Operational challenges that confront the profitability of Digital Subscriber Lines for the Internet Service Providers in Egypt: System Dynamics Approach

Ashraf Adel Khattab
Sales Manager, Yalla Online Internet Services Provider, Cairo, Egypt
MBA Graduate, Maastricht School of Management, The Netherlands
Tel: +2 3350069, Mobile: 0101550058
akhattab@yalla.com, a.khattab@yallamisr.com

Khaled Wahba
Assistant Professor, Systems and Biomedical Engineering Department
Faculty of Engineering, Cairo University, Egypt
Academic Advisor, Regional IT Institute, Cairo, Egypt
Tel: +2 02 737 6006, Fax: +2 02 739 1380
Khaled.wahba@riti.org

ABSTRACT

The Digital Subscribers Lines (DSLs) services were considered one of the most important sources of revenues that the Internet Service Providers (ISPs) used to depend on in generating profits. Since the evolution of the Internet DSL services in Egypt in year 2000, the market had witnessed several transformations that ended up with the introduction of the Asymmetric Digital Subscriber Lines (ADSL) model in January 2002. The ADSL technology in the Egyptian Internet market had arrived accompanied with negative effects on other dedicated DSL services. The researchers worked on analyzing the challenges that affected the profitability of the DSL for the ISPs in Egypt from two levels a macro level which includes all the challenges whether external or internal and a micro level which focuses on the operational challenges only. A system Dynamics methodology has been adopted in this paper. At the end, data gathered from interviews as well as secondary data was fed into a system dynamics model, in order to be able to predict the effect of changing any of the operational variables and its effect on the profitability of the DSL.

INTRODUCTION

At the end of year 2001, and the beginning of year 2002, the Internet society witnessed the emergence of a new type of ISPs that acted as local carriers (ISPs that possess huge bandwidth through a direct fiber connection from Europe and/or USA and have points of presence in most of Egypt's exchange offices). This was coupled with the new regulations and rules done by the National Telecommunications Regulatory Authority (NTRA), the regulator in the Egyptian Information and Communication Technology (ICT) sector. Year 2002, witnessed the start of provisioning the Asymmetrical Digital Subscriber Lines (ADSL) services to the Internet market in Egypt for the first time. Actually the emergence of the ADSL services opened the door for home users to have a digital line at a high speed and low cost. Also the ADSL services opened the door in front of small to medium companies, and ISDN (Digital Dial-up) users to shift for the ADSL service instead of the analog dialing. The market growth was undoubtedly not relative to

the large number of such ISPs, consequently, the market share battle increased; customers became an increasingly scarce resource pursued by increasingly aggressive ISPs. The emergence of the ADSL had a beneficial effect on the Internet industry in Egypt as it shared in increasing the penetration of the DSL in the Internet Egyptian market and allowed home users who were dreaming of having high speed service of making their dream comes true. However the researchers presume that the ADSL emergence caused lot of negative impacts that threaten the profitability of the DSL products for ISPs. The appearance of the ADSL service was coupled by cheap prices and lower profit margins, especially after EgyNet and TE data became the monopolistic providers for the ADSL services over splitter at the meantime class (B) and (C) ISPs acted as resellers for class (A) ISPs. The cheap prices of the ADSL services affected the prices of other DSL services specially the dedicated ones and which the ISPs used to depend on in generating higher profit margins. At the meantime, because the ADSL subscriber's switching cost from ISP to another reaches zero in some cases, the customer started to have a higher bargaining power and a decrease in loyalty causing unstable stream of revenues for the ISPs that affected their profitability. Because the cost structure makes price competition difficult, pursuing customer satisfaction and retaining current customers should be a major concern for any ISP to maintain a sustainable position. Thus ISPs have to focus on how to increase profitability and minimize costs as soon as possible in order to be cable of facing the coming challenges, which will affect the ISPs' survivability in the market. Among those challenges the researchers chose to focus on the operational challenges and how it could affect the profitability of the DSLs for the ISPs.

PROBLEM DEFINITION

There is a doubt that the ISPs nowadays are confronting lot of challenges that threaten not only their profitability but also, their ability to exist in the market. There have been no researches, assessments or papers published studying this case in Egypt up-till now.

RESEARCH OBJECTIVE

The purpose of this paper is to assess the differential impact for some of the operational challenges on the DSL subscriber and accordingly on the DSL profitability, by using the system dynamics approach.

STATE OF THE ART

The researchers tried to examine the effect of some operations management variables over the DSL's profitability for the Internet Service Providers in Egypt. The data were gathered from both primary and secondary sources then converted into a causal loop to show the relations among those variables, and finally converted into a stock and flow to test the validity of the model. The researchers defined profitability as the ability of the ISP to pay all its expenses like salaries and network expenses, and generate enough profit which could maintain the ISP's survivability and growth. Therefore, in order to maintain profitability the ISP should determine the challenges that confront it. If the ISP understood how each variable affects the profitability of the DSL, it would be easy to monitor the obstacles and the problems associated with those variables and thus decision makers can overcome losses and maintain profitability.
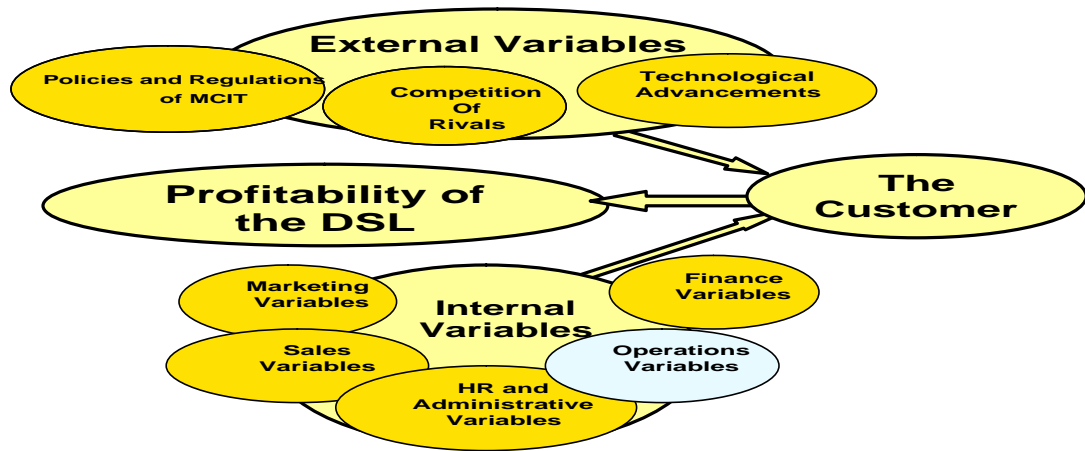
Figure 1: The DSL Profitability Model for ISPs from a Macro Level

Figure 1 shows all the internal and external variables that affect the profitability of the DSL. External variables include all the variables that affect the customer from outside the ISP. The ISP in this case has no control over it. Internal variables are those found inside the departments of any Internet Service Provider where every department has its own threats, the summation of all those threats represent challenges that confront the ISP's profitability and survivability. The idea behind the above figure is to explore the importance of the customer as the main source of generating profits for the ISP. The researchers interpreted the customer effect on the profitability of the ISP in terms of contracts signed or contracts terminated. Contract signed means that there is revenue for the ISP and contract terminated means loosing a customer and thus loosing a source of revenue. The researchers were interested to assess the impact of each of these variables on the customer and how the customer responds towards those variables. Among all variables, the researchers focused only on the operational variables in an attempt to examine what would happen to the DSL profitability if any of the operational variables were changed.
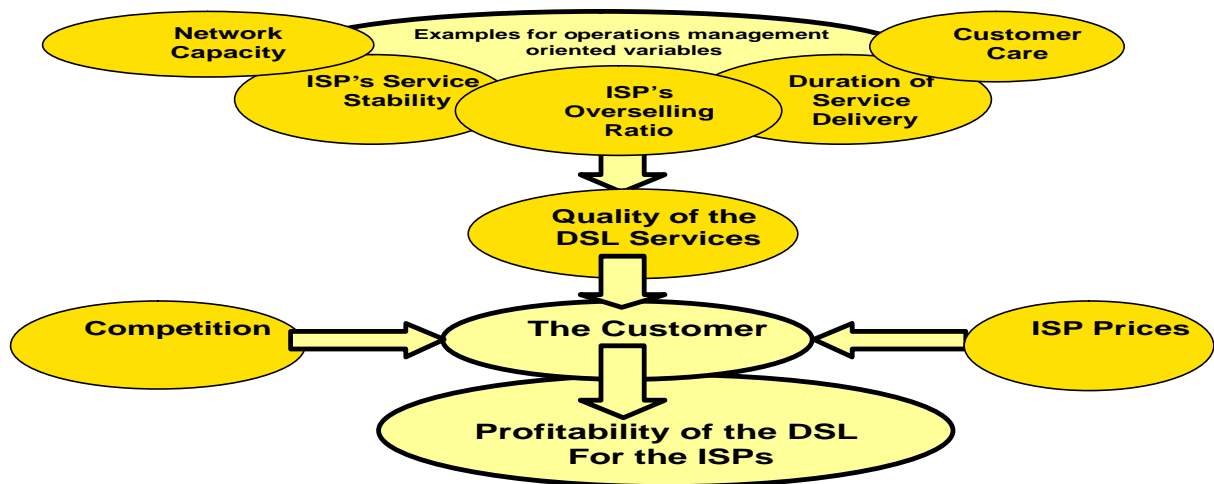

Figure 2: The DSL Profitability Model for ISPs from a Micro Level

The above figure represents some of the operations management variables and how it all affect the quality of the DSL services. Thus, Quality of Service is the output of the operations

department which at the end in addition to the prices settled by the ISP and the existence of external competition work on creating the customer's perception toward the quality of service provided by the ISP that affects his decision regarding continuing or terminating with the existing ISP and accordingly affect the profitability of the DSL.

MENTAL MODEL

Challenges that confront the DSL business in Egypt are growing by time and are getting more complicated. Selling more contracts and acquiring new customers can not be maintained unless the ISP can successfully meet the needs of the customer and understands how the customer perceives the quality of the DSL service. In order for the ISPs in Egypt move in the track of profitability, decision makers at different ISPs should start to analyze their past experience and see how they have acted relative to the market, at the same time, ISPs should start thinking of the future, and see how they would react with the challenges that might appear in the future. One of the best ways to examine all these issues is through creating management flight simulators as micro worlds where space and time can be compressed and slowed so we can experience the long-term side effects of decisions, speed learning, develop our understanding of complex systems like the DSL business and design structures and strategies for greater success. The researchers worked on designing a causal loop, which was fed by information gathered from interviews as well as secondary data. Then the data gathered was quantified in order to be fed to a system dynamics model to study the dynamics of and the relations among the DSL-profitability model.
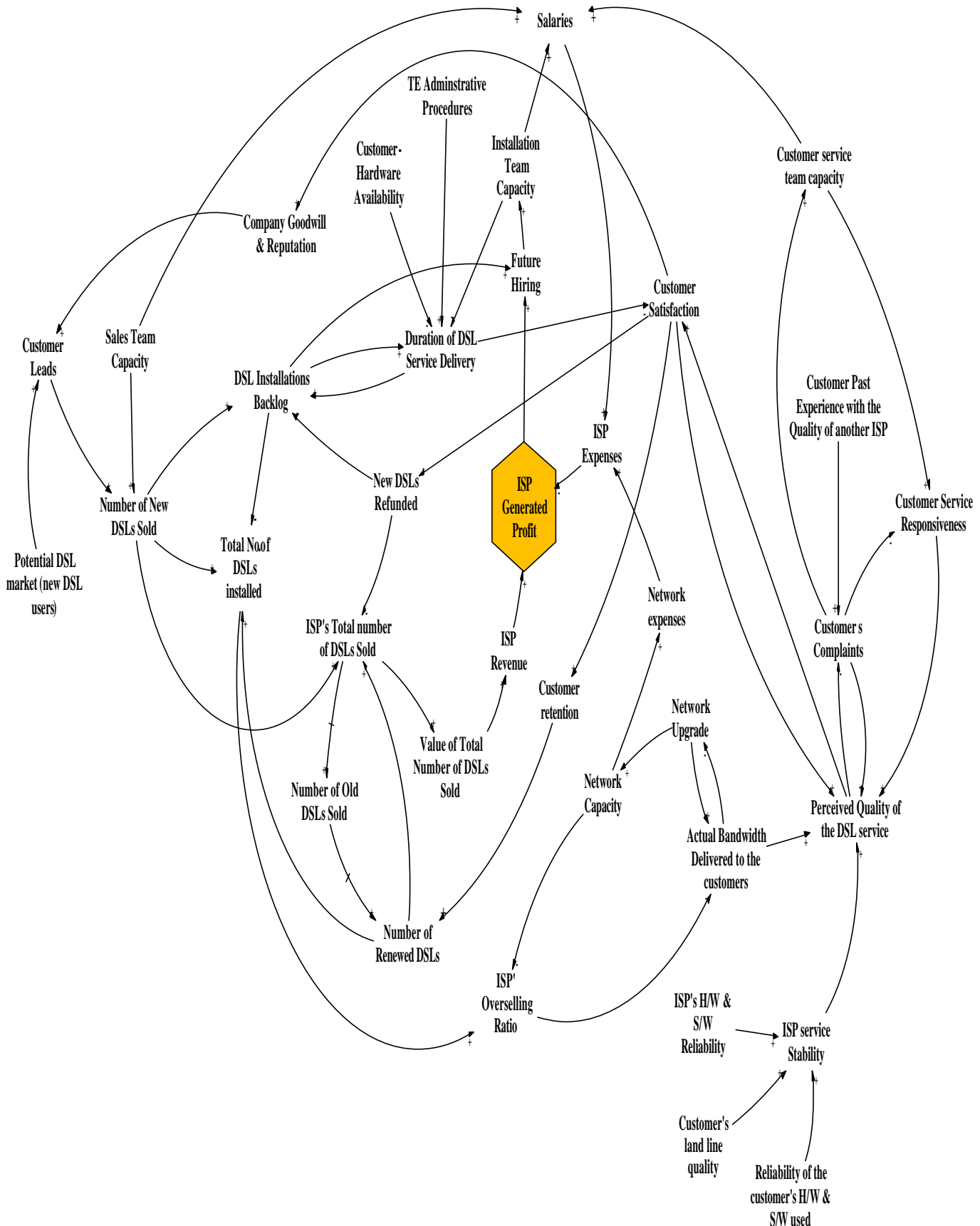
Figure 3 shows the causal loop for some of the most important operational variables that confront the profitability of the DSLs products for the ISPs. The causal loop comprises all the relations gathered from primary as well as secondary data. The researchers will break down this large loop into smaller ones, to easily describe the idea behind each loop.
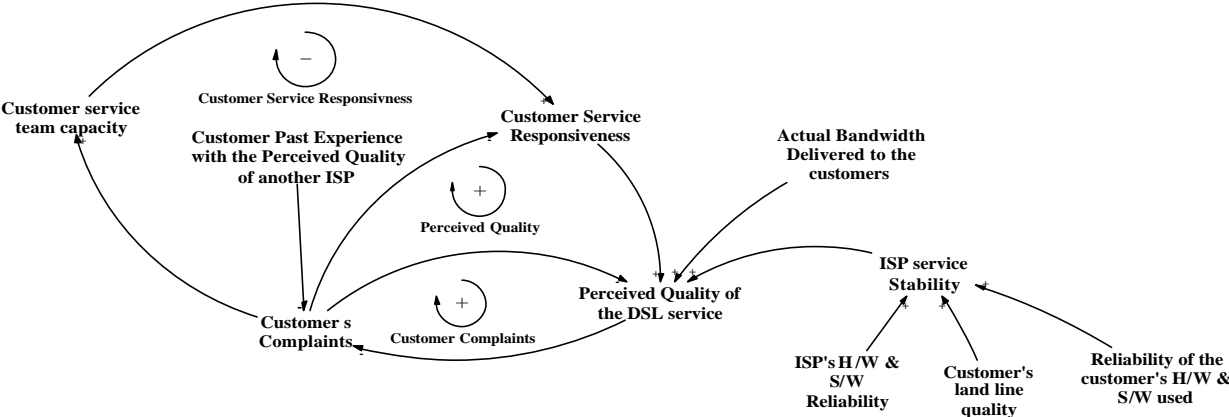
Customer Complaints Loops

Figure 4: Customer Complaints Loops

Figure 4 shows how the customer responds when his/her perceived quality is lower than the expected quality. The customer perceived quality for the DSL service is affected by many variables. Some of these variables might arise due to the ISP service instability or bandwidth congestions or because the customer is not convinced with the quality provided by the ISP due to for example, a previous bad experience with another ISP. At the end, all these variables cause the customer complaints to increase. As the customer complaints increase, the customer starts to call the customer care department of the ISP to inform them about the problem and how and when it could be solved. Once the customer care team receives the customer complaint they start responding to the problem through opening a trouble ticket to troubleshoot the problem until the problem get solved. The capacity of any call center or customer care department is equipped to handle a specific number of customer calls. In case of a critical problem that affects a large number of customers like for example, the disconnection of the ISP international bandwidth line, a flow of customer calls will arrive and the customer care department has to handle those calls. By time the customer care responsiveness will decrease and lead to a further deterioration in the customer perceived quality, as the customers will either find the customer care busy to report his problem, or the customer care will not be able to solve a larger number of customer problems due to the large inflow of calls.
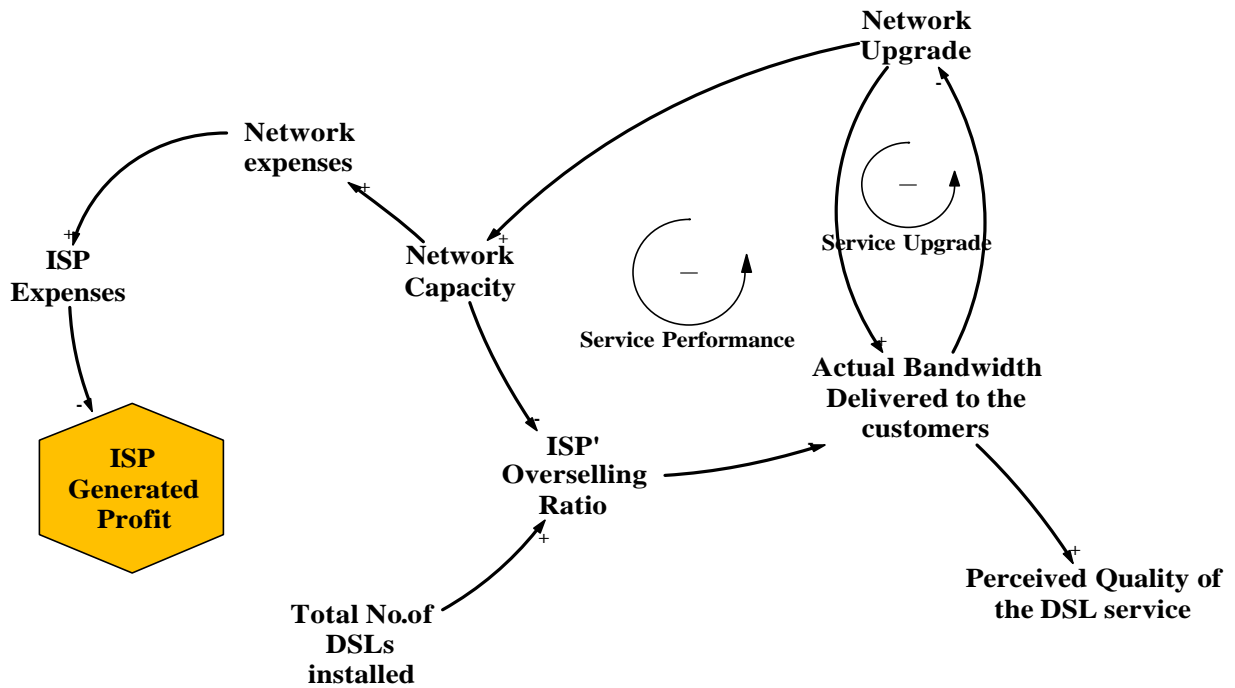
Network Capacity Upgrade Loops

Figure 5: Network Capacity Upgrade Loops

The network capacity of any ISP is designed to provide a specific amount of Internet bandwidths for its DSL subscribers. The amount of Internet bandwidths is controlled through a specified threshold level, which is determined in accordance with the management's settled overselling ratio. As the number of installed DSLs increase, the ISP bandwidth capacity starts to be congested until the ISP reaches the threshold level at which the network upgrade should be done. Of course upgrading the network to accept more DSL subscribers means additional costs incurred by the ISP, in terms of upgrading the ISP's international bandwidth in addition to buying additional hardware with more ports to connect more customers. The additional costs will affect the ISP's generated profit if the revenue was not that enough to meet those expenses. If the ISP's total bandwidth got fully utilized without upgrading the network, all DSL subscribers will be affected by this congestion as the actual bandwidth delivered to them will start to deteriorate and the DSL subscribers' perceived quality will start to deteriorate as well leading to customer complaints and dissatisfaction. Therefore, the ISP starts to do the network upgrade in order to maintain the same overselling ratio and thus the same level of quality performance and finally the actual bandwidth delivered to the customers starts to increase again.
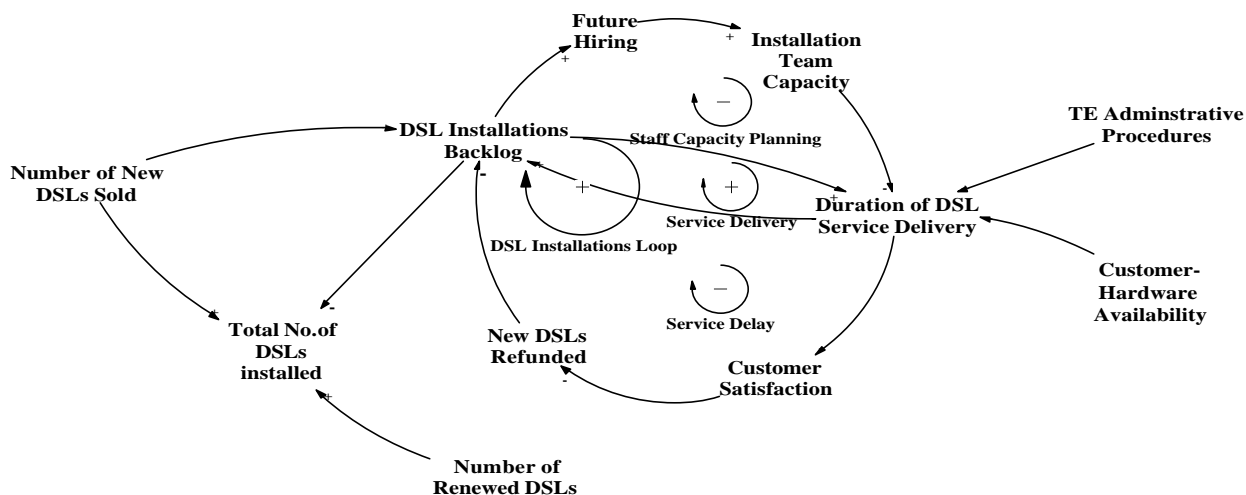
DSL Installations Loops

Figure 6: DSL Installations Loops

Once the ISP's sales man sells a new DSL, the installation process starts. The installation process starts by sending representatives from the ISP, delegated to fulfill Telecom Egypt' administrative procedures. Telecom Egypt's administrative procedures is a step undertaken by the ISP in order to acquire the approval of leasing the local loop (landline) which will connect between the customer premises and the ISP's hardware located in the exchange. Once the ISP representative gets the approval from Telecom Egypt, the ISP's technicians start to install the landline from the customer premises to the ISP hardware located in the nearest exchange. At the same time, the ISP purchasing department starts to purchase the customer's required hardware. Once the landline is installed the ISP sends an engineer in order to set-up and configures the hardware at the customer premises and the customer starts to receive the Internet service. Because, the ISP resources (Technicians, representatives, and engineers) are limited, and as the number of new DSLs sold increase, the duration of the DSL service delivery starts to increase. As the inflow of new DSLs sold increase more and more, the ISP resources will not be able to handle all the new incoming sales orders, as a result the delay in delivering the service will result in increasing the DSL installations backlog and the total number of DSLs which were expected to be installed during a given period will be reduced. By increasing the duration of delivering the DSL service, customers will start to be upset and dissatisfied, and in many cases lead to terminating the contract and refund their down payment. Of course as customers begin to terminate the contract with the ISP due to the delay in delivering the agreed service, the DSL installations backlog starts to decrease. As the ISP's management monitors the outflow of customers as a reason of service delay, the ISP starts hiring additional staff to assist and support the existing one, so that the new sold DSLs would be installed on time.
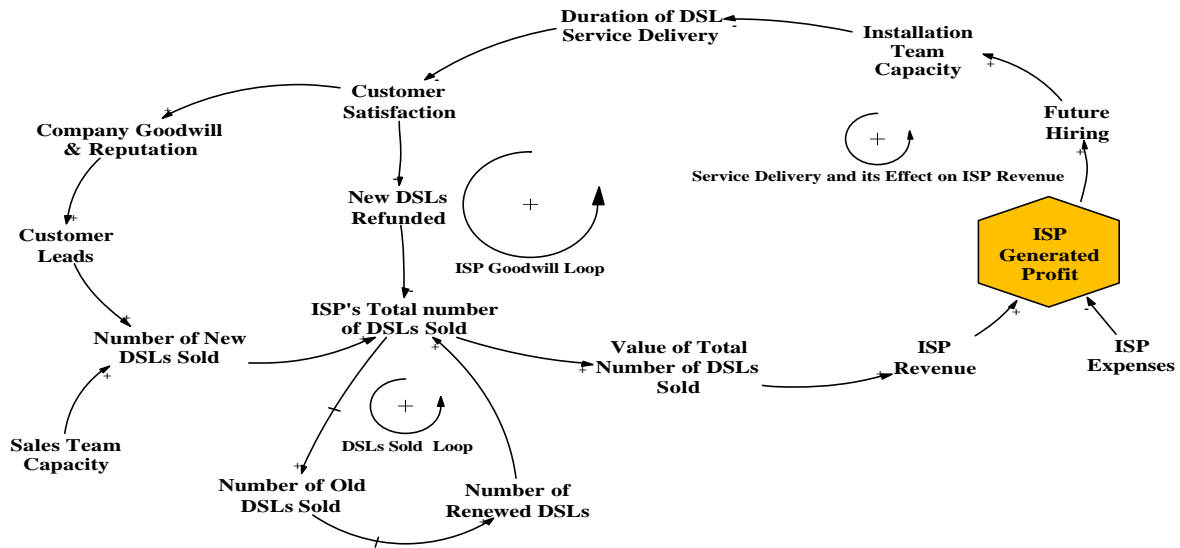
ISP Generated Profit Loops

Figure 7: ISP Generated Profit Loops

The source of DSL revenue for any ISP is money collected from selling DSL services for existing and new DSL customers. The ISP's total number of DSLs sold is the outcome of all new DSLs sold in addition to all renewed DSLs, and subtracting the new DSLs refunded. As the number of new DSLs sold increase, the ISP total number of DSL sold increase and thus, the value of DSL achieved-sales increase, which is considered the revenue for the ISP. From the profits generated, the ISP could take further re-investment decisions that work on supporting and increasing the efficiency of the existing system to generate more profits. One of those decisions is future hiring, which aids on accelerating the cycle of DSL installations and providing better services for the ISP's DSL customers. With a sufficient ISP's staff capacity, the ISP will be able to meet its coming orders of installations and thus the duration of service delivery will be shorter. Shorter delivery will consequently lead to more customer satisfaction and good reputation in the market, which will aid in attracting more new customers to the ISP.
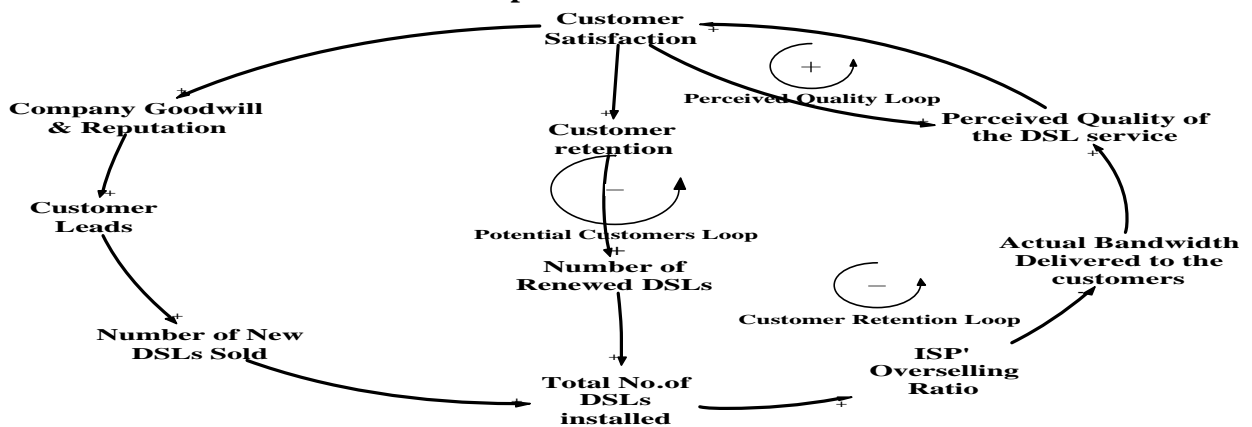
Customer Satisfaction-Retention Loops

Figure 8: Customer Satisfaction-Retention Loops

When the customer is satisfied from the service, he perceives the service-quality as of an acceptable quality performance and vise a versa. As the total number of DSLs installed increase, the ISP assigned overselling ratio increase, as a result, the actual bandwidth delivered to the customers will be negatively affected, and consequently, the customers' perceived quality would decrease. As the customers' perceived quality decrease, the customers will be dissatisfied. This will negatively affect both, the ISP reputation in the market, and the retention of the existing DSL subscribers. Consequently, the number of expected customers and the number of renewed DSL customers will decrease to affect the total number of DSLs installed and so forth.
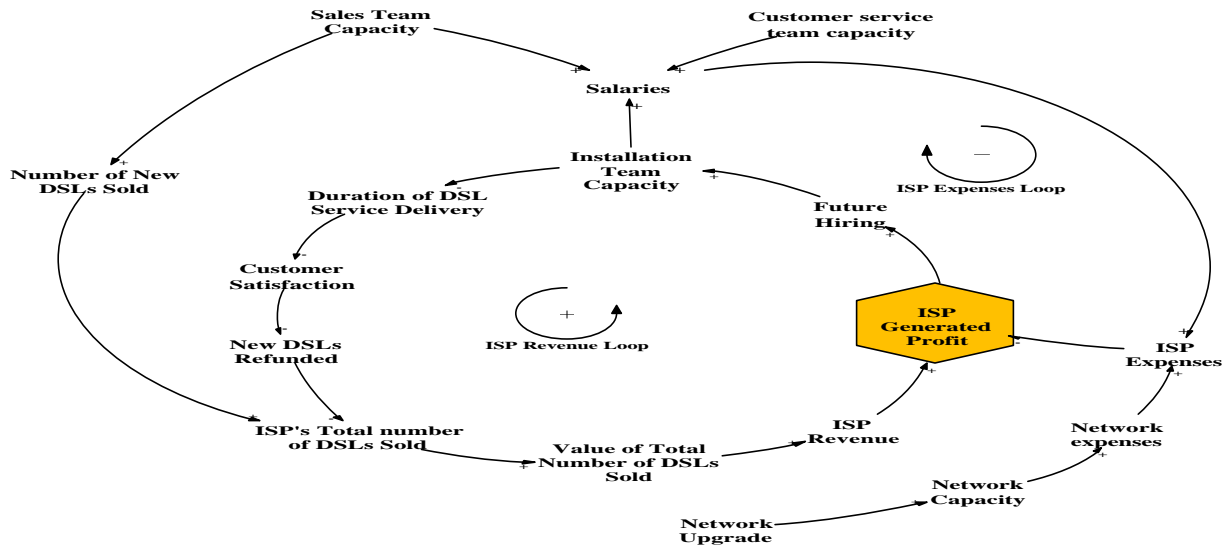
Revenues- Expenses Loops

Figure 9: Revenue-Expenses Loops

The resources of any ISP are limited and every ISP has to manage its business within its available resources until a point, where the ISP should increase its resources in order to meet its current and future demands. Once a new DSL is acquired, the installations team starts to do all the steps of installations. Those steps are controlled by the available staff capacity to handle the flow of new DSLs. If the staff capacity is not able to finish all the installation procedures at the required time, the duration of service delivery will be delayed; as a result, the customer will be dissatisfied and will take his money back after terminating his contract with the ISP. The customer refund will affect the value of the total number of DSLs sold, and consequently the revenue will be negatively affected. In order, to meet the inflow of new DSL sales and not to loose any further customers, the ISP should start to hire new staff at the departments which suffers lack of staff, and which cause the delay in service delivery. Once the new staff is hired the installations team capacity will be capable of handling the inflow of new DSLs, and delivering the service at the required time. As the staff capacity increase, the salaries will increase, and consequently the ISP expenses will increase as well. With the increase in the installations team capacity, the team will be capable of installing a larger number of DSLs within a limited time, and consequently, the ISP should make an upgrade for the network capacity to meet the demand of the new DSLs installed. Upgrading the network capacity will also lead to an increase in the ISP expenses.

STOCK AND FLOW

Information gathered whether primary or secondary is fed into a business dynamics model in order to analyze the Internet market quantitatively. The model starts at year 2000 till 2003. Most of the numbers used are taken on average from the interviews done from a specific ISP, taking into considerations that these numbers could be changed from ISP to another, and what seems to be relevant for one ISP would not be relevant for the other. The researchers worked on building a model, which could be modified, adopted and tailored by any ISP according to its relevant inputs. All units of bandwidths are measured in terms of 256Kbps, revenue is calculated in terms of total numbers of 256 Kbps sold multiplied by the value of single 256Kbps, expenses are calculated in terms of all cash out in Egyptian Pounds, and ISP profitability is calculated by subtracting expenses from revenues. All percentages and transit times given were taken as an average numbers from interviews.
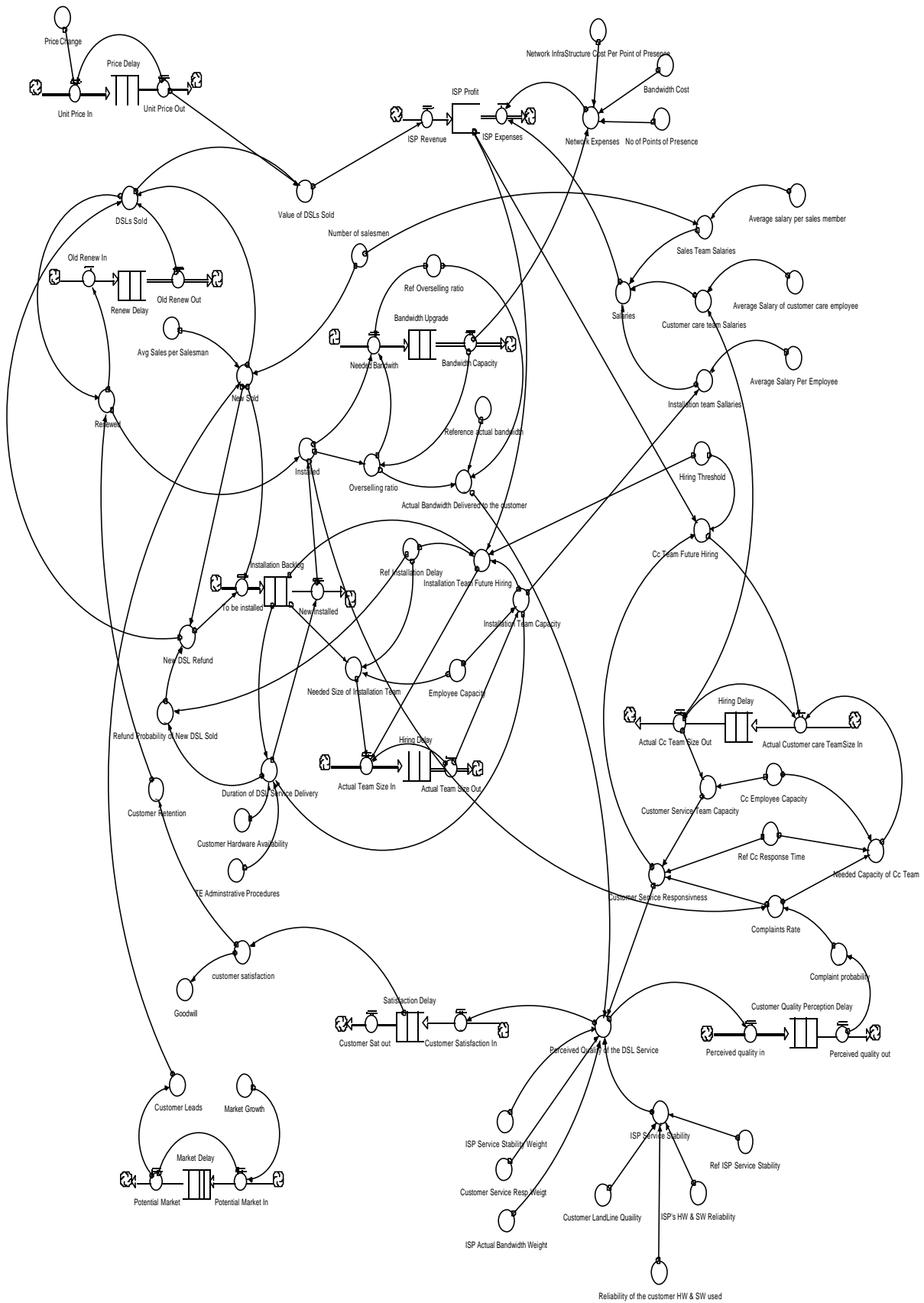
Figure 10: Stock and Flow Diagram

11

MODEL VALIDATION

The researchers worked on building up a model, which could be used to determine the effect of changing any of the operational variables on the profitability of any ISP. In order to make sure that the model is representative, the researchers will validate the model through two methods. First, the researchers will compare between the figures of profit generated from running this model over four years with the actual figures achieved by the ISP within the same period. For confidentiality reasons, all the numbers fed into the model are not the actual ones, and all numbers are based on the average of four years starting from January 1st 2000 till December 31st 2003. Second, the researchers will validate the model through choosing some of the operational variables and use sensitivity analysis tools applied through the software used in building this model to determine the effect of changing those operational variables on the profit of the ISP.
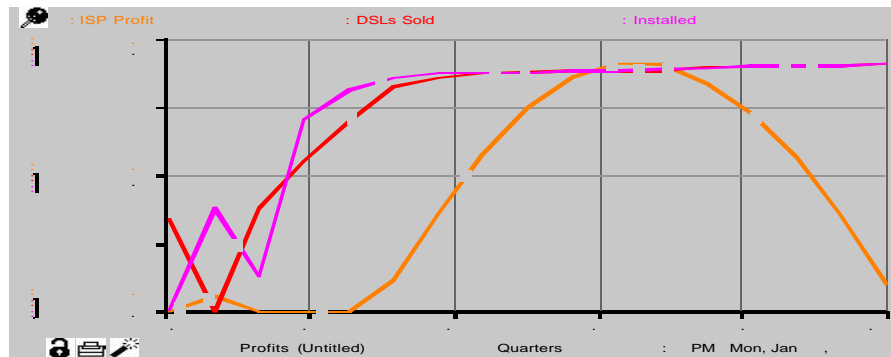
Output-Model Validation

Figure 11: The ISP's Generated Profit, Total Number of DSLs Sold and Total Number of DSLs Installed

By running the stock and flow model the researchers got the above figure which points out what happened to this ISP since its start in year 2000 till the end of year 2003. Figure 11 shows that the ISP's profit started to grow from the beginning of the second year (year 2001). The peak of profit was in the second and third year. The end of year 2003 showed a dramatic decline in the profit of that ISP compared with the profit of year 2002. The researchers presumes that the reason of profit degradation was due to the effect of the ADSL penetration into the market where the market witnessed fierce competitions, very cheap prices compared with the prices of the dedicated services and high expenses incurred by the ISP in terms of staff salaries, marketing expenses, and network upgrade. The following table represents the average figures of generated profits, total number of DSLs sold and installed by the ISP over four years.

Table 1: Stock and Flow Model Validation

Start of year 2000 till 2003	Output from Stock and Flow Model	Actual Data	Error
Average ISP Profit	394,082	405,954	2.9%
Average Total No. of DSL Sold	922	943	2%
Total No. of DSL Installed	919	934	1.6%

Table 1 compares some of the stock and flow model outputs with the actual ones. For confidentiality reasons all actual numbers does not represent the real ones, however actual numbers presented tend to simulate the real ones. In an attempt to make sure of the validity of the

model, the researchers while building the causal loop and the stock and flow model worked on getting the assistance of an operations director who had worked as an operations manager for IDSC and for several ISPs.

SENSTIVITY ANALYSIS-MODEL VALIDATION
The below figures show the effect of changing some of the operational variables on the profitability of the DSL services for the ISP. Although the numbers shown from the graphs are not realistic, but what the researchers are looking for at this point is the trend of the curves:

- **The effect of changing the overselling ratio over the actual bandwidth delivered to the customer, the customer service responsiveness, customers' perceived quality, and profit** assuming different rates (0.1, 1) take into consideration that 0.1 will represent the lowest level of over selling ratio and 1 will represent the maximum overselling ratio (The more the ISP install new DSL lines, the more will be the overselling ratio and the lower will be the actual bandwidth delivered to the customer).
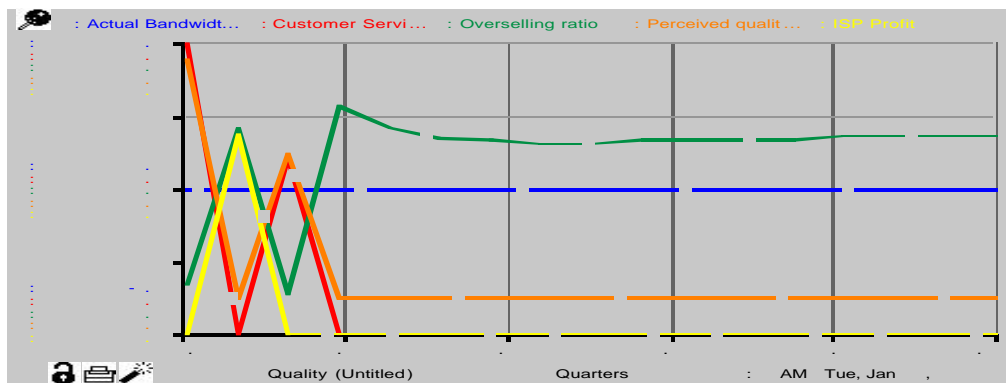

Figure 12: The Effect of Hundred Percent Overselling Ratio on The Profit of the DSL for the ISP, the Actual Bandwidth Delivered to the Customer, and Customer Care Responsiveness

As shown in figure 12, as the ISP increases its overselling ratio to a hundred percent the actual bandwidth delivered to the customers deteriorates, the customers' perceived quality is negatively affected; customers start to complaint, and terminate their contract with the ISP leading to deterioration in profit.
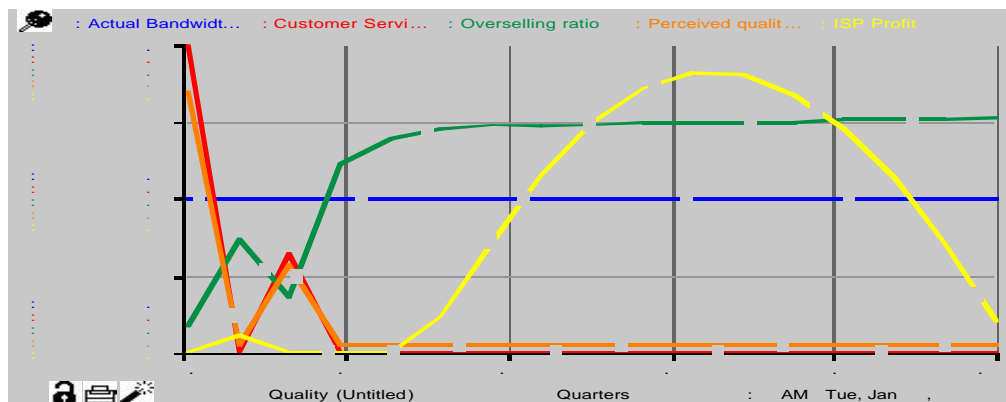

Figure 13: The Effect of low Percent Overselling Ratio on the Profit of the DSL for the ISP, The Actual Bandwidth Delivered to the Customer, and Customer Care Responsiveness

As shown in figure 13, once the ISP started to apply a low over selling ratio, customers started to have their full bandwidth, the customers' complaints decreases and accordingly the customer service responsiveness increases also. However, as the ISP's sales team is continuing to sell, the inflow of sales causes an increase in both the number of DSL installed and profits until the overselling ratio starts to boom again causing lower customers' perceived quality, more complaints, and so forth.

MARKET PREDICTIONS

The researchers in the coming part will try to predict what would happened for that ISP in year 2004 assuming that the ISP will not change any of its strategies or plans, and taking into consideration that any of the predicted conclusions would be changed in case the ISP succeeded in overcoming the problems that it faced in year 2003, and incase the ISP changed its strategy to coup with the existing challenges and threats. The model will be extended to run for five years (20 quarters starting from year 2000 till the end of year 2004).
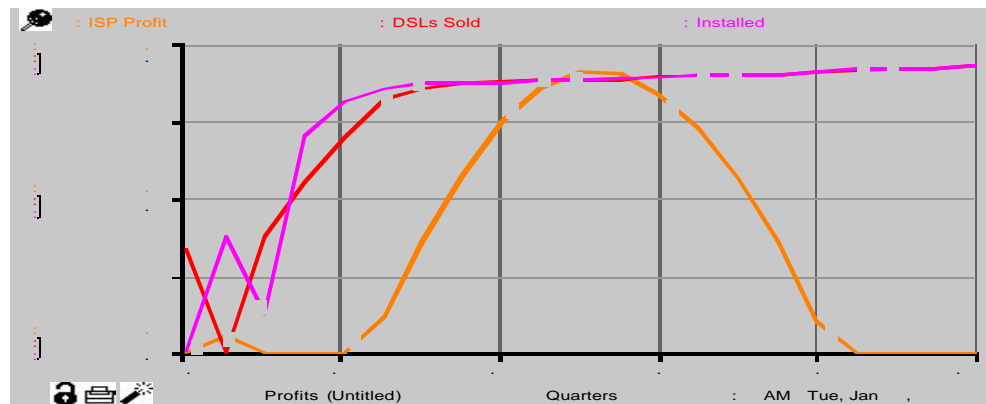

Figure 14: The DSL Profitability Predictions for the ISP

As shown in figure 14, the ISP in year 2004 will witness a further decline in its profit till it reaches zero, at the same time the number of DSLs sold and installed will increase at a decreasing rate and might start to decrease in the coming years. This gives an indication that although the ISP is selling and although the revenue of the ISP is increasing, but still the ISP is affected by a lot of challenges which affect its expenses such as the continuous upgrade which the ISP should keep on in order to maintain its level of service quality. Also the expenses per ADSL customer is very high compared with the revenues generated.

RESEARCH FINDINGS

The findings of the research were gathered from interviews, whether face to face or through telephone. In this section, the researchers answer the minor research questions.

- The first question was related to the extent by which the customer Internet perceived quality affect the profitability of the DSL for the Internet service providers. From the interviews settled with representatives from customer care and sales departments for class (B) and (C) ISPs, they both agreed that the retained customer is the basic and main enticement of profit for any ISP. Without customer retention, the ISP will not be able to survive and maintain profitability. The Interviewees agreed that to successfully retain the customer it is very important to understand how he perceives the DSL's delivered quality of service from his

point of view and not only from the ISP's point of view. Some of the interviewees stressed on the importance of customer relation management (CRM), which assures customers satisfaction. The ISP should work on following up with its old customers even if they were not complaining, this ensures more customer loyalty toward the ISP. Representatives from business users indicated that the availability and the responsiveness of the ISP's customer care department are of the most important issues, which affect the DSL subscriber's perceived quality of service. All interviewees who had previous experience with more than one ISP agreed that of the basic issues, which made them willing to switch to other ISPs were the unavailability and the bad response of their ISPs.

- The second question was related to the extent by which the customer past experience with the quality of other ISPs affect the perceived quality of the current ISP. Representatives from customer care departments at different ISPs mentioned that they noticed that new customers who had terrible past experiences with the quality of other ISPs tends to distrust the current ISP's quality of service for a period of time that reaches an average of five months of stable service after this period the customer starts to create a positive perception for the current ISP's quality of service after which the customer starts to trust the service of the ISP.

- The third question was related to the extent by which the ISP service quality affects the customer satisfaction and the customer retention. All interviews conducted by DSL subscribers indicated that there is a direct relation ship between the quality of service perceived by the DSL subscriber and between the customer satisfaction and his retention with the same ISP. Thus the researchers presume that customer retention cannot be created unless it is preceded with customer persuasiveness, then customer satisfaction, then customer trust, then customer loyalty and finally customer retention. Most DSL subscribers agreed that as long as they are satisfied with their ISP, they won't look for other rivals unless the ISP's delivered quality of service is not acceptable.

- The fourth question was related to the extent by which the customer satisfaction affects the goodwill of the company. From the interviews settled with both ISPs and DSL subscribers, the researchers presume that the effect of the customer satisfaction on the goodwill of the company does not take an immediate effect, the average period taken such that the customer satisfaction would have an effect on the goodwill of the ISP is from a year to a year and half. All interviewees mentioned that the ISP usually starts to realize the effect of customer satisfaction on the goodwill of the company from two main issues: first from the number of DSL leads that arrive to the sales department of the ISP and second from the number of old DSL contracts which are renewed yearly. When the ISP looses a customer after a period of time, its effect to the ISP is realized in the following year when the source of revenue for such a refunded customer is zero balance, which means that the ISP has failed to convince its customer by its quality of service and accordingly affects the ISP's goodwill.

- The fifth question was related to the extent by which the duration of service delivery affect the customer's decision to terminate the contract with the current ISP and look for another one. From the interviews settled with the DSL subscribers, the average time taken by the customer, after which he starts to look for other ISPs is two weeks after the promised period of delivery.

- The sixth question was related to the extent by which the duration of service delivery affects the DSL installations backlog. Has a strong effect as the duration of service delivery increases, more and more DSL lines waiting for installations are accumulating causing the backlog to increase.

- The seventh question was related to the extent by which the ISP's service stability affect the customer's perceived quality of the DSL services. Through the interviews settled with the DSL service providers and with the DSL subscribers, the researchers summed-up the most important issues that affect the ISP service stability into: the reliability of the ISP's hardware and software used, the reliability and quality of the customer's landline, and finally the reliability of the customer's hardware and software used. The malfunction of any of those issues would negatively affect the ISP stability of service, which accordingly will affect the customer's perceived quality.

- The eighth question was related to the extent by which the ISP's customer care responsiveness affects the perceived quality of the DSL service. All DSL subscribers whether business users or residential users agreed that the ISP's customer care responsiveness is one of the major aspects that affect their decision to retain with their current ISP or to shift to other rivals.

- The ninth question was related to the extent by which the customer complaints affect the customer service responsiveness. From the interviews settled with customer care representatives working at different ISPs, the interviewees indicated that in cases of crucial technical problems which confront the ISP, the ISP's customer care staff responsiveness might be affected due to the large number of phone calls received simultaneously and due to the limited number of telephone lines available to the ISP.

- The final question was related to the extent by which the ISP's actual bandwidth delivered to the customers affects the customers' perceived quality of the DSL service. All DSL subscribers agreed that the ISP's actual bandwidth delivered to them is one of the most important issues that affect their judgment about the ISP's delivered quality of service.

CONCLUSION

From the interviews done by the researchers and from secondary data gathered the researchers can consider the following among the most important ingredients for the DSL quality, and of which, the ISPs should take care while providing their DSL service:

1- Customer Relation Management (CRM) in terms of:
- **The ISP's call center availability**: easy to be accessed no busy calls.

- **Short responsive time**: hiring skilled staff, who can quickly troubleshoot and identify the problem in limited time.

- **Customer care staff** capable of handling the phone conversation with the customer in a professional way, and capable of convincing the customer in case the problem exists from the customer's LAN and not from the ISP.

- **Long-term relation with the customer**. The DSL service should not be a line installed to the customer and then forgotten; the ISP should keep its relation with the customer after the sale to guarantee his loyalty.

- **Presentable installation engineers**: Installation engineers are engineers responsible to visit the customer premises in order to install and run the service. Those engineers should be trained on how to treat the customer, how to speak with him and how to solve any problem done by the customer.

2- Actual Bandwidth delivered to the customer: an issue which is related to the ISP's overall strategic policy regarding targeted profits and quality of service delivered.

3- Service Stability in terms of: reliable hardware provided to the customer, reliable landline installed at the customer premises, and reliable ISP's network infrastructure.

REFERENCES

Huston, Geoff. (2001). ISP Survival Guide: Strategies for Running a Competitive ISP

Anthony J. Pennings. (2002). History of Information Technology

DSL world Wide Data Analysis. (2003). Point Topic Consulting Firm Retrieved November, 10, 2003 from Web Site: http://www.point-topic.com

Internet Connectivity in Egypt, NICI (2001). Retrieved November, 10, 2003 from Web Site: http://www.nici.com.eg

Sterman, John D. (2000). Business Dynamics: Systems Thinking and Modeling for a Complex World. United States: McGraw-Hill

Forrester, J.W. (1975), Planning and Goal Creation

Needles, Powers, Mills, Anderson.(1999). Principles of Accounting

Macguigan, Harris. (1999). Managerial Economics

Samuel C.Certo. (1992). Modern Management

William J. Stevenson.(1998). Operations Management

Nichels, Mchugh, Mchugh .(1994).Understanding business

Grönroos, Scheuing, E.E and Christopher, W.F. (1991). The Service Quality Handbook: Quality Comes to Service

William A. Sherden, (1992), Improving Customer Retention

Abdel-Hafez, Fatma. (2003). RITI: Assessment of the Free Internet Access Project on the Internet Market in Egypt

Hassan, Ashraf (2001). RITI: Strategic Implications of Telecommunications Deregulation in Egypt

Mohsen, Kholoud. (2003). RITI: Internet Diffusion in Egypt: An Analysis of the Impact of Free Internet Policy

Strategic Marketing and Research, (2003), Retrieved December 2003 from the web site: http://www.stratgyic -marketing/article023/hutter.pdf

The World Fact Book 2002. Egypt. Retrieved June 24 2003, from the CIA World Fact Book. Web site: http://www.cia.gov/cia/publications/factbook/geos/eg.html

ITU (2002). Information Technology. Retrieved July, 17, 2003 from the ITU Web site: http://www.itu.int/itu-d/ict/statistics/internet01.pdf

Dutton, W.H. Rogers, E. M., & Jun, S. H. (1987). Diffusion and Social Impacts of Personal Computers

Pegasus Communications (2001). Causal Loop Diagrams. Retrieved August 18, 2003, from Pegasus Communications, Inc. Web site: http://www.pegasuscom.com/cld.html

ITU (2002). Information technology. Retrieved August, 5, 2003 from the ITU Web site: http://www.itu.int/ITU-D/ict/statistics/atglance/internet01.pdf

The World Fact Book 2003 (2003).Egypt. Retrieved September, 28, 2003 from the CIA World Fact Book Web site: http://www.cia.gov/cia/publications/factbook/geos/eg.html

Information Technology in Egypt. April 2002, Business Studies and Analysis Center (BSAC), American Chamber of Commerce in Egypt. Web site: http://www.amcham.org

Jagdish Sheth, Banwari Mittal, and Bruce I. Newman, Dryden Press. (1999). Customer Behavior: Consumer Behavior and Beyond