telephone Network (PSTN), WILL etc). The PSTN comprises the entire telecom infrastructure. Therefore wired telephone network highly affect the operations at SLT. This research was carried out to find the service provided by the PSTN sections in Kurunegala area. The quality of the telecommunication service depends on the continuity and the reliability. Due to service failures, reliability and the continuity of the service is lost. To increase the quality of the service it should minimize the service failures. These failures mainly occur due to exchanges failures, transmission failures or power failures. The solution for the power failures in exchanges are replacing the existing battery set with new battery, placing generators in all exchanges which start automatically when power breaks down or using the wind power or solar power system. Replacing the battery set is the best solution for the power failures in exchanges. Replacing the overhead cables in transmission root that get frequently damaged by underground cable or using ring topology for connecting exchanges can be used for the transmission failures. For the identification of fault occur in exchange quickly a power alarm can be used to the exchanges to identify the failure according to type of fault or make an auto generate SMS or emailing system to mobile phones of the technicians when a power failure occurs. From that they can know about it when they are not present in the exchanges and educate all the technicians about the each type of faults that an exchange can occur.

The other factor that affects the profit of the company is the high competition. Because today there are many telecommunication service providers, and they provide many special packages to customer with special charge. So many customers go for these special packages, because they have low charge. So introducing new packages with special offers this organization can increase the number of the customers and customer satisfaction.

KEYWORDS: Telecommunication, PSTN networks, Remote Switching Units (RSU), Extended Line Unit (ELU), Quality, Power failure, Transmission, Switching, Profit, Competition, Exchanges, Satisfaction, Package, Waiters List

INTRODUCTION

Today telecommunication industry is one of the most profitable industries when compared with other industries in our country.

There are many telecommunication service providers in Sri Lanka and there is a high competition between them.

Sri Lanka Telecom PLC is a Sri Lanka-based company that provides a range of telecommunication services across Sri Lanka.

This Organization started its operations in 1858 with the establishment of

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the first Telegraphic Circuit between Galle and Colombo. Now it provides its service over whole Sri Lanka. Sri Lanka has been divided into 4 regions for the effective controlling and maintaining of these areas. Kurunegala area belongs to the region 2. Seventeen Remote Switching Units (RSU) and 16 Extended Line Unit (ELU) belong to Kurunegala exchange area. The Kurunegala Telecom organization provides domestic and international, fixed and mobile telephone services, Internet services, Internet protocol television (IPTV), data services and domestic and international leased circuits. This research was carried out only about the wired telephone network and service provided by it. Wired telephone network (PSTN) is the backbone of the telecom infrastructure. Many customers use the wired connection of this organization. So the profit received though this section mainly affects the profit of whole organization. Therefore this research was carried out to identify the root causes for profit reducing at the public switching telephone network and investigation was mainly about the quality of the service providing by the PSTN connections and the waiting list for the new PSTN connections. The PSTN network has been divided into 3 sections. They are; outside plant maintenance section (OPMC), Switching section, Transmission section. All these sections should be effective for increasing the quality of the service in PSTN network.

RESEARCH OBJECTIVES

The objective of this research was identification of root causes for service failures and waiting list for new connection, and to examine options to reduce or control these causes and to increase the quality of the service provided by the SLT.

LITERATURE REVIEW

The main purpose of telecommunication is to send a message between two people from different locations. When consider about the voice signal, it can be transmitted at a long distance in copper wire, optical fiber or a radio link. To suit these transmission media, first it is necessary to transform voice into an electrical signal. Transmitter of the telephone converts the voice signal into an electrical signal. After transforming voice into an electrical signal it is transmitted to the telephone exchange through Copper wires. Then the signals transmit between exchanges as microwaves or light waves. These signals are band limited signals of 0-4 kHz.

For converting voice signal into electrical signal, this organization used Pulse Code Modulation. It is the most commonly used method for converting analog signal to digital signal in all voice telephone channels. Sampling, quantizing and encoding can be described as a process of PCM.

RESEARCH METHODOLOGY

This research studied about the factors affecting the revenue, continuous service and the quality of the service in the SLT. Consider about this research we can mention it as a corelational research, because the goal of a corelational research is assessing relationship among two or more variables. This research tries to find relationship between the revenue and quality of the service. So we can consider this as a correlational research. The data collecting techniques like questionnaires, interviews and report reviews to gather primary and secondary data were considered. In this study data collection was carried out for four months time period. Data analysis was carried out to illustrate the influence of certain root causes for the main problems which was the basis for conducting this research. By analyzing the data root causes were identified and the alternative solutions were discovered. The best solution was selected for implementing the service to

improve the quality and profit of the organization. In this research data collection was carried out in ten remote switching areas. Three questionnaires are used for primary data collection from customers and the employees. The details about the quality of the service, service failures, and reasons for decrement of the call durations can be gathered by these questionnaires. To collect data in deep, interviews were conducted with some customers and employees. Secondary data about this failure help to investigate reasons for failure and find solution for these failures.

The root causes for the reduction in profit can be identified though these primary and secondary data. The main reason for that is the reducing the telephone usage of the customers. It occurs due to high competition between service providers and reducing the quality of the service. Decrement of quality of the service occurs due to the improper working state of the exchanges. This research is expected to reduce the failures occurring in the system and increase the profit of the organization.

DATA COLLECTION & ANALYSIS

Reasons for decrease in quality of service

1).Service failures due to bad conditions exchange.

In this research the data were collected in ten areas. But only limited numbers of areas are discussed in the report. In this figure can be seen Narampola, Dabadeniya and Ududdawa exchanges have higher number of exchanges failures. There fore the details about the failure in Narampola, Dabadeniya and Ududdawa was collected. From these details can be identified about the failure type and how it occurred.

Table 1. Details about Exchange failures

Exchange	Number of total failures (within 6 months)
Kurunegala	0
Narammala	10
Katupotha	1
Horombawa	0
Giriulla	0
Narampola	46
Pahamune	2
Dabadeniya	22
Ududdawa	23
Kuliyapitiya	1

Table 2. Details about Narampola ELU failures

Month	failure type		
	Transmission	Switching	Power
May	0	1	6
June	0	0	5
July	1	0	5
August	0	1	6
September	2	3	8
October	2	2	4

Figure 1. Summary of failures occurred in Narampola Exchange Area

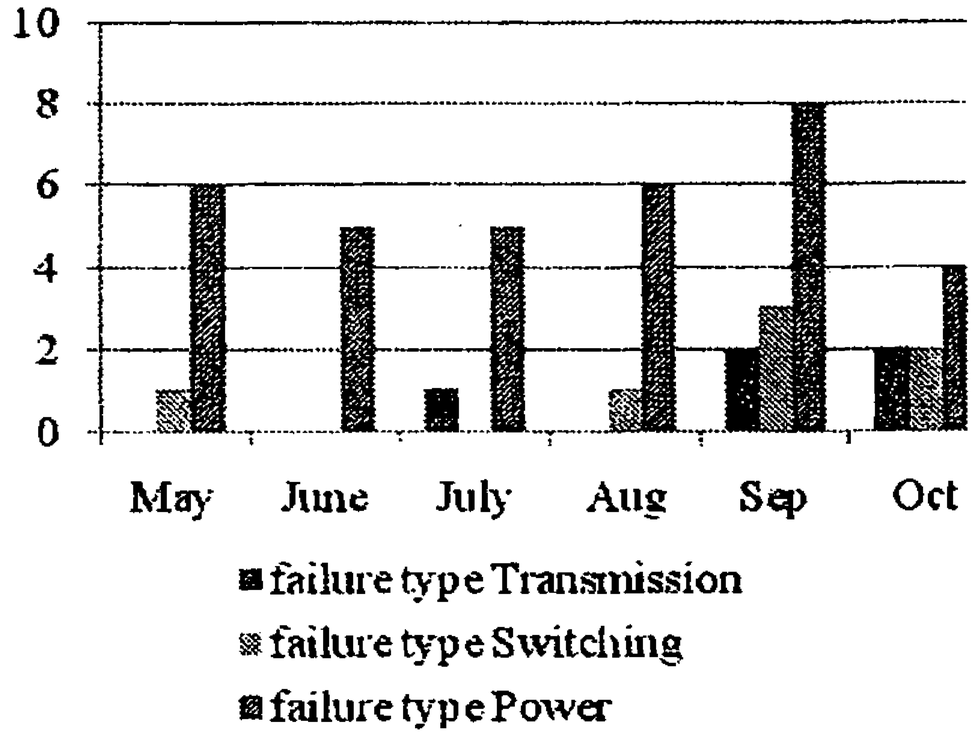


Figure 1 shows exchange failures occurred in Narampola RSU. Mainly these failures occur due to power. Normally exchanges are powered by the commercial power. When the commercial power had a breakdown exchanges were powered by the battery set in exchange. Normally an exchange can operate properly a minimum 8 hours by a battery set.

Table 3. Details about exchange failure due to power

Time duration of commercial power down	Number of exchange failures
0.5 hour	0
1.0 hour	6
1.5 hour	14
2.0 hour	10
3.0 hour	4
4.0 hour	0

But in the Narampola ELU it can work less than 3 hours from the battery set. So we can say these failures occur due to bad condition of battery sets.

Table 4. Details about Dambadeniya RSU failures

Month	failure type		
	Transmissions	Switching	Power
MAY	0	1	2
JUN	2	0	4
JUL	1	0	5
AUG	0	1	2
SEP	1	0	6
OCT	1	1	0

By analyzing above, it can be shown that Dambadeniya RSU also had failures due to power.

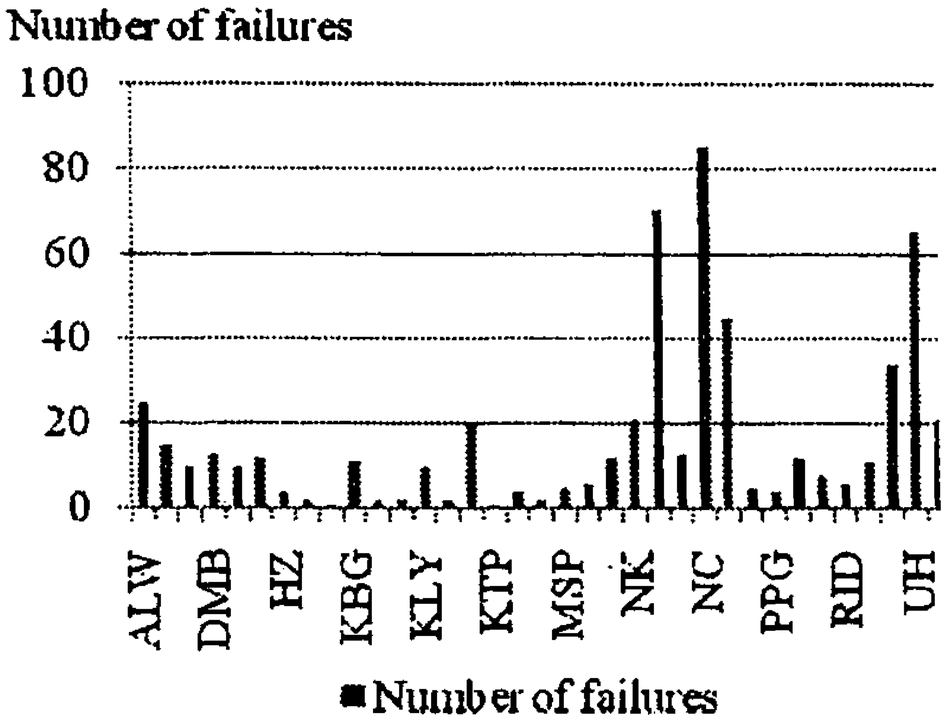
Table 5. Details about Ududbaddawa ELU failures

Month	failure type		
	Transmissions	Switching	Power
MAY	5	1	2
JUN	4	0	1
JUL	3	0	1
AUG	0	1	0
SEP	2	0	0
OCT	1	1	1

Table 5 shows exchange failures occur due to transmission error. The transmission media between the exchanges are the optical fiber or radio link. These failures mainly occur due to damaged optical fiber.

2). failures in maintenance section.

Figure 2. Fault reports in different areas during 1st September to 30th October



Above figure shows fault occurred from the Main Distribution Frame (MDF) to subscriber premises in September and October months. When consider about the area that occur many faults can be see these faults occur in the overhead cables. When consider about the cables, type used in these areas is the same. So we can say these faults occur due to bad condition in this cable type.

Table6. Details of new connection providing

Month	Requests	Provided	Completed (days)			Rejected
			<3	3<7	>7	
JUL	162	148	36	32	80	14
AUG	79	66	30	16	20	13
SEP	68	54	12	20	22	14
OCT	97	84	30	25	29	13
NOV	138	106	18	49	39	32
DEC	151	126	25	53	48	25

Above table shows the details about the new connection providing. Analysis of the data about the exchanges show, even if there is free capacity to provide new connections they cannot be provided. The reasons for this can be mentioned as below.

1. Spare loops are faulty. So spare loops cannot provide proper communication media. So these loops cannot supply the new connection.

2. There is not enough working spare loop within required distance.
3. In some area there is no PSTN facility although, customers are waiting for this.

RESULTS AND DISCUSSION

When the quality of the telecommunication service is considered it highly affect the profits of the organization. So when we select solutions for the above problem we should think about the organizational merits and the demerits.

Possible Solutions are

1. Replace the faulty cables with new cables.
2. Start a new project to provide new connection.
3. Repair the faulty spare loop
4. Provide CDMA phone to customer where PSTN connection cannot provide.

From first two solutions, 2nd solution is more effective. Because when replacing a cable two works need done that is drawing a new cable and removing the faulty cable. So this takes more manpower and the time. But also it can provide limited number of new connection than 2nd solution. The existing connections also should replace the new cable. So while this time existing customers also had to face the problems. That means in this time they cannot use the service. But when we consider 2nd solution, it takes more money and some time. But from that, a large number of new services can be provided. So when consider about above two method, 2nd method is more efficient than 1st one. Using the 3rd method we can provide limited number of new connections. That means the number of new connections can be provided is limited to existing number of spare loop (free loop in a cable). But in method it takes less manpower and money than 2nd method. The 4th solution is not effective and efficient. This method can be used only if the customer like. But most of the time customers like PSTN line due to reliability. So we cannot say this method is more efficient. The efficient and effective method for decreasing the number of waiters for PSTN line can be 2nd and 3rd methods.

When considering about increasing the quality of existing service it highly affect the states of exchanges. For maintenances of the working state of the exchange we should consider about the power supply of the exchange. For this we can use following methods.

1. Replace the battery set with new battery.
2. Place the generators in all exchanges which start automatically when power break down.

When we consider about above two methods placing generators in all exchanges like ELU is not practical. And also placing generators take more money. But replacing batteries is more cost effective. By using new battery set exchanges can work properly a minimum 8 hours from the commercial power breakdown. When consider about charging of battery they can be connected to the commercial power parallel with exchanges. When the commercial power is on, the battery set is charged and power exchange, and when the commercial power off battery begin to power the exchange. So the exchange works without breakdown. But consider about generators they need additional power like diesel. So if we used only a generator for power failures it has high maintenance cost. So replacing the faulty battery set with new battery set is more effective.

High competition

Today there are many service providers in Sri Lanka. They provide some special packages to customers with fewer charges. So the customer use these

connection without using their PSTN connection. Until now SLT haven't introduced packages likes this. By introducing packages they can keep their customers and can increase the profit of the organization.

CONCLUSION

The research was so helpful to understand the telecommunication service and the equipment that they used. And also from it the failures occurring in wired network (PSTN) and how they affect service can be understand. And also it gave knowledge about the reasons for failures and how to overcome these problems. Though this research can be identified the root causes for service failures and waiting list for new connection. The main reason for the service failure is the power failures in the exchanges. To overcome this problem, placing the faulty battery set with new battery set is the best solution. The reasons for that, from this battery set, the exchange can be operated properly in commercial power breakdown more than 8 hours. And it has low maintain cost than other solutions. To prevent the transmission lost due to damage of the transmission path can be used the ring topology. In this method exchanges can transmit data in two paths. Although one path damage the exchange can transmit data from other path. By using this method it can maintain the continuity of the transmission.

The factors which affect to the delay of the new connection service can be identified from investigation. By starting a new project to provide new connection and repairing the faulty spare loop can be provide PSTN service to new customers without any delay. By increasing the quality of the service and the customer satisfaction this organization can be increased the income and the profit of the organization.

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