Managing New Service Development through Relationship Marketing.
An application of Six Sigma DMAIC methodology in a Telecom Company.

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Abstract

Customer-oriented processes are essential to achieve customer satisfaction. This research describes the application of the concepts of Relationship Marketing as a starting point in the process of developing new services in a telecommunications service provider in Spain. In the quest to increase customer satisfaction, this paper seeks to understand whether the structure of internal processes is the most suitable to channel customer requirements using relationship marketing philosophy but in order to use a systematics tool and a robust method; DMAIC methodology of Six Sigma is applied. Previous researches have contemplated the used of Six Sigma methodologies within manufacturing industries, while this research tries to explore a unique niche by shifting from a production approach, to a service-process, where few researches are found. The scientific research is initiated with the exploration of New Service Development (NSD) processes in the company allowing the preparation of As-Is process maps. Two ways or scenarios are identified for developing new services in the company; the first one where “Standard Services” are developed and proposed by the company, while in the second scenario, services born from a specific customer requirement and known as “Special Projects”. The collection of the Voice of the customer (VOC) identifies 13 criteria that are essential for purchasing, making possible to compare the linkage between internal activities with customer requirements. In a final stage the methodology proposed is validated with a service within the company portfolio.

Significant contributions of this research are presented through the framework proposed so as to measure the performance gaps within the services provided by company, regardless of their lifecycle stage, which can also be extrapolated to other businesses of the group. Moreover it provides an understanding on the impact of each process activities in a specific requirement highlighting the most Critical to Quality (CTQ) activities and proposing improvement opportunities.

Key-words: New Service Development (NSD), Relationship Marketing, DMAIC OF Six Sigma, Critical To Quality (CTQ), Voice of the Customer (VOC), Customer Satisfaction, Scenario 1 “Standard Services”, Scenario 2 “Special Solutions”.
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To all again, many thanks.

Challenges are what make life interesting; overcoming them is what makes life meaningful.  
*Joshua J. Marine*
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List of Acronyms

The acronyms will be kept in the “Spanish” nomenclature so it is easy to the reader inside the company, to relate with their usual acronyms.

AR – Action Research
CTQ – Critical to Quality
DPS – Product and Service Development Department
ISBU – International Services Business Unit
ISP – Internet Service Providers
IT – Information Technology
ITSM – IT Service Management
KPIV - Key Process Input Variables
KPOV - Key Process Output Variables
MKTP - Product Marketing Department
MKTO – Operative Marketing Department
NSD- New Service Development
OB(s) – Operating Business
PdP & PdS – Plan for developing Products and Services
QoS – Quality of Service
RACI – Responsible, Accountable, Consulted and Informed.
RM – Relationship Marketing
SLA – Service Level Agreements
TG – Telecommunications Group
TLPS – Telepresence Service
TTM – Time to Market
TW – Telecommunications Wholesaler
VOC – Voice of the customer
WBS - Work Breakdown Structure
1 INTRODUCTION

In today’s dynamic and fast-growing markets, telecommunications’ service providers are struggling to become more and more competitive, devoting considerable efforts in improving processes management. At the same time consumers are becoming more informed and able to choose among many telecommunications’ service providers.

For this reason and so as to remain competitive, service firms are giving more recognition to service quality concepts, it is no longer enough to satisfy the customer, but retaining them requires considerable efforts from all the members of the supply chain from development to delivery. Creating loyal relations is measured through two major areas; service quality and meeting customer needs.

Increasing customer loyalty and retention and moving from one-time loyal customers to creating partnerships, brings to focus the concept of Relationship Marketing, used as a starting point of the research. At the same time managing relationships with internal and external customers is a very subjective task usually lacking a methodological and systematic framework.

The uniqueness of this research study is presented due to the application of a methodological tool that is usually applied to manufacturing processes that is used as a framework to improve service quality in this research. This combination seeks to employ a methodological tool applied in six sigma projects, such as DMAIC, to encourage a customer-oriented process where the outcome is focused on improving service quality and hence increasing customer satisfaction. In another words, whether DMAIC in this research defines the “How” to proceed with a process improvement, Relationship Marketing will serve as the “What” of the improvement.

This research study is conducted in the Telecommunications Group (TG) a leading organization in the Spanish industry with a broad participation worldwide. TW, the area where this study is performed, is the Telecom Wholesaler and a part of the group (TG). TW is also known as the “factory” for the organization, due to the characteristics of its main activities that are to develop international wholesales services for TG customers.

The basis of this research is centered in analyzing the gaps between the services developed by TW and the services requested by the market, so as to increase customer retention and satisfaction.

The sources of the empirical study have been the author’s observations, along with an extensive research on the lifecycle for new service development. This research uses data collected primarily from interviews with TW’s personnel and validated with internal information and market researches made by professional analysts, found in the company’s knowledge network portal.

After this preface, the document is displayed across 8 chapters. Initially a brief introduction of the development of new services in TW is given, highlighting the two types of new service development in TW. The scenario classification is made to
distinguish “Standard projects” from “Special projects” in the company. Within this section, the research questions are presented along with the objectives to be achieved.

Then, chapter two breaks down the methodological structure of the document and the scientific method used to conduct research, where the deliverables for each DMAIC’s phase are described.

In the third chapter TG and TW organizations are presented, in terms of their portfolio, organizational structure and its customers. Special emphasis is given to the MKTP group within TW that is dedicated to development of new products and services where this study has been carried out.

Literary approaches are described in chapter four, using the concepts of Relationship Marketing as a starting point to raise a customer focused organization, through the DMAIC methodology of Six Sigma. Employment of DMAIC structure enables a basis for improving service quality, therefore encouraging an increase in customer satisfaction and minimizing the gaps between customer requirements and the services offered by TW.

The empirical analysis is covered through chapters 5 to 7, breaking down the DMAIC methodology in its 5 Phases; Define and Measure in chapter 5, Analyze and Improve in chapter 6, and Control in chapter 7. The target is to identify critical to quality (CTQ) drivers and activities, to suggest improvement opportunities.

The final and eighth chapter collects the outcome of this investigation based on three areas, results obtained, answers to research questions and finally the academical and practical significance of this research.

1.1 General Overview – TG and TW

As stated, TW is a Telecom Wholesaler organization belonging to the Telecom group (TG), a leader in the telecommunication’s industry in Spain. TW’s function is to develop and deliver wholesale services for the Telecom Group worldwide.

Within TW, the department of Product Marketing and Service Development (MKTP) performs an essential role in the lifecycle of services, which is developing new services and solutions. Developments in TW are treated in two different ways, projected in this research as “scenarios” depending on where the new service idea or request arises.

In the first scenario (Sc. 1) ideas of new services are determined by the company’s human capital and documented in a common file to be revised in annual meeting. Instead, the second scenario (Sc. 2) is about new services born from an End User’s specific requirement, being the output a customized solution that can be later standardized and incorporated into the standard service catalog.

Ceaseless competition in the industry has obliged companies to increase flexibility, maximize the portfolio and to manage more accurately the service’s supply chain. At
the same time customers are seeking for the best and most affordable option among service providers, increasing significantly their bargaining power.

Within the TW’s service’s portfolio, some solutions have not reached the forecasted sales, either by the increasing market competition or due to characteristics of a certain service.

Main critical issues addressed by TW’s human capital are gaps between the service developed by TW and customer’s expectations, leading to low customer satisfaction in both scenarios and a high time to market. The reason for these nonconformities may vary according to the scenario, but in both cases improvements areas are to be identified and analyzed at the beginning of the service lifecycle.

Thus, this company-based research is organized in order to gain empirical evidence on the NSD lifecycle, understand quality drivers for wholesale customers and to explore where is the gap between the services developed by TW and the needs of the market. At the same discover the linkage between the customer perceived value and TW’s current processes in order to target improvement activities and solutions in each scenario.

Besides, this research seeks to understand whether the structure of the internal processes for both scenarios in TW is the most suitable to channel customer requirements without affecting the time to market.

The interpretation of the Voice of the Customer (VOC) in this analysis was initiated with the collection of empirical information and records that provided evidence and encouraged the selection of this research.

1.2 Research Questions

Developing long term relationships with wholesale customers is mandatory for the evolution of telecommunications’ service providers. The relationship is grounded by understanding customer priorities. Within the service lifecycle, the development phase should be devoted to understanding customer needs and requirements, because most of the problems emerging when developing new services arise because of poor data collection.

Considering the problem background, the following questions are proposed so as to guide the research and are complemented with the following addressed sub-topics that are in line with improving NSD management:

- How is New Service Development (NSD) managed in TW?
  - Which are the critical to quality (CTQ) variables that drive customer satisfaction in the telecommunications wholesale industry?
  - Which are the most CTQ activities in the lifecycle of both scenarios?

- Where are the gaps between the services developed by TW and the Voice of the customer (VOC)?
1.3 Objectives

The purpose of this research is centered in understanding and managing the processes embedded in the development of new services within TW.

The objectives are categorized into primary and secondary; primary objectives describe the purpose for conducting this research, and the secondary objectives are those achieved as an outcome of this research.

**Primary Objectives:**

- Explore the process of developing new services in TW, for both scenarios considering standard services (Sc.1) as well as customized solutions (Sc.2) to better recognize gaps between the services developed and market needs.
- Understand the purchasing priorities of wholesale customers when selecting a Telecom service provider.
- Translate the VOC into measurable critical to quality (CTQ) drivers.
- Analyze the linkage between the current NSD processes in TW, against the CTQ drivers, so as to pinpoint performance gaps.
- Identify CTQ activities within the NSD lifecycle for both scenarios.

**Secondary Objectives:**

- Find improvement opportunities focused in increasing customer satisfaction, by analyzing performance gaps among current NSD process’s activities.
- Establish a framework to analyze the service performance.
- Define key performance indicators to evaluate and monitor performance.
- Create competitive advantage opportunities by comparing TW’s performance against the performance of different business providers.
- Promote customer retention through relationship marketing with all the actors of the service supply chain, for the mutual benefit where the flow of information and communications are improved.
2 RESEARCH METHODOLOGY

This chapter’s objective is to describe the paradigms, approaches and methodology used to guide this study. Subsequently the scientific research method is defined in terms of the methodological approach used in Six Sigma, known as DMAIC, with the main purpose of structuring systematically the investigation to answer the research questions exposed in chapter 1.

In the last section, the sources of analysis for data collection are defined, classifying data into primary and secondary. The methodology used serves to frame the analysis and furthermore provides a fundamental foundation for the development of the research project.

2.1 Research Paradigms

The term “paradigm” is defined by Collis and Hussey (2009, p. 55), as a research practice used to frame the investigation in accordance with the views, philosophies, nature of knowledge and assumptions of people.

In order to conduct this company-based study, two research paradigms are explored: Positivism and Interpretivism. For the researcher, having the possibility to observe as an intern within TW’s environment and produce subjective qualitative data, gives the study the characteristic of interpretive.

Interpretive research paradigms have certain methodologies associated as the “Case Study Research” which have been selected for investigating NSD lifecycle process in TW. Yin, (2009 p.18) defines the “Case Study Research” as “an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.”

This research study is focused from a standpoint of developing new services in TW, where no significant barriers exist between NSD life cycle process and the context.

Among the “Case Study Research”, the “Action Research Methodology” is when the researcher intercedes inside the research context to try to get full performance improvements throughout the process.

The “Action Research” is a problem-solving method used to conduct a research “in action” where the research activities are concurrent with the daily action and situations. It involves not only the researcher but also members of the organization who are actively participating in a specific project. Some characteristics of the AR are (Coughlan and Coghlan 2002):
Research Methodology

- “In action” rather than “about action”, where AR uses a scientific method to solve certain problems.
- Participative, because it requires the involvement of various members, further than been objects of the study, their participation is key for the process.
- Concurrent where simultaneous scientific work is performed while actively participating in the daily action.

Hence, the approach used for analyzing the two-presented scenarios for developing new services in TW are outlined as a Case Study Research as shown in Table 2.1.

<table>
<thead>
<tr>
<th>Scenario 1: Standard Services</th>
<th>METHODOLOGY</th>
<th>REFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case Study Research</td>
<td>Robert Yin,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2009)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scenario 2: Customized Solutions</th>
<th>METHODOLOGY</th>
<th>REFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case Study Research</td>
<td>Robert Yin,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2009)</td>
</tr>
</tbody>
</table>

Table 2.1 Methodological Design of the applied research

2.2 Research Approach

Three approaches can be used to solve the research question. These approaches are; Induction, Deduction or Abduction (Collis and Hussey, 2009). Figure 2.1 illustrates the approaches and the roles facing reality versus theory, as the authors describe them.

The Deduction approach starts with a well-known theory applied to reality through hypothesis, instead an induction approach follows the reality where empirical evidence is collected to propose and induce a theory to the situation. Reichertz refers to induction as the “logic of discovery”, while deduction is described as the “logic of justification” (2011). Lastly, the Abduction approach is described as a bidirectional method ranging between theories and reality.

This research study is constructed following an Abduction approach. In TW, the researcher is moving between theory and reality, documenting NSD process from the end user, and gathering empirical data on recent and previous projects.

![Figure 2.1 Research Approaches (Collis and Hussey, 2009)](image-url)
2.3 Scientific Research Method

This scientific research is initiated using as a starting point the concepts of Relationship Marketing, so as to promote a customer-oriented process where the focus is in attracting and maintain relations to achieve customer satisfaction.

TG and TW as Telecom companies have a Six Sigma culture, despite the approach is usually applied in production and manufacturing processes, Six Sigma methodology can be also applied to “services process”, historically projects have been previously deployed within the Telecom Group (TG) and it is proven that even in the telecom industries, Six Sigma is a concept for improving service quantity (S.-H et al. 2012 p. 625).

The methodology to deploy Six Sigma projects is known as DMAIC and is defined as a problem solving method and a “gated-process” that encompasses 5 key phases; Define, Measure, Analyze, Improve and control as shown in Figure 2.2 (Pyzdek and Keller 2009).

The main objective for selecting DMAIC approach for this study is to establish control improvements in New Service Development in TW throughout a systematical methodology.

As stated before, DMAIC in this research defines the “How” to proceed with a process improvement, Relationship Marketing will serve as the “What” of the improvement.

![Diagram of DMAIC's framework](Pyzdek and Keller 2009 p.147)
Based on DMAIC’s structure a research process was designed to guide the present study as a “gated-process”. Table 2.2 reflects the research phases broken according DMAIC with its purpose in this research and the deliverables as a result of each stage:

<table>
<thead>
<tr>
<th>DMAIC</th>
<th>Research Phases</th>
<th>Purpose in this Thesis</th>
<th>Deliverables</th>
<th>References and Sources of Analysis</th>
<th>Ch.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFINE</td>
<td>Define</td>
<td>Define the problem and business processes of the improvement activity and schedule</td>
<td>• NSD Lifecycle, • “As-Is” Process Maps</td>
<td>• Company Documents and Interviews with MKTO and MKTP. • Pyzdek, T. and Keller, P. 2009 p.198</td>
<td>Ch.5</td>
</tr>
<tr>
<td>MEASURE</td>
<td>Identify Key</td>
<td>Identify Key Measures, viable metrics to track the process.</td>
<td>CTQ Tree Diagram: • Level 1 - Critical Needs • Level 2 - Quality Drivers VOC • Level 3 - Performance Measures</td>
<td>• Reidenbach and Goeke (2002 p.29) • Brue and Howes 2006. p.136 • VOC – James, D OVUM Wholesale Customer Survey 2009.</td>
<td>Ch.5</td>
</tr>
<tr>
<td>ANALYZE</td>
<td>Analyze problem</td>
<td>Analyze problem to minimize gaps between the current outcome and desired outcome</td>
<td>Value Process Linkage Model: • Value Stream • Link Value to Process • CTQ Process Matrix</td>
<td>• Reidenbach and Goeke (2006 p.15) • Reidenbach and Goeke (2006 p.26) • Reidenbach and Goeke (2006 p.27) • Unstructured interviews with DPS Team</td>
<td>Ch.6</td>
</tr>
<tr>
<td>IMPROVE</td>
<td>Identify CTQ</td>
<td>Identify CTQ activities and improvements solutions</td>
<td>Value Process Linkage Model II part: • Targeted Process Map • Opportunities Table Model Improvement Proposals (Process, People, Tools)</td>
<td>• Reidenbach and Goeke (2006 p.29) • GE Paper, Malcom, F. and Bott, M. • Pzydek and P. Keller 2009</td>
<td>Ch.6</td>
</tr>
<tr>
<td>CONTROL</td>
<td>Validation of</td>
<td>Validation of the framework</td>
<td>• Control of a Pilot Service through CTQ matrix</td>
<td>Validation of the model made by the author with Market information of the service: • Videocollaboration Market Report Montiel, J. (2012) • Company Documents • Unstructured interviews Telepresence Team</td>
<td>Ch.7</td>
</tr>
</tbody>
</table>

Table 2.2 Research Process (Made by the Author)

The empirical research is started in Chapter 5. The first phase consist on the DEFINE phase, where the main objective is to build the problem statement to guide to research. Initially this phase introduces how New Service Development is carried out in the company, describing both scenarios’ lifecycle and responsible.

The most significant outcome of this phase is centered in the construction of the “As-Is” process maps, where the process flow is described in a customer-oriented process, initiated since the End User makes request until the monitoring phases.
Once both processes are described, the second phase "MEASURE" is started for identifying key measurements through an analysis of the voice of the wholesale customer (VOC) and translating it into Critical to Quality (CTQ) drivers that will serve to later measure the performance of TW.

**Chapter 6** continues with the DMAIC approach thorough the ANALYZE phase, consisting of an accurate assessment of current performance of the company. The analysis is made using CTQ performance matrix and value performance models commonly used in Six Sigma Projects, so as to obtain improvement opportunities for the IMPROVE phase. In this stage, an opportunities table is drawn and critical activities are mapped in the process maps.

**Chapter 7** involves deploying the last activity of DMAIC framework consisting of the CONTROL phase. In this chapter the CTQ framework is validated with an existing service of the company and understanding the implications of the model.

### 2.4 Sources of Analysis

According to Yin (2009), data collection can be made through two approaches, qualitative and quantitative respectively.

The **Qualitative Approach** described by Yin is based on oral resources and non-structured interviews, allowing interaction between the interviewer and the interviewed and enabling spontaneous questions to arise.

In this study, the author conducts a qualitative research in order to get answers about the NSD process lifecycle, starting with end user requirements throughout the whole process for creating services. This qualitative research is based in collecting data by performing un-structured and face-to-face interviews with various members of the organization.

Moreover, this study also integrates quantitative data by exploring the documentation of in-process projects and completes projects, so as to gather statistical data in terms of end-user satisfaction and consequently allowing further analysis. Hence, the **Quantitative Approach** is also characterized in this study.

The sources of analysis used to collect the project data are presented in the following categories, classified by the researcher according to the degree of importance into primary and secondary data:

#### 2.4.1 Primary Data

- **Researcher’s observations:** Since this research is conducted internally within the Product and Service Development Department in TW, considerable information and data were collected through the daily interaction with colleagues and involvement in Project teams and meetings.
• **Non-structured interviews:** Due of the organizational culture of the company, the method selected for data collection was based on non-structured interviews and informal discussions, obtaining realistic information so as to accurately map NSD processes.

The interview process involved different departments belonging to the NSD lifecycle. Among the interviewed areas in the Global Resources Unit were; Operative Marketing, Product Marketing, Pre-Sales, Agreements, and Business Development. The interviews were fragmented into two main focus areas. Both pursued an understanding of the NSD processes, first part was based on idea generation of new services inside TW (Scenario 1) while the second was centered in product and service requests by the market (scenario 2).

The author considers this research approach appropriate and relevant for the study as it reduces the risk of missing valuable and realistic information that might not have been possible with structured and recorded interviews.

• **Knowledge Network Portal:** TG and TW have an internal platform for knowledge management and distribution. This portal serves as a repository where relevant market information of the company and the industry is stored. Is an intangible asset to all company’s employees and a key driver for the generation of initiatives.

Below the description of some important analysts and its scope areas is described:

- **Ovum:** qualitative and quantitative research of the telecommunications industry.
- **Current Analysis:** Market and Product assessment.
- **Forrester:** Marketing and Strategy Research, focus on Customer Intelligence and IT.
- **Gartner:** Market reports focused on IT and Networks.

Others analysts in the portal are; Analysis Mason, Accenture, BN Americas, Focus Economics, Gartner, IDC, Quantum, Screen Digest, Strategy Analytics and Wainhouse.

In this research, business reports made by Industry Analysts are used as primary data for understanding the VOC since significant barriers exist between TW and end users of wholesale services. These relationships will be described in chapter 3.

• **Literature Research:** a broad theoretical literature analysis has been carried out for this research, comprising two key topics; Relationship Marketing and DMAIC framework of Six Sigma. Several books were used for understating Six Sigma applied to Telecommunications Service companies, but also a high number of Business Journals and publications were used, especially for linking Relationship Marketing within the process.
2.4.2 Secondary Data

• **TG and TW Intranet and website**: information displayed in the company website was used so as to incorporate the company structure, vision, and objectives in the research. At the same time it provided with knowledge of the company’s portfolio of services and the worldwide coverage.

• **Manuals and Project Documentation**, the company processes for creating new “Standard Services” (Sc.1) are described for each service, supported by marketing manuals and scope documents. Instead for “Special Projects” (Sc.2) the process information is vaguely supported with company documents.

Despite the lack of documentation regarding business processes and responsibility’s structures, historical information of projects and developments were found in order to set the stage for the empirical study. Thereby, merging current processes with market information and previous projects’ documentation allowed finding improvement areas and proposing solutions.
3 COMPANY OVERVIEW

The following section is centered in presenting the Telecommunications Group, the company where the study has been carried out. The aim is to provide a better understanding of the telecommunications group and its structure. Due to confidentiality issues the name of the companies are being replaced as TG and TW.

The initial description concentrates in the Telecommunications Group (TG) as a whole, its coverage, positioning and its organizational structure followed by an introduction to one of its main units, the Telecommunications Wholesaler (TW), known as the “factory” for its main function that is creating new wholesale services for the group.

3.1 Telecom Group - Spain (TG)

TG is a leading group in the telecommunication sector in Spain, who provides communication, information and entertainment services worldwide through a wide range of products and services.

Some facts and figures of TG are (Company’s website):

The group operates in 25 countries with organized operations throughout Europe, Latin America and China. TG has more than 280.000 employees serving 299.7 million customers and until September 2011, 46.9 million customers were located in Spain.

The second biggest market is in Latin America, where it has 194 million customers. Likewise, TG has a robust presence in Brazil, Argentina, Chile and Peru with substantial operations in Colombia, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Puerto Rico, Uruguay and Venezuela.

Besides its leading position in Spain and wide coverage in Latin America, the group also encompasses operations in the United Kingdom, Ireland, Germany, the Czech Republic and Slovakia. TG accounts with an integrated management model in order to extend the focus on the clients by leveraging scales and the industrial and strategic alliances.

The company’s structure is arranged into two geographical regions as shown in Figure 3.1 Latin America and Europe, a Global Business Unit and Global Resources Unit that develops telecommunication services.

The unit for “Telecom Wholesaler” (TW), belongs to Global Resources and serves the TG by providing Global services to fixed and mobile carriers, Internet Service Providers (ISP) and content providers. Likewise, inside the unit, additional departments are shown, which contribute with the Telecom Group.
These units are also centered in serving globally as “Multinational Solutions”, who provides integrated applications to business so as to enable communications with customers, employees, partners and providers. Content Delivery Network’s whose objective is to guarantee web contents globally ensuring the highest speed and end-to-end quality of service. “Machine-to-Machine communications” brings the Internet of People to the Internet of things and finally “Global Advertising Solutions” which delivers Mobile Phone and Web banners, SMS messaging and email advertising for the group.

For the purpose of this study only the Telecom Wholesaler Unit (TW) within the Telecommunications group (TG) will be further examined.

### 3.1.1 Market Position of TG and TW

Market reports position Telecom Group (TG) in the TOP 5 of National wholesale players with revenues of 2.16 $ bn as shown in Figure 3.2 (Accenture, 2012).

Among the group, TW reaches the TOP 5 of International wholesale players with revenues of 1.19 $ bn (64% of its Total revenue). TG has 7.2 % of the total revenue share of European wholesale market (Accenture, 2012).
Another reliable source is the Industry Specialist Gartner, which according to the Magic Quadrant elaborated in April 2012, for Global Network Service Providers, TG has a “challenger” position inside the quadrant compared to competitors, which does not positions TG as a leader (Fig. 3.3) (Rickard, N et al. 2012 p.2).

![Magic Quadrant](image)

**Figure 3.3 TG Global Positioning (Gartner April 2012)**

### 3.2 Telecom Wholesaler Business in Spain (TW)

TW is a global provider within the Telecom Group (TG) whose main objective is developing and delivering international communications infrastructure for the Telecom Group TG. Its focused on providing Global Wholesale services to fix and mobile carriers, and wholesale customers as, Internet Service Providers (ISPs), content providers and Multinational Companies (MNCs). Among the international services offered by TW are: Voice, Capacity, Satellite, Corporate, Interconnection, Mobility and new services that will be detailed in the upcoming section (Company website).

TW’s coverage extends to more than 30 countries employing more than 700 professionals and maintaining an international network of over 45,000km of optical fiber cables. Figure 3.4 reflects its worldwide coverage.
TW relationship with TG is fundamental for the development of telecommunication businesses, because TW ensures a single point of contact for provisioning services to multinationals and global wholesale telecommunications business.

It is important to highlight that TW far beyond being the wholesaler provider; it belongs and plays an important role within the telecommunications group TG. For this reason TW’s strategic objectives are strictly aligned and associated with the overall objectives of the group.

TW Strategic Objectives are (Company Documents):
- To gather inbound international traffic, providing a single interface with international carriers wherever the group has presence.
- To act as the group’s international carrier to meet all the international traffic needs
- To provide international IP connectivity for the Group’s local ISPs through its international backbone.
- To maximize return on existing assets (Opex and Capex management) fostering the Group’s synergies.
- To provide global scope to all fixed and mobile services for MNCs and for new innovative services that can leverage its global presence.

### 3.2.1 TW Service Portfolio

TW has a solid portfolio of products and services that are established by the Service Development department and delivered to corporate customers worldwide through the Operating Businesses.

Even though TW has a strong presence worldwide, this type of industry is characterized for being fast growing, it is for this reason that process for new service development and continuous improvements are part of daily activities.
The portfolio of services is classified into the following categories; Voice, Capacity, Satellite, Corporate, Interconnection and Mobility Services as shown in Table 3.1 (Company Documents):

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Examples of Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice Services</td>
<td>Access to International Network with 200 direct routes to international carriers.</td>
<td>International Termination, Transit, Data/Video Telephony, Freephone, Direct Country</td>
</tr>
<tr>
<td>Capacity Services</td>
<td>Broadband Connectivity, unrestricted access door-to-door by an automatically reliable restored fiber optic network, which connects Europe, Latin America and the United States</td>
<td>SDH/SONET, Wavelength, IPLC Service</td>
</tr>
<tr>
<td>Satellite Services</td>
<td>A solution no matter the distance, providing solutions that other communications infrastructures are not able to offer due to lack of infrastructure in some places.</td>
<td>VSAT-IP, Satellite Cellular, SCPC/MCPC, Distribution</td>
</tr>
<tr>
<td>Corporate Services</td>
<td>Integrated solutions for large corporations, by providing end-to-end services</td>
<td>Data Services; MPLS VPN, Global LAN, Corporate Voice Services; Corporate Telephony, Complete LAN/WLAN Serv, Collaborative Services: Telepresence</td>
</tr>
<tr>
<td>Interconnection Services</td>
<td>Safe and high quality connections offering a large number of services and content, allowing a high number of users connected, benefiting from widespread international coverage. Main traffic exchange points are in Europe, USA, Latin America, Asia and Africa</td>
<td>Internet Transit, IPX/GRX (with RIM access)</td>
</tr>
<tr>
<td>Mobility Services</td>
<td>Provides comprehensive and secure quality management from the start, adapted to the needs of each mobile operator assisting convergence with a single point of contact.</td>
<td>Welcome SMS, SMS hub, MMSRelay Service, Mobile phone services for Corporations, WLAN Roaming, Dual IMSI service</td>
</tr>
</tbody>
</table>

Table 3.1 TW Service Portfolio

For this research study, all the services in TW portfolio are used, as long as the request comes from wholesale corporate clients or multinationals.

3.2.2 TW Organizational Structure

TW has recently changed the company structure into one that is more customer-oriented, where the time to market is improved. TW organizational is structured as show in Figure 3.5.

The company is organized into three main divisions; Global Customer Services, Solutions Delivery Center and International Wholesale Services.

The Solutions Delivery Center focuses on maintaining the global networks and the platforms of the company, developing new products and services and lastly is involved in the quality process and information technology process.
Particular attention will be given to the Product & Service Development department - DPS shown in figure 3.6, where this study has been carried out. Within this department the new international services and global infrastructure for corporations are developed.

For the development of new services, two important divisions are involved in the process; first Operative Marketing MKTO and International Services Business Unit (ISBU), which main function is to determine the products and services that will be developed throughout the year, pricing the new services and forecasting the demand.

On the other hand, Product Marketing Department-MKTP develops the roadmap of the services, where the description of the service features and life cycle are defined and gathered.
3.2.3 TW Customers

TW as a wholesaler offers a wide portfolio of its services to multinational customers and carriers. The relationship with the End User is completely indirect and hardly ever communication exists between them and TW. Thus, two types of direct customers have been identified for TW; Internal and External.

**INTERNAL CUSTOMERS:**

**Operating Businesses (OBS)** are TW first internal customer and are also part of the telecommunications group TG but spread in different countries worldwide. These partners as OBS buy the services developed by TW and subsequently sell them to the end users in their respective countries. Some examples of Operating Business are TG Spain, TG Brazil, TG Argentina, among others.

In most of the cases, the OBSs do not develop International Services for corporations. The interaction between OBSs and end users is produced when a corporate customer requires a new telecommunication service as shown in Figure 9. Thus, the first contact in the demand chain is the OB.

For instance, if a corporate customer in Argentina needs a new service, the request is made to the OB - TG Argentina. This OB will send the request to TW, communicating directly with Operative Marketing (MKTO), which is part of TW Group and finally with Product Marketing department (MKTP) so as to analyze and further develop the request. Although OBSs and TW are both part of TG, a formal partnership does not exist between them, for this reason OBSs are not forced to buy the services developed by TW.

Hence, the flow if information for developing a new service is described Figure 3.7. It shows all the different actors across the demand chain. It is palpable the indirect relationship between the corporate client with MKTP. The communication between these two is null, but it is important to mention that at the same time MKTP is responsible for developing the new services requested by the corporate customer.
**EXTERNAL CUSTOMERS:**

**Multinational Customers (MNC’s)** are the OB’s external customers. Corporate End Users are MNC’s that transmit the needs directly to the OB’s. End users of the services developed by TW are corporate clients worldwide as; Nokia-Siemens, Ferrovial, DHL, Inditex among others.

TW’s Multinational Customers (MNC’s) base consists of 248 accounts. The largest group of customer in TW’s perimeter based on headquarters location is shown in Figure 3.8; USA with 76 which represent 31% of the total corporate customers. Next countries are UK 20%, Spanish Countries 8% and Brazil 2%. These last two although with few customers generate a significant percentage of the revenues, 36% and 11% respectively.

![Figure 3.8 MNC Perimeter (Company Documents)](image)

Thus, TW gives support for all customers in TG, through Operating Business, accounting with more than 1000 MNCs. Among the “Off-Net” countries (Fig. 10) are Middle East, Africa and Asia Pacific

**Carriers** represent the other type of TW’s customer, which whom TW have a dependent relationship. Carriers are not members of the telecommunications group (TG) as the OBs, but with them TW has signed agreements and alliances for provisioning International Services. Carriers are local operators and International network providers as China Unicom, KPN, Telecom Italia.

This research project focuses on the requests made by external corporate customers demanding through the Operating Business (OBs). The service lifecycle will be analyzed in the upcoming chapters.
4 LITERATURE REVIEW

This chapter explores the theoretical framework used to guide this study in order to provide answers to the research questions. The literature used in this research is centered in methodologies and frameworks commonly used to improve process performance and increase customer satisfaction.

Relationship Marketing theory is used as a starting point in this research so as to raise a customer-focused process in the organization. The concept of relationship marketing emerged from the need of creating loyal and long-term relationships with the customer especially in service firms.

For building robust relationships with customers, a focus on Relationship management requires implementing set of methodological and statistical tools that are brought through DMAIC methodology from Six Sigma. DMAIC stands for Define-Measure-Analyze-Improve-Control and is a problem solving method frequently applied to seek improvement areas in a process or in a product or service.

4.1 Relationship Marketing

For years, business practices were transformed with the rise of concepts like Marketing in the 1960’s, where companies strived to focus on customer needs and more recently, the basis of the Quality Concepts aiming to drive customer satisfaction. Nowadays, Relationship marketing is recognized to be undergoing a similar paradigm shift (Gruen 1997; Gummesson 1999; Lambe, Spekman and Hunt 2000; Mattsson 1997; Webster 1992).

4.1.1 The Evolution of Relationship Marketing

According to Gruen (1997) and Grönroos (1989), production-oriented philosophies have shifted into selling-oriented process to finally reach to marketing-oriented philosophies through relations.

Marketing strategies were centered in attracting customers rather than in retaining them (Schneider 1980), but recently companies have been focusing in its internal customers, indeed Procter & Gamble which was one of the pioneers of the modern marketing and the 4 P’s has renamed its trade departments as “Customer Business Development”. Additionally, service companies have implemented loyalty programs, and one-to-one marketing with the end users, as airlines, banks and insurance among others (Sheth, J. 2002 p.4).

Marketing for services firms gave rise to the need of relationship marketing. Marketing services was a task oriented to promote the relationship between the consumer and
the service company (Möller and Halinen, 2000). Practitioners have argued that customer satisfaction is the main outcome of the relationship between the user and the company’s employees (Berry and Parasuraman, 1993; Grönroos, 1990) highlighting the need of developing strong, robust and long-term relations with customers (Berry, 1983; Grönroos, 1991; Gummesson, 1987) so as to gain a competitive advantage in the industry.

Initially, the concepts for describing the relationship among consumer-service firm were known as “Relationship Selling” (Chonko and Tanner, 1990; Crosby et al., 1990), but it has been debated since the benefit is mutual, both for the salesperson and for the consumer (Bejou, 1994).

Theories of interactions have also contributed to relationship marketing literature, where buyer-seller relations are influenced by the atmosphere, involving dependence trust, mutual goals, commitment, satisfaction, and adaptation (Ford, 1984; Wilson, 1995; Grönroos, 1990; Hakansson, 1982).

### 4.1.2 Conceptualizing Relationship Marketing

Relationship Marketing (RM) for a company can be perceived in two ways; strategically and operationally, as having a customer focused organizational culture, where the values are centered in the relationship between buyer and seller (Sin, et al. 2005 p.186)

The definition of Relationship Marketing was first conceptualized in 1983 by Berry who defined it as “attracting, maintaining, and enhancing customer relationships.” In 1991, Grönroos introduced the importance of establishing long term relationships with the customers as “establishing relationships with customers and other parties at a profit by mutual exchange and fulfillment of promises.”, and in 1999 Harker added to the definition, “proactively creating, developing and maintaining”.

Authors have defined relationship marketing in terms of “perception” where the benefits of retaining customer were considered to be superior economically than attracting new customers (Verhoef, 2003; Reichheld and Sasser, 1990). Some relevant definitions are:

Morgan and Hunt (1994) define relationship marketing in terms of maintaining relational exchanges by successfully establishing and developing trust and commitments.

Bennet’s (1996) concept for RM describes a lifetime commitment and interaction with the customer, so as to gain knowledge and use it to satisfy customer needs.

Grönroos latest definition conceptualizes RM as: “Marketing is to establish, maintain, and enhance relationships with customers and other partners, at a profit, so that the objectives of the parties involved are met. This is achieved by a mutual exchange and fulfillment of promises” (Grönroos, 1994 p.6).
The journal of relationship marketing addresses the need of looking at marketing and sales as a one sole phenomenon. The definition for relationship marketing given by Gummesson contemplates a view of relationship marketing in a comprehensive management and social context as:

“Total relationship marketing is marketing based on relationships, networks and interaction, recognizing that marketing is embedded in the total management of the networks of the selling organization, the market and society. It is directed to long-term win-win relationships with individual customers, and value is jointly created between the parties involved. It transcends the boundaries between specialist functions and disciplines” (Gummesson, 1999, p. 24).

The concept of RM considers relations of suppliers with own suppliers, further beyond that only focusing on suppliers and customers.

4.1.3 Relationship Marketing in Services Firms

Service Firms do not think in terms of acquiring customers, but as having customers, especially in an era where consumers can select a supplier among multiple, so marketing addressed to support and defend the customer base is gaining more importance especially for service industries (L. Berry 2002 p.60). Berry expresses that the relationship-based marketing in service companies must meet the following three basic conditions (2002, p.62):

1. The need or desire of the service is periodic from the service customer. For example; janitorial services versus funeral services.

2. The selection among various suppliers is made by the customer, for example selecting a dentist vs. taking the taxi in the airport waiting line.

3. The customer can choose among various suppliers of the industry, where switching suppliers is very common. For example selecting from a list of restaurants vs. paying electricity from the community electric utility.

When a supplier meets these three conditions and the customers can control its own choices and alternatives, a possibility exist of creating relationships with the customer rather than just attracting them (L. Berry 2002 p.62).

In service firms, the elaboration of the marketing plan, can consider five relationship marketing strategies. These strategies are not independent and can be used in a combination (L. Berry 2002 p.62).

1. Core Service Strategy: This strategy involves designing a core service in a manner that allows establishing a customer relation. The ideal core service is the one that creates a need, providing a base for selling additional services overtime leading to an attraction of customers (Berry and Thompson). An example of a “core service strategy” is the “Individual Financial Services” provided by the Wachovia Bank in North Carolina, USA. This program consisted on the customer selecting specific service they needed and paying only for the services selected, in terms of tax
preparation, cash flow analysis, insurance analysis, financial record keeping among others. This service created a competitive advantage for the Wachovia Bank in the long run, attracting customers and at the same time offering a platform of financial services. (L. Berry 2002 p.63)

2. **Relationship Customization**; it is about customizing services adapted for an individual customer requirements, and subsequently capturing these data for addressing other market needs. Xerox, for example, practiced the customization of its offering by launching the program “Flied Work Support System”. This offering consisted of keeping record of the customer’s equipment in a database, so when the customer called for assistance, all the data regarding the equipment, location, service recorded is tracked easily.

3. **Service Augmentation**; it consist of encouraging loyalty among customers by providing features and “extras” to the service offerings. The differentiation of the service to be meaningful must be centered in generating value to the customer, rather than creating “extras” available for competitors. As Levitt (1974) writes: “Having been offered these extras, the customer finds them beneficial and therefore prefers doing business with the company that supplies them” (pp. 9-10). A practitioner of this strategy is Fairfax Hotel in Washington DC, creating extras to the service offering oriented to satisfy the customer by: providing a concierge service, night butler, 24 hr. room service, room amenities, bathroom phone, etc.

4. **Relationship Pricing**: it involves promoting customer relationships by giving a price incentive as reward when consolidating business with one supplier. The concept of relationship pricing is not new and has been presented through quality in service firms, as for example the Frequent Flyer programs of the airlines.

5. **Internal Marketing**: is based on creating the relationship with the inner customer of the organization; in the form of employees, and other members of an organization. L. Berry (2002 p.68) distinguish the employees as the customers and the job as the products in this relationship, where the effort for increasing customer satisfaction is in the same necessary for creating internal marketing. The basic principle for encouraging the internal marketing in service firms is centered in the idea that the quality of service in organizations is given by the skills and attitudes of the people producing the services. To fill this condition, service firms must keep employees motivated, by first understanding what is the need. One way promoted by Marriott Corporation is launching annual surveys to all employees. Then, the results are discussed upper management and solutions can be channeled.

### 4.1.4 From Marketing Mix to Relationship Marketing

When Grönroos introduced the concept of “perceived service quality” (1982) was to promote the understanding of customer satisfaction based on the usage process, where interactions exists between the user and systems, physical services and service providers employees” (C. Grönroos, 1994, p.5).

Within service provider firms, employees that interact with the customer are not considered marketers, nevertheless they are part-time marketers. For Grönroos, these part-time marketers have much more impact on the customer purchasing decisions (C. Grönroos, 1994, p.5).
The Four P’s and the marketing mix paradigm (Product, Price, Place and Promotion) perceive customers as a passive part and the seller as the active, where no direct relationship is built with the producer and marketer of a certain product. It is clear that for a Service Firm, the Four P’s approach cannot fit the reality of Industrial and Service Marketing, it is for this purpose where Relationship Marketing has emerged and has been supported for ongoing trends in modern business (C. Grönroos, 1994 p.6).

However, relationship marketing is still perceived as a new born concept in marketing, with a high importance in services marketing. Philip Kotler expressed that “companies must move from a short-term transaction-oriented goal to a long-term relationship-building goal” (C. Grönroos, 1994 p.9).

Reichheld, expressed that the basis of creating loyal relationships with customers is done as an integral process where the firm aligns the customer desires with the company’s business strategy (1986, p. 64).

In this line of thought, the Marketing strategy Continuum has been created in order to establish marketing and management implications in of relationship marketing, shown at the end of the continuum in Figure 9. At the other end of the continuum is positioned “transaction marketing” trying to demonstrate the focus behind a one-time transaction marketing. In the continuum (Fig. 4.1) providers of packaged goods can be positioned within a “transaction-type strategy”, instead for a service firm can become too restrictive to apply a marketing mix and will be probably better applying a relationship-type strategy (C. Grönroos, 1994 p.7).

Although practitioners have been paying attention to the conceptual framework of Relationship Marketing, no systematic attempt to asses it has been made so as to measure business performance (Sin, L., et.al 2005 p.1). Relationship marketing as a concept behaves as a starting point in this research to shape current process into a customer-focused perspective managing relations through delivering quality.

![Figure 4.1 The Marketing Strategy Continuum (Grönroos, 1994 p.11)](image-url)
4.2 Managing Customer Satisfaction

The competitiveness of service firms is determined by the perceptions customers, being it a prerequisite for achieving customer satisfaction and profitability (B. Edvardsson 1997 p.32).

Customer Satisfaction is born anteceding the concepts of customer loyalty (Anderson, Fornell and Lehmann 1994, Oliver 1997, Oliver 1999) and it has been noted that customer satisfaction may not represent a short-term gain, but it does have a significant impact in the long-term (Malthouse and Mulhern 2008 p.65).

The concept of "Customer Satisfaction" might be considered as obvious, but underneath it relays the challenge which is not only measuring satisfaction, but instead link performance with the customer actual satisfaction and behavior (Sven den Boer 2006, p.22).

Particularly in service industries customer satisfaction is a captivating feature, where retaining customers is more important than attracting (~Kim et al., 2009), [Lee et al., 2000], [Namkung and Jang, 2007] and [Park et al., 2004]). It is known that 59% of consumers in developed and emerging economies, had quit the relation with a company because of poor service. In some countries as China and Brazil, the figures are increasingly higher with an 85% and 75% respectively (S.Biswas 2011 p. 164).

Figure 4.2 describes the focus areas linked to relationships. The first one, "Managing services" for attracting and retaining customers by involving tactical and strategic decisions, while “Customizing Services” represent personalizing services to individual customer requirements. Integrating Customer Satisfaction and relationships results in a successful customer relation (Rust and Chung 2006 p.561).

![Diagram: Areas of Research in Service and Relationships](Rust and Chung 2006 p.561)

Significant differences exist between managing services and managing products, because of the nature of each of them (Parasurama et al. 1985), while customizing Services contemplates adjusting the needs of the customer (Rust and Chung 2006 p.561).
Nowadays, industry forces are pushing for quality movements leading to the adoption of relationship marketing as a strategy (S.Biswas 2011 p. 163). A common thought among the mind of marketers is to use relationship marketing when the product is good or better, because if you have the best product then there is no need to encourage relationship marketing. But the definition of RM comprehends that a product cannot be targeted as best without relationship, because it is the one metric that allows benchmarking the performance from time to time (S.Biswas 2011 p. 164).

Specifically Telecommunications providers are creating new services at an increasing pace due to its short life expectancy. New emerging technologies combined with customer changing demands are forcing new and better services to be developed. New service development comprises the process from the idea to the market launch of the new service achieving customer satisfaction at all times (B. Edvardsson 1997 p.32).

4.2.3 Approaches for increasing Customer Satisfaction

Several methodologies have been developed so as to achieve customer satisfaction because of the significant benefits it uncovers.

The American Customer Satisfaction Model (ACSM) has been developed as a standard for firms, industries, sectors and nations inn general with the main purpose of evaluating the quality of goods and services perceived by the customers (Turel and Serenko 2006 p.316). The practitioners have adapted the model involving perceived quality, expectations and values, price tolerance, re-purchase likelihood and customer complaints (Turel and Serenko 2006 p.316).

Another supporting structure aimed to increase customer satisfaction is provided by Powell (1995) when he developed the twelve (12) key factors for TQM, along with strategic elements previously defined by Tamimi (1995). These factors involved:

- Committed leadership
- Adoption and communication of TQM,
- Closer supplier -customer relationship,
- Benchmarking with best competitors
- Open organization,
- Employee empowerment,
- Zero-defects mentality,
- Flexible manufacturing,
- Process improvement,
- Measurement performances

Additionally, an alternative study based on exploring the linkage of quality concepts with the company performance was developed by Sila (2007), where 4 key business areas are used to measure organizational performance:

- Human Resources Results
- Customer Results
• Organizational Effectiveness
• Financial and Market Results

Besides the above approaches, within the Information Technology industry, within three (3) methods have been defined for measuring performances (S.Biswa 2011 p.180):

1. **SEI-CMM levels;** The Capability Maturity Model (CMM) is a model used for describing the software process maturity by identifying the key practices needed so as to achieve maturity. It serves to company so as to move from a chaotic stage process to a mature software process. CMM consists of five (5) maturity levels: Initial, Respectable, Defined, Managed and Optimizing.

2. **Tick IT;** Is a quality management certification program a method for improving quality in software development.

3. **Six Sigma** is identified as a measure of quality that attempts for the minimal amount of defect. It is a practice focused on the customer, not the product or the service. The methodology to deploy six sigma comprehends data and statistical analysis into a project-based workflow allowing business to identify improvement areas and to facilitate the process of decision-making.

Besides, Six Sigma, is a commonly used methodology used specifically to achieve customer satisfaction by linking the VOC with an understanding of Critical to Quality factors as shown in Figure 4.3 (Sven den Boer 2006, p.22).

![Figure 4.3 Linking Customer needs with supplier capabilities](image)

Other academics in the field have expressed their view regarding Six Sigma concepts (Antony, J. 2009 p.275):

**Dr. Matthew Hu, Vice President of Robust Sigma Technology, USA,** described that Six Sigma has a proven success by providing tools for business management.
Dr. Roger Hoerl, GE Global Research, USA, explained instead that Six Sigma uses similar processes philosophies from TQM, but argue that “Six Sigma also strives to address several of the shortcomings of TQM, such as lack of a bottom-line orientation, lack of dedicated resources, an informal and uncoordinated project selection process and use of “whoever is available” to conduct projects” (Antony, J. 2009 p.276).

While Dr. Tom Pyzdek, Consulting, USA emphasizes the importance of Six Sigma because it was originated and based created by the “America’s most gifted CEO, as Motorola’s Bob Galvin, AlliedSignal’s Larry Bossidy and GE’s Jack Welch. These people had a single goal in mind: making their businesses as successful as possible. Once they were convinced that the tools and techniques of the quality profession could help them do this, they developed a framework to make it happen: Six Sigma” (Antony, J. 2009 p.276).

4.3 DMAIC of Six Sigma

Initially Six Sigma was all about less than 4 failures or defects per million opportunities, while nowadays it is described as a powerful management strategy involving approaches that seek to incorporate quality into products and services throughout the lifecycle (Antony, J. 2009 p.274).

The birth of Sig Sigma was originated with the need of measuring quality and values and to provide a link between quality and metrics (S.den Boer 2006 p.21-23). Six sigma has been defined as a systematic and rigorous process emerged from the work of notable quality pioneers (Pyzdek and Keller 2009 p.3) aimed to achieve process improvement through the application of measures to evaluate a process (Antony 2004) A good definition of Six Sigma is:

“Six Sigma focuses on Critical to Quality metrics from an end-to-end perspective, allowing for a total quality picture focused on the product as well as the processes within the operation that produces the product” (S.den Boer 2006 p.22).

Common applications of Six Sigma are based on manufacturing process but its philosophy and methodologies can be used in others fields. Nevertheless, at the heart of Six Sigma, a systematic method that enables the analysis and leads to improvements in the business process is found. This research methodology is known as DMAIC (S.Biswas 2011 p. 187).

The main purpose of the DMAIC is to provide a conceptual method to improve the service quality in companies and been used in various industries as a methodological framework seeking to focus in problem-solving capabilities within a business context (Hamza 2008).

For example, an article published in “Production Planning & Control” exposed a case for “Improving the efficiency of IT help-desk by Six Sigma management methodology (DMAIC) in October, 2011 with the main purpose of probing that service efficiency of the IT department could be improved by employing DMAIC´s methodology (Shinh-Han Li 2011).
Additionally to this research, in 2010 the “International Journal of Engineering Science and Technology” published a research paper centered on how Six Sigma in Telecom industries could help improving traditional and modern telecommunications providers. The outcome of the research indicated that despite of looking at Six sigma and Telecom as mutually exclusive concepts, these two approaches are highly complementary in the pursuit of achieving process optimization and service quality. (Bhargava, M., et al 2010)

Finally in 2006, Ho, Xie, and Goh developed a case study based on the integration of DMAIC methodology and statistical quality engineering education into existing curricula and the potential applications of Six Sigma for educational excellence (Kun-Tzu Yu 2011 p.4).

DMAIC is defined as a problem solving method frequently applied to seek improvement areas in a process or in a product or service. DMAIC is a structured framework consisting of a 5-phases “gated-process”; Define, Measure, Analyze, Improve and Control, meaning that completion of one phase are required prior to passing to the next phase. Only when each phase is completed, then the “gate” is considered to be closed (Pyzdek and Keller 2009 p.147). In each phase, objectives, tasks and techniques are defined, and described as:

**Define Phase** - Is characterized for the understanding of the problem by defining the business processes, and establishing the plan for the upcoming analysis and improvement activities. In this phase the main output is a clear problem statement, objectives and organizing deliverables of each phase (Pyzdek and Keller 2009 p.166).

A problem statement can be difficult and complex to define due to high number of breakdowns that it might have. Tree Diagrams are usually employed in this phase, with the main purpose of breaking down certain problem into several categories, and to provide more detail into the problem statement. The philosophy behind Tree diagrams is to reach a problem solution through understanding small problems reflected in the tree.

**Measure Phase** – The goal is to establish critical measurements that will serve as parameter to analyze performance along the research. The metrics are obtained by gathering the Voice of the Customer (VOC) and translating it into Critical to Quality (CTQ) drivers.

Within the Measure Phase, the “As-is” process maps and flowcharts are used to describe the situation as it is, with activities and sub activities represented by a symbol. The American National Standards Institute (ANSI) establishes symbols types essentially used for computing processes, nevertheless, researchers find appropriate to use the following figures in flowcharts.
The VOC represents a high significance parameter when trying to minimize discrepancies between requirements and deliveries. M. Bhargava emphasizes the difficulty in gathering data information for service processes in Telecom Industries (2010 p.7658). For this purpose and summed up with dealing with long supply chains, many professional analysts in the industries are focus on developing customer surveys reflecting the specific needs and wants of the telecom markets.

**Analyze Phase** – is organized to find ways to eliminate the gaps between the desired goals in terms of service development and the current performance. Data, either descriptive or exploratory is to be analyzed to identify the root causes.

In this phase “As-Is” processes maps are analyzed to drive decision making in turn of which activities can cause delay or distortion in the process (Pyzdek and Keller 2009 p.198)

**Improve Phase** – The main objective is to identify and select the proper solution to improve the current performance and implement it using statistical methods to validate the improvement.

An Opportunities Table developed by GE serve as a basis Model for the improvement stage, been used by GE, to relate how current IT processes compared to VOC can help to identify improvement proposals, so it is easier to prioritize actions (M.Fry and M.Bott p.6).

**Control Phase** – in this phase the documentation of the project is made as to institutionalize the change, lessons learned are recognized as to find standardization and replication opportunities within the company.

Besides DMAIC’s methodology, other structures within Six Sigma are used when a process does not exist at all, and the project focus is to develop a radically new product or service, is known as DMADV. This model concentrates in Define-Measure-Analyze-Design-Verify and is part of Design for Six Sigma (DFSS) toolkit.

A clearer differentiation between DMAIC and DMADV is provided in Figure 4.4 (Pyzdek and Keller 2009 p.147). This research will be conducted following the six sigma quality improvement method known as DMAIC, since a current process for developing new services is already in place and the aim is to improve service quality while minimizing gaps between the service developed and market needs.

### 4.4 Relationship Marketing and DMAIC

Whether a Six Sigma methodology as DMAIC defines “How” to proceed with a process improvement, relationship marketing serves as the “What” of the improvement, leading to a relationship-oriented approach. For this reason, this research aims to integrate both concepts.
Figure 4.4 DMAIC vs. DMADV (Pyzdek and Keller 2009 p.147)

Although Relationship Marketing seeks to increase customer satisfaction by developing loyal relations, it is not it is not enough as sole. For this reason Six Sigma methodology is used along with it in order to ensure quantitative metrics and a more complete methodology to manage services.

Additionally, a long tradition exists for developing Six Sigma projects within the Telecom Group (TG) and the Telecom Wholesaler (TW).

For the reasons mentioned, the approach used in this study follows the DMAIC methodology of Six Sigma. The use of Six Sigma in IT provides benefits in various ways as (Bon J and Sven B 2007 p.29):

- Processes can be tracked down with six sigma tools as control charts.
- Increase process efficiency through the gathering of measurements and quantitative data.
- Provide a clear dentition of the end user needs though “CTQ” Critical to Quality deliverables.
- Establish a framework to prevent risks by root causes analysis rather than reacting to a process behavior.
- Clarifies everyday situations and processes, which facilitates recognizing the activities that need more focus.
5 EMPIRICAL RESEARCH

The main purpose of this chapter is to describe the situation constituting this research project aimed to find out all the aspects involved in New Service Development processes.

The chapter will follow DMAIC methodology used in Six Sigma projects, starting with the DEFINE phase, to explore the lifecycle of new services and to understand the structure of NSD processes in the TW. Therefore, two scenarios will be presented, the first one characterized by idea generation within the company and the second one where proposals are made by customer’s specific requirements. Subsequently, “As-Is” processes map are drawn to better understand the flow of both scenarios and to set the stage for further steps.

Afterwards the MEASURE phase is described to produce a current state’s assessment that along with Critical to Quality Factors (CTQ) are fundamental to identify improvement areas in the NSD process of TW.

5.1 DEFINE Phase

This phase is characterized for discovering the lifecycle process in TW through the collection of data and information so as to understand and analyze the process of developing new services, either if the new service development is born as a standard service, the case of scenario 1, or if it is driven by the market demand as scenario 2.

5.1.1 New Service Development

As explained before, new service development in TW, is presented in two different scenarios shown in Figure 5.1 according to where the service’s idea has been born.

First scenario consists in new services ideas proposed by TW employees, which are consequently released to the market according to the demand.

The idea generation process for the development of new services begins at an annual meeting in TW where new services to develop are proposed and selected. These services are referred as “Standard Services” because are available to all customers from the moment of launch through TW Service Portfolio.
Instead, the second scenario represents new services that are triggered by a specific end user’s demand. These developments are custom solutions which are usually more complex, thus are referred as “Special Projects” in TW.

Figure 5.1 Scenarios for New Service Development in TW (Made by the Author)

5.1.2 NSD Scenarios

Once a development opportunity arises, the execution for the service evolution begins by going through various stages in TW where developments are treated with a different approach according to the scenario.

**SCENARIO 1** the development of new “standard services” in TW is described in three stages illustrated in Figure 5.2; an Annual Development plan which followed by the Service Development Process and finally Monitoring Process (Company documents).

1. **Development Plan**; it is the first stage of a new development consisting on defining the new services to be developed in the year. Ideas are gathered by MKTO in a document called PdP- Product Development Plan, and PdS – Service Development Plan. These documents are analyzed and explored in an Annual Meeting held on August-September. Ideas exposed are mainly proposed by employees and direction, and can represent either a new development to be launched, or new applications, functionalities and improvements that arise from monitoring an existing service. These are “Standard” services because they are available to any customer within TW portfolio from the moment of release.

2. **Service Development Process**; it is in this phase where the development of the service is made, along with the Viability analysis, launch and implementation. Documentation for the service is prepared as the Viability Document, Marketing Manual, Concept documents, pricing templates, service forms and Project Planning, among others.

3. **Monitoring Process**; In this final stage current services are analyzed to understand its life cycle and improvement areas through data collection and evaluation of performance. During the whole process continuous improvement is present.
SCENARIO 2 – The majority of new developments in TW emerge from an End User specific need of a customized solution. In these situations the developments are treated as “Special Projects”.

Special projects might be born at any time of the year and are handled as a tailored solution made precisely and exclusively for a particular customer. These projects are specially critical in the “delivery time” factor, which requires a different approach for the development cycle.

The new service request might be an improvement or application from an existing service(s) packaged for a specific customer or a whole new development. In this case, a corporate customer as NOKIA-SIEMENS, DHL, make request to any national OB worldwide. Subsequently the local OB communicates directly with TW for analyzing the request.

The Special Project request is received by the Pre-Sales Team part of MKTO-International Services Business Unit (ISBU) in TW who reviews the project’s requirements and analyze the possibility of developing a new custom solution. Additionally, these requirements are scanned to recognize if some of them can be complemented with TW existing portfolio of standard services.

If the service cannot be qualified as “Standard” is named as “Special Project”. Every special solution requires a Technical and Operative Validation from all impacted areas in TW. A Project Team is assembled to guide the special project and the Pre-Sales team initiates the process by opening a request for Validation in TW internal platform.
Initially a technical high level viability is performed by MTKP, and accepted or rejected. In case of acceptance, MKTP identify similar scenarios on database that can be used as a reference.

At this stage, Special Project Team add all information, documents or references which may serve to facilitate the task of validation before passing it to all areas for validation. In the next phase, the request arrives to each involved areas as, Supply, Processing, Management, Billing and Legal, which identify their needs to go ahead with the project.

Each area must respond with a flag (green=operationally viable, yellow=viable but must consult each time, red=not viable) commenting and providing the necessary documentation for the resolution.

Afterwards, Pre-Sales Team sends offers to the customer, and once accepted, a project name is assigned so as to identify the project in the internal platform.

Finally, Operations assigns the resources indicated in the Operative Validation to start with the provisioning and management of the service.

After development, it is possible to standardize the customized service and sold to other customers through each country OBs and included in TW portfolio, but if the specialization level is too high the time-to-market will increase making it not worthy to standardize. For this reason, the lifecycle for special projects is very different from standard services.

It is important to highlight that the local OBs are TW’s customer, although both are part of the same group, the OBs are who ultimately decide whether to purchase the service to TW. Decision-making of the OB is driven by corporate customer requirements, but it also might happen that a new similar and simpler service is being developed nationally by the OB.

The relationship between OB and TW is very strict, meaning that TW is not authorized to establish a direct communication channel with the end user without prior notifying to the national OB who will also profit from the sale of the service.

At the same time, the End User cannot make requests directly to TW. TW is a unique department who exclusively serves the operating businesses worldwide that are part of the telecommunication group and carriers.

At this definition point, it is crucial to make a differentiation between both scenarios and its consequences. For this reason and to have a better notion of the size of each scenario, data was collected to identify the amount of standard projects versus the customized solutions currently handled in TW.

Figure 5.3 illustrates the ratio between amount of new services developed as “Standard” (scenario 1) versus the amount of special projects developed in 2011(scenario 2). This information serves as reference to channel the analysis according to TW’s current projects and priorities.
As the figure shows, the amount of Special Projects in 2011 was 250 of customized projects while the quantity of Standard Services sold were 63.

5.1.3 Roles and Responsibilities

Roles and responsibilities for developing new services either standard or customized, involve the DPS Department of TW. Figure 5.4 shows the relationships between all the actors involved in the creation of a new service, and how each role affects the execution of the new service development NSD process:
OBs - Operating Businesses as explained before, OBs are TW’s internal customer and also part of TG. Communication flows directly from the corporate customer to the OBs in each country. The OBs address customer needs to TW in order to develop a new service. Ideally the OB should transmit ideas and proposals to TW so as to document them in the PdP & PdS, since OB’s are very near to the customers.

MKTO - Operative Marketing belongs to TW, and it is in charge of estimating the demand for the services that are going to be developed throughout the year. Inside MKTO, the ISBU (International Services Business Unit) is located serving as the first contact with OB’s and customers in the demand chain. Pricing the services is also MKTO responsibility.

MKTP - Product Marketing communicates directly with MKTO, and along with them develops the roadmap of the service, where the service feature and life cycle is defined. MKTP is also in charge of evaluating the services offered by the competitors in order to improve TW current services.

PMO - Project Manager: plans, coordinates and controls the whole project development phases. It gets supports from one representative of the areas involved;

- Technical Responsible; representative of the technical department and assures that the service is developed according to the scope and objectives desired. This area generates technical documentation.
- Marketing Responsible; defines commercial statements of the service. Generates commercial documentation as the Welcome Pack where all the information of the service is gathered; the marketing manual, pricing, customer care.
- Integration Responsible; gathers all the information to model up the service. Along with the process department, helps to define the required processes to achieve standardization of the services.

Pre-Sales: create the request for the services that are present in TW portfolio through the available system platform and employing the appropriate procedures.

Transactions; this area processes the service requirements that TW gets.

Legal: revise all the contractual documentation to guarantee the content of each contract.

Network: it refers to one representative from the Network department and communicates with the PMO is critical to maintain well aligned the service development process.

Processes; is in charge of the standardization of the service, by developing all the operational procedures, work flows and responsible for each of the activities required.

Information Technology IT: develops the IT structure that will support the new service.
5.1.4 “As-Is” Processes Maps

So as to outline the problem and to better analyze the situation, flowcharts in the form of current (“As-Is”) processes maps are drawn for both scenarios (Fig. 5.5 and 5.6), where activities and flows are defined. The idea behind drawing the current flow of activities is to analyze and further uncover complexities in the process (Pyzdek and Keller 2009 p.198) Symbols and shapes are used so as to indicate process, documents and decision points.

Process flows and responsibilities for developing standard products and services in Scenario 1 are described in internal documents. Nevertheless it is critical to highlight that in order to properly draw the process as it currently is, the documented information was combined with empirical evidence and feedback received from employees to build a more accurate “As-Is” process map.

The existing documented process in TW initiates in the Viability Phase (Step 4 in Fig.5.5). The annual meeting is mentioned as a formal annual event but it is not included in the process map. Figure 5.5 tries to outline the real process map starting from the idea generation phase. The outcome is a more market-oriented process so improvement areas can be monitored from idea generation phase, considered a significant task when developing new services in a fast growing industry as telecom.

Hence, figure 5.5 reflects the process flow of scenario 1, including the annual Meeting where proposals contained in the PdP and PdS are analyzed and selected so as to start working with the new developments. Project initiation phases involve feasibility and scope studies in order to present the proposal to a committee. After approval, a pilot of the service is deployed in customer’s facilities. Finally the service is included in TW’s catalogue until it is requested by a customer. Standard services in this scenario are constantly monitored to find improvements and to rate customer satisfaction.

The case of scenario 2 is slightly different, since no documented process exists for the development of special projects in TW. Customer requests of customized solutions are very common in TW but at the same time the requirements are exceptional and vary from project to project.

However the lifecycle and communication flows are similar for the vast majority of special projects. The process flow map was developed by getting involved in current projects, and by interviewing the closest figure to the customer in the demand chain, the ISBU personnel. It is a very critical and time-consuming development process, since it conveys precise requirements from corporate clients.

Figure 5.6 illustrates scenario 2 where customer requirements represents the input information and main reasons to start the process.

The process maps were drawn for scenarios 1 and 2 as described. A number was assigned to each activity and decision point, corresponding to its chronological order. The letter “A” stands for Activity while “D” is for Decision points.
Figure 5.5 Scenario 1 “As-Is” Process Map (Made by the Author)
Figure 5.6 Scenario 2 “As-Is” Process Map (Made by the Author)
5.2 MEASURE phase

In order to better visualize the consequences and potential problems that may arise, a Tree Diagram is represented in Figure 5.7 so as to illustrate the impact in both scenarios when developing new services, either born inside the company as scenario 1 or triggered by the Market as scenario 2.

As exemplified in the figure, the first scenario reflects new standard services born in the meeting for the Annual Development Plan where new services are proposed based on knowledge, ideas, opinions and occasionally on market information which may result in distorted market needs. The fundamental issues identified for scenario 1 are gaps in the processes that interpose between the market needs and the service developed by TW. Thereby for scenario 1 it is critical to recognize where are the improvement areas in TW’s development process since this situation is impacting customer satisfaction and TW’s market penetration.

Similarly, the case of Scenario 2 commonly requires a high level customized solution usually involving a big customer, resulting in discrepancies between the solution offered by TW and customer requests. Furthermore the customization level of the developed solution occasionally can be extremely high, making it difficult to standardize and hence increasing time to market.

At this stage where the process has already been defined, some indicators are to be established in order to accurately find which are those drivers that can increase customer satisfaction and minimize service gaps in Scenarios 1 and 2.

Critical to Quality (CTQ) is a concept commonly used in improvement projects, which serves to describe the different output characteristics in a certain process.
Factors that are critical to Quality (CTQ) are identified through stakeholders and market analysis in this research study, focusing in the voice of the customer (VOC) and understanding what is the real customer need (Reidenbach and Goeke, 2002 p.29).

In order to translate customer’s broad needs into more measurable requirements CTQ Tree is used as the selected tool, based on a 3 level process. (Fig.5.8). Initially, the focus is to identify needs each scenario to consequently assign a quality driver with a measurable performance value (Basu, R. 2011 p.63).

Level 1 – Critical Needs

When developing new services internally, the case of Sc.1, significant gaps are reported by DPS between the service developed and customer's expectations. The need in this scenario is to adapt internal processes so they are oriented to increase customer satisfaction, which is achieved by understanding customer’s purchasing criteria of wholesale services (Fig.5.7).

For Scenario 2, the end customer is the same than in Sc. 1, so the external need is also to satisfy customer requirements while internally achieving service standardization is desired. Usually new services catalogued as “Special Projects” are very complex and take too much time to develop, impacting significantly the time to market.

Level 2 - Quality Drivers

Quality drivers correspond to the criteria used to measure the quality in NSD process which must satisfy a specific need identified in Level 1. From a customer’s point of view, quality drivers are the factors that drive the purchasing decision (Reidenbach and Goeke, 2002 p.29).

A number of drawbacks prevented the researcher to directly communicate with the End users that TW serves worldwide. Corporate users are the OB’s customers and TW fulfills the function of the supplier for the nationals OB. For this reason the flow of information between end user and TW, is restricted in most of the cases.

Several ways are used in Six Sigma projects for collecting the Voice of the customer (VOC). The gathering can be made reactively and actively. (Brue and Howes 2006. p.136)
Reactive data defined by the authors, are sets of existing data as complaints. Instead Active data is based on benchmarking information that can help so as to understand customer needs and expectations, as shown in Table 4 (Brue and Howes 2006. p.136).

<table>
<thead>
<tr>
<th>Subjective</th>
<th>Objective</th>
<th>Qualitative</th>
<th>Quantifiable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Complaints</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Telephone Survey</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Mail Survey</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Focus Group - in person</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus Group - Online</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interviews. One-on-one</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Intercepts (street)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Table 5.1 Subjective and Objective Data (Brue and Howes 2006. p.136)

In this study the voice of the customer is collected though a market research and usage of customer surveys. According to Brue and Howes (2006, p.136), the usage of surveys must satisfy the following conditions;

- Survey must represent the entire population of customers.
- The selection of participants must be random.
- The survey must be made objectively in order to yield quantitative measurements.

A wholesale customer survey was used as reference in this research study, which was made by OVUM, an industry analyst who is focused in qualitative and quantitative research concentrated in the telecommunications industry.

From August until October 2009, OVUM, conducted a survey based on in-depth interviews with 26 companies that buy wholesale telecommunication services. The survey was directed to senior managers involved in purchasing and operations and it was structured with a combination of phone interviews and questionnaires.

Hence, the Voice of the corporate customer (VOC) analyzed in this research study is captured through the latest “wholesale Customer Survey” carried out by a professional telecom analyst, Ovum in the year 2009. The sample of this survey is described in Table 5.2 shown below, classified into geographical location of companies, by type of customers, by segment and by type of services.

The outcome of the survey, combined with TW's internal information and requests for services (RFI), yielded a list of criteria that are basic for the selection of a supplier of corporate services through the eyes of the end user and how this affects buyer’s purchasing decision.
Hence, 13 quality drivers were used in the survey to measure performance when buying corporate services:

1. **Price** – including discount structures, billing, and payment terms. Far beyond Price it includes the time to agree on a final price.

2. **Service-level factors** – including service availability, Quality of Service (QoS), and Service Level Agreements (SLA) conditions.

3. **Repair times** – the time it takes from the moments of acknowledging the fault until the problem is resolved.

4. **Geographic coverage** – important when trying to reach particularly difficult locations. When dealing with telecommunications suppliers, customers are not only interested in the coverage but also “where” in those countries.

5. **Product and service features** – the range of variants of each service that is offered

6. **Delivery lead times** – the time between placing an order and receiving the service

7. **Financial stability** – encompasses profitability, debt levels, and ability to invest in new technologies.

8. **Long-term relationship** – importance of trust and mutual understanding. A close relationship benefits the supplier in terms of gaining inside knowledge.
9. **Organizational flexibility** – willingness of the Supplier (TG and TW) in this case) to adapt processes to changing demands and requirements of Customers.

10. **Supplier brand** – market perception of a wholesaler and its reputation. In the wholesaler Market is often less important than in Retail.

11. **Service packaging** – automated quotation tools, web-based portals, and B2B interfaces

12. **Price vs. quality flexibility** – availability of best quality possible for the lowest price. Some suppliers offer the same service at different quality levels at different price points, for example a premium service priced above the standard: a basic quality service cheaper than the standard.

13. **Breadth of product range** – the variety of wholesale services offered by a wholesaler

The survey requested wholesale customers to rate two sets of data:

- Importance of the 13 Criteria when selecting a Wholesale Supplier. The scale of importance used was: Essential for Purchasing, Important, Nice to Have, Not Important and unnecessary.
- Performance of Wholesale Suppliers of the industry (as TW) rated by the customers. The scale of performance used was: Excellent, Good, Adequate, Poor and Inadequate.

From the survey, two different set of data are assessed and shown in Table 5.3.

The upper chart describes the importance of the criteria when selecting wholesale suppliers from the corporate customer’s point of view. Instead the bottom chart measures the performance of wholesale suppliers as TW rated by their own customer. These criteria are key in this research since it helps to identify performance gaps and Quality Drivers of the corporate market.

To appropriately prioritize the criteria in Table 5.3 applied to NSD in TW, an analysis has been made based on the collected data using the **Weighted Point Plan Method**, assigning weights to the positive factors in order to select the most important critical factors for corporate users allocating 70% to Essential or Excellent to have: 25% to Good or Important; and 5% to Nice to Have or Adequate.

Additionally, criteria are classified according to the overall percentage of satisfactions compared to supplier performance and ranked in 3 performance levels; Green for the highest performance, Yellow for Medium performance and Red for the lowest performance.
## Importance of Criteria in selecting Wholesale Supplier

<table>
<thead>
<tr>
<th>Importance for selecting a Wholesale Supplier</th>
<th>Essential</th>
<th>Important</th>
<th>Nice to have</th>
<th>Not important</th>
<th>Unnecessary</th>
<th>TOTAL Weighted Average</th>
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<tbody>
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<td>Price</td>
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<td>59.7%</td>
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<td>10%</td>
<td>10%</td>
<td>10%</td>
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<td>8%</td>
<td>4%</td>
<td>4%</td>
<td>48.8%</td>
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<tr>
<td>Repair Times</td>
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<td>8%</td>
<td>4%</td>
<td>4%</td>
<td>48.8%</td>
</tr>
<tr>
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<td>46%</td>
<td>12%</td>
<td></td>
<td>4%</td>
<td>41.5%</td>
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<tr>
<td>Organizational Flexibility</td>
<td>42.0%</td>
<td>31%</td>
<td>15%</td>
<td>4%</td>
<td>4%</td>
<td>39.7%</td>
</tr>
<tr>
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<td>4%</td>
<td>4%</td>
<td>31.2%</td>
</tr>
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<td>Price Vs. Quality Flexib.</td>
<td>23.0%</td>
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<td>27%</td>
<td>4%</td>
<td>4%</td>
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<tr>
<td>Breadth of product Range</td>
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<td>42%</td>
<td>19%</td>
<td>4%</td>
<td>12.7%</td>
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</table>

## Performance of Wholesale Industry suppliers rated by their customers

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<th>Suppliers Performance</th>
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<th>Adequate</th>
<th>Poor</th>
<th>Inadequate</th>
<th>TOTAL Weighted Average</th>
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<tr>
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<td>Price</td>
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<td>45.1%</td>
</tr>
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<td>Repair Times</td>
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<td>42%</td>
<td>27%</td>
<td></td>
<td>12%</td>
<td>37.5%</td>
</tr>
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<td>35%</td>
<td></td>
<td>4%</td>
<td>45.5%</td>
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<td></td>
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<td>35.9%</td>
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<tr>
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<td>35%</td>
<td>31%</td>
<td></td>
<td>19%</td>
<td>33.8%</td>
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<td>31%</td>
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<td>31%</td>
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<td>31%</td>
<td>38%</td>
<td></td>
<td></td>
<td>33.1%</td>
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<tr>
<td>Price Vs. Quality Flexib.</td>
<td>4%</td>
<td>27%</td>
<td>31%</td>
<td></td>
<td>15%</td>
<td>28.2%</td>
</tr>
</tbody>
</table>

Table 5.3 Corporate Services’ Critical Needs (Made by the Author, VOC data from OVUM)
The effect of weighting the criteria allows comparing the gap between the purchasing criteria of corporate users and the actual performance of supplier of services highlighting the disparity between both measures for the same criteria in Table 5.4.

<table>
<thead>
<tr>
<th>Essential for Purchasing Decision</th>
<th>Good Supplier Performance</th>
<th>% Differentiation from Purchasing Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>59.7%</td>
<td>47.1%</td>
</tr>
<tr>
<td>Service-Level Factors</td>
<td>53.5%</td>
<td>47.1%</td>
</tr>
<tr>
<td>Long Term Relationship</td>
<td>49.6%</td>
<td>40.7%</td>
</tr>
<tr>
<td>Repair Times</td>
<td>48.8%</td>
<td>37.5%</td>
</tr>
<tr>
<td>Financial Stability</td>
<td>41.5%</td>
<td>45.1%</td>
</tr>
<tr>
<td>Org. Flexibility</td>
<td>39.7%</td>
<td>35.9%</td>
</tr>
<tr>
<td>Delivery Lead Time</td>
<td>34.2%</td>
<td>33.8%</td>
</tr>
<tr>
<td>Service Packaging</td>
<td>31.2%</td>
<td>25.4%</td>
</tr>
<tr>
<td>Price Vs. Quality Flexib.</td>
<td>29.0%</td>
<td>28.2%</td>
</tr>
<tr>
<td>Geographic Coverage</td>
<td>28.8%</td>
<td>45.1%</td>
</tr>
<tr>
<td>Product &amp; Service Features</td>
<td>21.9%</td>
<td>43.1%</td>
</tr>
<tr>
<td>Supplier Brand</td>
<td>15.8%</td>
<td>33.1%</td>
</tr>
<tr>
<td>Breadth of product Range</td>
<td>12.7%</td>
<td>45.5%</td>
</tr>
</tbody>
</table>

Table 5.4 Weighted Criteria (Made by the Author)

Figure 5.9 compares supplier performance, as rated by the customers of wholesale services, versus customer expectations in these 13 criteria. In other words, the following section compares suppliers’ performance against VOC demanded requirements. The most important criteria identified were Price, Service Level factors, Long Term Relationship and Repair Times. But, the biggest gap between importance and suppliers performance was found in “Price”. In contrast, the closest match between selection criteria and supplier performance was in “Breath of Product Range” which is the least important criteria for customers.
Level 3 – Performance Measures

As it is shown in Figure 5.9, suppliers are falling short from customers’ expectations and rather exists a misconception where suppliers are focusing. For instance, “Breath of product range” is a criterion that does not drive purchasing decision among corporate customers and has a low influence in the purchasing decision of the end users, but at the same time suppliers are having a mid-rate performance, which indicates that perhaps resources are overused. Currently, TW has a project with a very important Industry Analyst, to perform a study of the current catalogue of products and services.

These criteria reflect the VOC and the importance of certain factors when purchasing new services, but not all of these factors can be impacted from the NSD lifecycle. For this reason, each driver is analyzed according to the impact they have in the NSD process in TW.

In order to complete the CTQ Tree, the Level 2-Quality Drivers selected to drive customer satisfaction in NSD process are: Price, Service-Level Factors, Repair Times, Long Term Relationship, Organizational Flexibility, Financial Stability, Service Packaging, Delivery Lead Time, Geographic Coverage, Price Vs. Quality Flexibility, Supplier Brand, Product & Service Features and Breadth of product Range.

The above Quality Tree reflects level of needs and the quality drivers to satisfy the selected needs according to each driver’s structure and characteristics within TW.

<table>
<thead>
<tr>
<th>Scenario 1 and 2</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase Customer Satisfaction</td>
<td>Decrease Time to Market</td>
</tr>
</tbody>
</table>

**Figure 5.10 CTQ Tree – NSD (Made by the Author)**

<table>
<thead>
<tr>
<th>LEVEL 2 - Quality Drivers</th>
<th>LEVEL 3 - Performance Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>Discount structures, billing, payment terms and time to agree on a final price.</td>
</tr>
<tr>
<td>Service-Level Factors</td>
<td>Service Availability, QoS and SLA.</td>
</tr>
<tr>
<td>Repair Times</td>
<td>Time to repair.</td>
</tr>
<tr>
<td>Long Term Relationship</td>
<td>Trust and Reliability, Influence on RoadMaps, negotiation of better discounts, faster turnaround quotations.</td>
</tr>
<tr>
<td>Organizational Flexibility</td>
<td>Adapt processes to demand and specific requirements.</td>
</tr>
<tr>
<td>Delivery Lead Time</td>
<td>Time between placing and order and receiving the service.</td>
</tr>
<tr>
<td>Geographic Coverage</td>
<td>Extent of the service, supplier coverage to reach a specific difficult locations.</td>
</tr>
<tr>
<td>Price Vs Quality Flexibility</td>
<td>Different quality levels at different price points.</td>
</tr>
<tr>
<td>Supplier Brand</td>
<td>Market Perception of TW and reputation.</td>
</tr>
<tr>
<td>Product &amp; Service Features</td>
<td>Variants of each service; connections speed, class of service, contention ratios, flexible bandwidth options.</td>
</tr>
<tr>
<td>Breadth of product Range</td>
<td>Variety of wholesale products &amp; Services offered by TW.</td>
</tr>
</tbody>
</table>
6 ANALYZE AND IMPROVE

The purpose of the ANALYSIS phase is to link value of each driver with the “As-Is” process maps to find which activities of the NSD can be targeted for improvement in both scenarios, and thus satisfy the needs in level 1. The methodology used is based on Reidenbach and Goeke (2006), to create CTQ Processes Matrix in order to have a more customer-focused process.

Subsequently the IMPROVE phase aims to provide an Opportunities Table, where CTQ activities are highlighted and assigned a potential solution to achieve an increment in the driver leading to an increase of end user satisfaction.

6.1 ANALYZE Phase

Once CTQ drivers have been identified and linked with customer satisfaction in chapter 5, the upcoming steps will be oriented to combine these drivers with the NSD activities described in the "As-is" process maps. For this purpose will be used the Value-process linkage method proposed by Reidenbach and Goeke (2006 p.15).

6.1.1 Identifying the Value Stream

Reidenbach and Goeke mention the importance of recognizing a Value Stream of the processes, though some can be identical. The value stream is defined by the authors as all the activities, communications, documents, that combined add value to the
Analyze and Improve

customer and should start with the market need in order to produce a customer-focused value stream (2006 p.23).

It is important to highlight that not all the activities in NSD should be targeted for improvements because it will require too much time and many resources within the organization (Reidenbach and Goeke 2006 p.23). The “As-is” process’s activities of both scenarios are filtered into the more valuable activities, dismissing approval processes and decision points. The selected activities are shown in the first column of Table 6.2 and 6.3 respectively.

6.1.2 Linking Value to Process

A CTQ Process Matrix is a simplified QFD (Quality Function Deployment) Matrix, which is centered on the inputs that are most likely to affect the process outputs. The main objective of the matrix is to relate the key inputs to the key outputs (VOC drivers) using As-Is process maps as the primary source. The activities of the NSD process were previously described for each scenario in order to link the valued activities to the identified drivers in this stage of the process.

By using the VOC as main driver, which were derived from reliable information it is possible to replace distortion and opinions, with measurable facts in the process matrix (Reidenbach and Goeke 2006 p.29).

In the CTQ matrix, values are assigned in the intersection between rows and columns in order to measure the correlation between inputs (activities) and outputs (value performance drivers). The result of the combination tries to size the impact of individual activities on the outputs and to provide a comprehensive outlook on which of the activities should be targeted for six sigma initiatives. (Reidenbach and Goeke 2006 p.26)

---

**Table 6.2 CTQ Process Matrix: Framework and Components (Made by the Author)**

<table>
<thead>
<tr>
<th>PHASES</th>
<th>INPUTS</th>
<th>WEIGHT OF THE DRIVERS BASED ON CUSTOMER IMPORTANCE</th>
<th>IMPACT by ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity 1</td>
<td>A2</td>
<td>52.69%</td>
<td>Red= High Impact</td>
</tr>
<tr>
<td>A3</td>
<td>59.62%</td>
<td>Yellow= Medium Impact</td>
<td></td>
</tr>
<tr>
<td>A4</td>
<td>61.54%</td>
<td>Green= Low Impact</td>
<td></td>
</tr>
<tr>
<td>Decision 1</td>
<td>66.54%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Figure 6.2 CTQ Process Matrix: Framework and Components (Made by the Author)**

\[ \text{Impact} = \sum \text{Customer Rating} \times \text{Activity} \]

- Red= High Impact
- Yellow= Medium Impact
- Green= Low Impact

---

50
In each row, activities of the NSD process represent the KPIV (Key Process Input Variables) and are mapped vertically through the CTQ Process Matrix in order to track performance gaps as shown in Figure 6.2. NSD activities are drilled down on the left side of the matrix and quality criteria are in the top of the matrix identified as drivers. Under each of the quality drivers the customer rating is shown, derived from the output of the survey that rated the importance of each driver for corporate customer when purchasing wholesale services in this specific market.

The output variables are presented vertically, using as drivers the 13 criteria described in the 5th chapter for increasing wholesale customer satisfaction in the telecommunications industry, which are plotted into the matrix as KPOV (Key Process Output Variables).

The combination of the processes with the quality drivers has been filed by the DPS team in terms of the relationship of each NSD activity with the 13 drivers.

Each driver has an importance weight in the table representing the importance for purchasing wholesale Services in each Scenario (Fig.6.3). For instance, in the first Scenario (standard services) the criterion “Price” has an importance rate for the customer of 59.7% so it was translated to the CTQ process Matrix as the most important criterion, and so forth for the remaining 12 drivers.

In contrast, the driver’s importance for Scenario 2 experience a slight change in weight. Since this scenario is characterized for developing customized solutions requested by a specific customer, the criteria driving purchasing decisions is the same, but does not have the same weight as the ones presented for scenario 1.

Due to communication barriers with the End Customer, the weighting scale for the 13 drivers has been adapted by the author based on project documentation and the outcome from interviews with the ISBU. The spider graph in Figure 6.3 illustrates the CTQ driver’s importance for Scenario 1 (Dark Blue) and Scenario 2 (light blue).

![Figure 6.3 CTQ Drivers Importance (Made by the Author)]
The scoring scale used in the CTQ Matrix is based on Reidenbach and Goeke (2006 p.27) with the following spheres of control; 9 for High Impact, 6 for Moderate Impact, 3 for Influence and 0 for no impact or control.

<table>
<thead>
<tr>
<th>IMPACT</th>
<th>Importance Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>High Impact</td>
</tr>
<tr>
<td>6</td>
<td>Moderate Impact</td>
</tr>
<tr>
<td>3</td>
<td>Might Influence</td>
</tr>
<tr>
<td>0</td>
<td>No Impact/Control</td>
</tr>
</tbody>
</table>

Table 6.1 CTQ Process Matrix Performance Scale

Once the performance assessment was made by the team, the author weighted the values assigned for each activity, and translated it into an Importance rate scale (70% for the most important, 25% medium importance, 5% low importance and 0% no importance) as shown in Table 6.1.

The result of the CTQ Matrix, is used to pinpoint two main findings, the first one based on the process activities (KPOV) and the second one centered in the 13 drivers impact (KPIV):

a. **KPOV**: are the Key Process Output Variables. The objective is to understand the importance and criticality of each activity, though weighting the relationship between an activity with the rated importance of each driver. For KPOV, the higher the score the greater the impact on drivers (Reidenbach and Goeke 2006 p.29).

b. **KPIV**: stands for the Key Process Input Variables. The purpose is to understand what is the correlation percentage and impact of each driver along the service lifecycle. The result specifies a rank of the most critical drivers along the NSD lifecycle.

For example, having a red 30.63% for the criteria "Price", means a high impact driver, because the assessment does not reflect a price-oriented process, with many activities with low occurrence ("cero impact") throughout the whole NSD process. For this reason the lower the score of the KPIV, the greater is the impact.

**Scenario 1 – CTQ Matrix Analysis**

CTQ Matrix in Table 6.2 reflects the relationship of each driver with the activities in Scenario 1. In this order of ideas, a “3” value in the first cell means that the DPS team does not consider that the activity “A1 Searching for New proposals” is related with price and pricing structures. Instead, the value reflects that a “minimal impact” since is a process for generating ideas and probably, at this phase the team might think how it will be priced in the future, but the activity currently does not contemplates pricing the services.
<table>
<thead>
<tr>
<th>PHASES</th>
<th>Process Scenario 1 - INPUT</th>
<th>Total KPIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDEA GENERATION</td>
<td>53</td>
<td>19,11</td>
</tr>
<tr>
<td></td>
<td>Projects Selection</td>
<td>6</td>
</tr>
<tr>
<td>PROJECT START - Financial</td>
<td>6</td>
<td>16,77</td>
</tr>
<tr>
<td>Viability</td>
<td>6</td>
<td>36,48</td>
</tr>
<tr>
<td>DEVELOPMENT</td>
<td>6</td>
<td>32,17</td>
</tr>
<tr>
<td>SERVICE DEPLOYMENT</td>
<td>6</td>
<td>35,19</td>
</tr>
<tr>
<td>PILOT, MONITORING &amp; Service</td>
<td>6</td>
<td>26,86</td>
</tr>
<tr>
<td>Evolution</td>
<td>6</td>
<td>39,85</td>
</tr>
<tr>
<td>Impact by Driver</td>
<td>6</td>
<td>39,74</td>
</tr>
<tr>
<td>TOTAL ACTIVITIES</td>
<td>6</td>
<td>24,84</td>
</tr>
</tbody>
</table>

Table 6.2 Scenario 1 – CTQ Matrix (Made by the Author)
By linking the performance value to NSD process it is possible to target improvement areas in current processes that are directly related with customer satisfaction. In the column, “Total KPOV”, activities with the higher rank (in red) indicate the strongest influence for meeting customer requirements.

To better illustrate the outcome of the CTQ Matrix, activities are drawn accordingly with the value obtained from the matrix, so as to understand which activities have the highest impact in customer satisfaction (Fig. 6.4). The chart reflects the prioritized criteria based on how customers drivers are related with TW’s processes, meaning that activity with the highest value, in this case “A15 Contract Formalization” is a high impact activity.

![Figure 6.4 Pareto KPIV Scenario 1 (Made by the Author)](image)

Although it is worthy knowing the impact of variables in the process, a clearer image is provided in Figure 6.5, where discrepancies between customer desires (brown line) and TW variables related performance (light blue line) are palpable. Additionally to these comparison, it is included the performance of suppliers in the industry (dark blue dotted line), rated by their own customers through Ovum’s surveys. Red error bars represent the gap between wholesale customer desires versus customer requirements.

This analysis is useful to target opportunities that can generate a competitive advantage for the company within the service development process. The exploration will be made for both scenarios.
Analyze and Improve

Long-term relationship is ranked in the 1st position in TW related performance and it is also a TOP 3 for wholesale customers. An in-depth relationship built on trust provides benefits for both parties and for the supplier is beneficial so as to gain valuable inside knowledge. The long-term relationship is a driver that TW should keep fostering within all process.

Major improvement areas are recognized so as to draw a more customer-oriented process, through managing shortcomings and over-deliveries. Some opportunities with high importance where identified in Price and Service Level Factors.

A27 Improvement Areas recognition consists in evolving new services located in the final stage of the service lifecycle, either adding service features or modifying the characteristics of a service. MKTO is the department responsible for requesting improvements of a service. Updates can arise by the OB or as an end user request, or else made by TW Direction and human capital.

When a new update in a standard service is required, the procedure is the same as if the service is standard. The proposal must be documented in the PdP/PdS document so as to be analyzed in the Annual Meeting. The document can be filled by anyone in the DPS Team, among

Since proposals may arise from any DPS team member, interviews were conducted among members whose proposals are contained in the most recent PdP/PdS to understand the background in some of the ideas. The responses were gathered in informal meetings and interviews in order to obtain the more real answer (Fig 6.6).

Figure 6.5 Scenario 1 Performance Vs. Customer Requirements (Made by the Author)
understand the background in some of the ideas. The responses were gathered in informal meetings and interviews in order to obtain the more real answer (Fig 6.6).

Undoubtedly, either recognizing improvement areas or creating a new service does not have a formal procedure within TW generating distortion in the demand chain. Promoting a close and long-term relationship with the OBs, in the Idea Generation and Service Evolution Phases, will provide TW with valuable inside knowledge of users, placing the company in an advantageous position.

**Price** criterion does not involve only list prices, as stated before it includes discount structures, billing, payment terms and time to agree on a final price. “Price” can be regarded as a main driver in conjunction with Service Level Factors, due to the characteristics of customers in this research. Wholesale customers do not always prefer the cheapest option but the need in this market is more service-oriented. Price lists are meaningless for wholesale customers, they want to negotiate with suppliers and reach mutual understanding (OVUM p.15). Wholesale Customers shared their thoughts in the survey:

“We are keen to move away from book prices. We are a growth business and we are willing to share the benefits of that growth with our suppliers” – Mobile Provider

“We base our product pricing on cost elements of our components. We are looking for consistency over a longer timeframe” – Mobile Provider

“Pricing is essential because we aim to be a low cost provider” - Carrier

Even though “Price” criterion has been allocated by customer as an essential driver and an order winner, TW assessment does not reflect a price-related performance. The
variable “price” has a percentage of occurrence equal to 32.20% along the NSD lifecycle, meaning that price-related activities are not performed throughout the whole process and might be omitted in some occasions.

A17 Network Technical Plan, not influenced at all by Price and Long Term Relationship in TW process, showing a “zero” importance in Table 6.2. This activity consists on the deployment of network systems and platforms that are required for service initiation, obeying requirements and specifications found in the scope document. Responsible of this activity are the network planning team. The sturdiness of the service and availability to restore quickly an incident strictly depends in the technical plan.

The scope document is developed by DPS based on customer initial requirement using a company template. Some areas covered in this document are Service Description, Service Coverage, Billing Structures, Market Intelligence and Special Requirements on the Applications and Systems. When asked to the DPS Team the reason for no relation with Price or Service Level, among the answers was:

“Technical Team does not pay attention to customer requirements; they develop the technical networking plan based on the scope document”.- MKTP Mngr.

Additionally, along Service Deployment phase (A21-A24), these activities are performed by the Integration responsible and consist of an internal pilot of the service to be later deployed in customer premises. The driver “price” again is not impacting deployment activities. Improvement areas must be identified in these activities so as to achieve a more customer-oriented process.

Cultural changes, especially within the technical team (Network and integration) might be necessary. Not having a customer-oriented process, or more significantly a cost reduction philosophy impacts significantly the outcome of the service. Furthermore due to TW huge traffic volume, TW can reach economies of scale and offer more competitive prices to the Operating Businesses and take advantage in this criterion.

Service Level Factors, in telecommunications industry, an immediate service restoration is much more important that the financial compensation. Therefore Service level factors are significant and an order winner. As stated in the previous chapter it represents the availability and quality of the service and the agreements that wholesale customers can coordinate with suppliers, but also involves another driver from the list Repair Time. Wholesale customers have the responsibility to supply to retail customers, so the need for mutual understanding between wholesale customers and suppliers as TW is key so as to simplify and facilitate the provision of the service. Some of the comments out of the survey are:

“We usually have a choice of suppliers so we will switch voice traffic away until they repair any outages” - Carrier

“Repair times are among the most important things to make customers happy. Our customer’s expectations are that we will be able to identify the fault and hence we have the expectation of our suppliers. But it is not just the time to repair, we need them to agree that there is an issue promptly, and to tell us where it is and what will be done about it” - Carrier
“Quality is the true value of the service rather than just the price. You get what you pay for. There is a lot of inexpensive looking product on the market, but end-to-end lifecycle turn out to be a lot more expensive” – Service Provider

“Our business depends on customer service and satisfaction, so service level factors are pillars to this” – Carrier

Far beyond reliable services, wholesale customers want a tailored agreement to match their own requirements in terms of quality parameters. Service Level Factor is also a criterion that should be related with TW performance.

A14 Analyze and Recheck Service Concept along with A15 Contract Formalization impact significantly the Service Level Factor. The activities consist on the development of the sales agreement with the internal customer decoupling them in three main sub-activities:

- Create Master Service Agreement (MSA); In general, a sales pattern is used as template and updated establishing the criteria that applies. MSA contains: General Terms & Conditions, Object, Scope, Rights & Obligations, Service Generic conditions (like service scope, service conditions structure in Annexes, service modification, suspension and discontinuation), billing & payment with generic pricing conditions (taxes, price change conditions, etc.).
- Requirements for Coverage Purchase Agreements. The representative DCAF area draws up a list of functional type requirements, technical, operational and billing for the purchase agreements required for the development of the service.
- Outsourcing Agreements: in case the service is outsourced, there shall be a service contract agreement. The Agreements Division in TW will support negotiation issues.

TW assessment yielded a high relation with these activities and certainly can be monitored to find improvements.

A26 Customer Satisfaction Surveys; ideally customer surveys are made during the service lifecycle. In reality, surveys are made after sometime of the deployment of the service, team said:

“Not all the times, we make a customer satisfaction Survey” - MKTP

“Almost never we conduct surveys when the bid has been lost” - ISBU

The survey template used currently in TW seeks to evaluate project manager performance, the management of service and compliance of initial requirements, through a 1 to 5 scale without going deep into reasons of incidents and failures. Improvement areas can be found within this parameter as specifying different types of surveys, one for the OB’s and another one to target end users of the service, and also one survey for lost bids. This activity (A26) has a significant impact in Service Level Factors and Long Term Relationship leading to an increase in customer satisfaction.

Among the activities with the highest rank are located in the Pilot, Monitoring and Service Evolution Phase, which are impacting significantly customer satisfaction, some improvement areas can be identified:
A25 PILOT Performance Evaluation in User premises is initiated once the service has been installed; a pilot test is run to evaluate the performance of the service. "Process" area is responsible of coordinating the execution of the tests to be carried through the areas. The Performance Evaluation pilot is done in customer premises, usually this is a requirement that TW make to interested users.

Other performance measurements as **Product & Service Features**, **Supplier Brand** and **Breath of Product Range** are over-delivered, meaning that suppliers as TW are putting efforts in offering a wide range of services as demonstrated in Figure 6.7, rather than spreading themselves with the services in the portfolio so as to provide a more specialized service to the end customer.

One clear example of this situation is a current study of TW’s catalogue conducted by an Industry Analyst and hired by TW, with the main objective of restructuring TW catalogue so as to provide a clearer value proposition for each service offering aligned with the fast growing market. TW is well positioned in terms of the breadth of its product and service range. However, the depth of product and service features is increasingly important when deciding on a supplier.
Scenario 2- Matrix and Analysis

The value performance analysis for Special Projects, is structured in the same way as for scenario 1, where drivers are correlated according to the impact in the lifecycle activities identified in “As-Is Process Map for Sc.2.

In this scenario, the weights of the drivers experience a slight change since the customer priorities are different when requesting a special project. Some drivers to be highlighted in this process are:

✓ **Service Level Factors**; is been ranked as the most important criterion for special projects.

✓ **Organizational Flexibility**; precisely the ability to tailor standard services and user requirements into a special project requires an extremely high level of flexibility by the company in all its organizational processes.

✓ **Supplier Brand**; due to the complexity and specialization of the special projects, the supplier brand along with the long-term relationship are a decision factor for the end customer when approach in an OB from the Telecom Group (TG).

Table 6.3 presents the CTQ Matrix for the second scenario. The author in conjunction with the DPS Team, assigned the values based on the impact, so as to pinpoint critical to quality activities and to understand how each driver is related with the overall NSD process.
<table>
<thead>
<tr>
<th>PHASES</th>
<th>Process Scenario 2 - INPUT</th>
<th>Service-Level Factors</th>
<th>Price</th>
<th>Org. Flexibility</th>
<th>Long Term Relationship</th>
<th>Repair Times</th>
<th>Financial Stability</th>
<th>Delivery Lead Time</th>
<th>Supplier Brand</th>
<th>Service Packaging</th>
<th>Price Vs Quality Flexibility</th>
<th>Geographic Coverage</th>
<th>Product &amp; Service Features</th>
<th>Breadth of product Range</th>
<th>IMPACT by ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>VALIDATION PHASE</td>
<td>A3 OB send requests of the End User to TW Pre-Sales Team (ISBU)</td>
<td>0.5965</td>
<td>0.5345</td>
<td>0.4955</td>
<td>0.4875</td>
<td>0.415</td>
<td>0.3965</td>
<td>0.3415</td>
<td>0.312</td>
<td>0.2895</td>
<td>0.288</td>
<td>0.2185</td>
<td>0.158</td>
<td>0.1265</td>
<td>TOTAL KPOV</td>
</tr>
<tr>
<td>VALIDATION PHASE</td>
<td>A4 ISBU receives requirements and check them</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>38.51</td>
</tr>
<tr>
<td>VALIDATION PHASE</td>
<td>A5 Standard Requirements are searched in TW portfolio to complement non-standards</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>27.09</td>
</tr>
<tr>
<td>VALIDATION PHASE</td>
<td>A6 Non-standards are to be developed by TW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>34.22</td>
</tr>
<tr>
<td>TECHNICAL VALIDATION</td>
<td>A11 High Level Viability Study</td>
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<td></td>
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<td>OPERATIVE VALIDATION</td>
<td>A13 Operative Validation, Requirement Validation Per Dpl.</td>
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<tr>
<td>CUSTOMIZED SOLUTION</td>
<td>A15 Pre-Sales Team send offer to client</td>
<td></td>
<td></td>
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<td>CUSTOMIZED SOLUTION</td>
<td>D3 Customer Accepts?</td>
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<td>27.56</td>
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<tr>
<td>CUSTOMIZED SOLUTION</td>
<td>A17 Final Technical Validation</td>
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<td></td>
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<td>CUSTOMIZED SOLUTION</td>
<td>A18 Final Solution V.1 (low level)</td>
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<td>CUSTOMIZED SOLUTION</td>
<td>A19 Operations assign resources</td>
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<td>PROVISIONING</td>
<td>A20 Final Solution V.2 with provision</td>
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<td>47.58</td>
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<tr>
<td>PROVISIONING</td>
<td>A21 Service Management (operation &amp; maintenance)</td>
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Table 6.3 Scenario 2 – CTQ Matrix (Made by the Author)
For the 2nd Scenario the Pareto Chart below (Fig. 6.8) reflects the activities with the highest impact when developing special projects, based on the VOC drivers. This graph is the output of the Key Performance Input Variables (KPIV) that resulted from filling the CTQ Matrix. As in Scenario 1, the author along with the DPS team completed this matrix so as to assess its own performance with each variable.

The focus of the assessment is to target improvement activities aligning them with customer purchasing drivers so as to increase customer satisfaction.
One of the main strengths when attracting customers for “Special Projects” is the **Supplier Brand** name. TG and TW have a strong branding among competitors. As stated in Chapter 3, Market reports positions Telecom Group (TG) in the TOP 5 of National wholesale players with revenues of 2,16 $ bn. TG has the 7.2 % of the total revenue share of European wholesale market. Additionally has a challenger position in Gartner’s Magic Quadrant.

**A11 High Level Viability Study**, anything identified, as a “Special Project” for TW, must pass through a validation phase, either Technical or Operational (A.13). The technical validation is about the service architecture of the customized solution. It is performed by the Operative Marketing Team (MKTO), who sets the stage for the evolution of the project, since they provide relevant input information that will allow the Operative Validation, where areas identify needs and requirements to go ahead with the project.

Technical validation is complemented with the Operative validation described before, so as to decide is the special project is viable or not to communicate it to the customer.

The CTQ matrix allocates A11 as a high impact activity, which outcome is directly linked to customer satisfaction.

If MTKP provides poor information, or use vague reference documents, it will determine the “flag” given to the special project (green=operationally viable, yellow=viable but must consult each time, red=not viable), impacting significantly drivers as **Organizational Flexibility** and **Long-Term Relationship**.

> “Without a proper relationship it does not make sense to do business. All the effort to integrate (with a supplier) needs to be justified by a longer-term relationship” – Carriers

> “We must be able to contact the technical team from top to bottom, so that we can handle our own customers. We are a small business and so rely on relationships rather that in contractual terms” – Service Provider

Some drivers as **Organizational Flexibility** are very difficult to evaluate, interviewees have said that reputation in the market can be a source of information regarding flexibility or the contrary, inflexibility. Some wholesale customers said:

> “As our services develop, some standard services are not exactly what we need. It is important that our suppliers are able to discuss and tweak what they are offering” – Mobile Provider

> “We wouldn’t choose them if we couldn’t work with them. Inflexibility rules them put” – Service Provider

> “We are using emerging technologies and therefore flexibility is key” – Carrier

Having a flexible organization promotes long term relations, but that having extremely flexible and customizable processes has also an impact. TW themselves recognize that the flexibility and customization levels within the company are extremely high, even the results obtained through the surveys show that for the end user, is not the most significant criteria.
Flexibility can be targeted for improvement mainly through the activity A6 Non-Standards are to be developed. This activity has a mid-high impact and consists of listing the special services that are not found in the TW catalog, in order to carry out the technical and operational feasibility study. The request for validation must be opened by the Pre-Sales area through the internal platform.

TW itself is considered a very flexible supplier, which consequently help to build long term relations with its customers. Rather that been a strength as shown in Figure 6.9, too much flexibility is leading to a very high time to market.

Researchers have found that wholesale customers are using web-based portals and B2B interfaces to enable customers to interact directly with suppliers through Operational Support Systems (OSSs) to order, manage and monitor the required services (Ovum p.18).

If applying this case to TW, end users must be able to interact with the OB in a direct channel, having OSSs to backup and document all information that can be transmitted to TW. This can be a major improvement area for DPS.

Within the customization phase, the activity A17 Final Technical Validation does not have a Price related performance according to DPS Team. The technical team, MKTP performing this activity, is the same that for Scenario 1, where there is a lack of customer-focus when deploying technical activities.

It is worth to highlight that pricing structures are not only related to the Price but also the time to agree on a final price, which depends in all members of the demand chain, and giving the importance of the technical team in this type of industry, it is necessary a more customer oriented philosophy.

A19 Operations assigns resources the allocation of the requested resources is made by each department at the initial phases and consists of assignation of monetary resources, human capital, IT & Equipment, etc. needed to go on with the special project. Since this activity involves many departments in TW as Supply, GAE, Processing, Management, Billing, Legal and C&AC, the output will affect considerably the end solution.

Moreover, in the provisioning phase, another activity is identified as high impact activities: A20. Final Solution with Provision where the “Special Project” is deployed in customer premises with a considerable impact in Repair Times and Long-Term Relationship.

As in scenario 1, Breath of Product Range and Product and Service Features are again over delivered. Despite of exceed performance, the main issue with these drivers when targeting special projects is the high time to market when trying to incorporate these solutions into standard services catalogue.

In the provisioning phase, A21 Service Management is classified as a high impact activity, which implicates operations and maintenance activities performed to improve the service, decrease incidents and evolve a solution in terms of features or characteristics. When analyzing management documentation for special project in
2011, the average time to deliver a response to the customer (without provisioning) was of 30 days, but depending on the specialization level it might be more.

The idea behind the analysis is to acknowledge if standardization of services is needed or instead promote TW as a “customizer” of solutions. It is clear, that wholesale customers want high flexibility rather than a large service portfolio, so reducing the amount of Special Projects does not seem a good way to retain customers, also because this customers are also those who purchase standard services.

6.2 IMPROVE Phase
6.2.1 Opportunities Table

In the ANALYZE Phase, activities were compared with most important purchasing drivers for customers in order to understand the relations and importance between them through the CTQ matrix.

The current IMPROVE phase, seeks to identify the greatest opportunities for improvements based on the activities identified previously through an Opportunities chart shown in Table 6.4. The Opportunities Table as a basis Model for this step has been used by GE, one the pioneers of Six Sigma projects to relate how current IT processes compared to VOC can help to identify improvement proposals, so it is easier to prioritize actions (M.Fry and M.Bott p.6)

For both scenarios the potential opportunities are allocated in three major categories related to the area where the improvement is centered, either a Process, a Tool or in People’s behavior and organizational culture (M.Fry and M.Bott).

Each improvement activity is related to a main impacted driver so as to understand channel potential solutions. Additionally each Table try to seize the opportunities by measuring the business impact on the CTQ drivers into High, Medium or low depending on the weight given by the customer and the CTQ activities depending on the critically found in the CTQ matrix.

Before a potential solution is proposed, the activities are classified according to the degree of control that DPS has in improving the activity, into Control, Influence or Out of Control. Lastly a potential solution is proposed and catalogued into short-term and long-term.

As the saying goes “You can't manage what you can't measure”, some improvement opportunities in this research propose a measurement system so as to introduce measurements in TW’s process gathering statistical service data, acknowledging the company performance.
<table>
<thead>
<tr>
<th>#</th>
<th>Act. #</th>
<th>Activity</th>
<th>People, Process or Tool</th>
<th>Responsibility Area</th>
<th>Description and Gaps</th>
<th>Underlying Root Cause</th>
<th>High Impacted CTQ Driver</th>
<th>Secondary CTQ Drivers Impacted</th>
<th>Driver/Impact</th>
<th>Activity Impact</th>
<th>Control, Influence, Out of Control</th>
<th>Potential Solutions/Initiatives</th>
<th>Short-Term Solution</th>
<th>Long-Term Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A15</td>
<td>Contract Formalization</td>
<td>Process</td>
<td>Pre-Sales</td>
<td>High Impact activity, NO Gap. Frequent monitor is required</td>
<td>Technical team is disconnected with end user requirements, they just follow the scope doc.</td>
<td>Service Level Factors</td>
<td>Long-Term Relationship</td>
<td>High</td>
<td>High</td>
<td>Control</td>
<td>• Define KPIs to include more accurate data in SLA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A17</td>
<td>A17 Network Technical Plan,</td>
<td>People</td>
<td>Network</td>
<td>DPS Team indicated a “CERO” RELATIONSHIP for Price and Long-term Relation drivers.</td>
<td>Price</td>
<td>Long-Term Relationship</td>
<td>Delivery Lead Time</td>
<td>High</td>
<td>Med-High</td>
<td>Influence</td>
<td>• Produce Service Reports and assess Technical Team Performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>A21- A24</td>
<td>Service Deployment phase</td>
<td>Process and People</td>
<td>Integration and Processes</td>
<td>DPS Team indicated a “CERO” RELATIONSHIP for Price and Long-term Relation drivers.</td>
<td>Price and Long-Term Relationship</td>
<td>Service Level Factors</td>
<td>Delivery Lead Time</td>
<td>High</td>
<td>High</td>
<td>Influence</td>
<td>• Produce Service Reports and assess Technical Team Performance</td>
<td>Improve Sc.1 Service Documentation</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>A26</td>
<td>Customer Satisfaction Survey</td>
<td>Process and Tool</td>
<td>ISBU</td>
<td>Tool is only designed to track performance vaguely, lost bids are not measured.</td>
<td>The process is Manual and not tracked with an online tool</td>
<td>Service Level Factors</td>
<td>Long-Term Relationship</td>
<td>High</td>
<td>High</td>
<td>Control</td>
<td>• Operational Feedback Systems</td>
<td>Customer Satisfaction Surveys at two points: Entry and Monitoring Survet</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>A27</td>
<td>A27 Improvement Areas recognition</td>
<td>People</td>
<td>MKTO</td>
<td>Process is not customer-oriented. New services proposals are gathered: Competitors search 34% Own-idea 28%, Portal 25% and OB and Customer 13%</td>
<td>No Formal Procedure for IDEA GATHERING. Lack of Communication with OB and End Customers.</td>
<td>Long-Term Relationship</td>
<td>Breath of Product Range, Supplier Brand</td>
<td>Low</td>
<td>High</td>
<td>Control</td>
<td>• Calculate Value of Customer Retention</td>
<td>Competitor “X” has a specific department devoted for Data Intelligence</td>
<td></td>
</tr>
</tbody>
</table>

**SCENARIO 2 - New Service Development “Special Projects”**

<table>
<thead>
<tr>
<th>#</th>
<th>Act. #</th>
<th>Activity</th>
<th>People, Process or Tool</th>
<th>Responsibility Area</th>
<th>Description and Gaps</th>
<th>Underlying Root Cause</th>
<th>High Impacted CTQ Driver</th>
<th>Secondary CTQ Drivers Impacted</th>
<th>Driver/Impact</th>
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<th>Control, Influence, Out of Control</th>
<th>Potential Solutions/Initiatives</th>
<th>Short-Term Solution</th>
<th>Long-Term Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A6</td>
<td>Non-Standards are to be developed</td>
<td>Process</td>
<td>Pre-Sales</td>
<td>TW itself is considered a very flexible supplier, which consequently help to build long term relations with its customers but rather than been a strength, too much flexibility is leading to a very high time to market when including special services in standards portfolio</td>
<td>TW is becoming a customizer of solutions developing services for just one customer which is so specialized that cannot be included in the portfolio.</td>
<td>Organizational Flexibility</td>
<td>Breath of Product Range</td>
<td>High</td>
<td>Med-High</td>
<td>Control</td>
<td>• Operational Feedback Systems</td>
<td>• Customer Satisfaction Index</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A11</td>
<td>High Level Viability Study</td>
<td>Process</td>
<td>MKTO</td>
<td>DPS Team indicated a “3+low” RELATIONSHIP between this activity and high impact drivers as Price and Long-term Relation</td>
<td>MTKP provides poor information, or use vague reference documents requirements may be distorted and the viability study will take longer time.</td>
<td>Long-Term Relationship</td>
<td>Organizational Flexibility, Price, Delivery Lead Time</td>
<td>High</td>
<td>High</td>
<td>Control</td>
<td>• Improve Sc.2 documentation: process flows, structures, RACI Matrix...</td>
<td>Define KPIs for Special Projects (MTTSD, MTTC, Service Reuse)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>A17</td>
<td>Final Technical Validation</td>
<td>People</td>
<td>MKTO</td>
<td>DPS Team indicated a “3+low” RELATIONSHIP between this activity and Price</td>
<td>Technical team is disconnected with end user requirements, they just follow the scope doc.</td>
<td>Price</td>
<td>Long-Term Relationship, Delivery Lead Time</td>
<td>High</td>
<td>Medium</td>
<td>Influence</td>
<td>• Produce Service Reports, improve service documentation and assess Technical Team Performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>A20</td>
<td>Final Solution with provision</td>
<td>People</td>
<td>Integration and Processes</td>
<td>is deployed in customer premises with a considerable impact in Repair Times and Long-Term Relationship.</td>
<td>Technical team is disconnected with end user requirements, they just follow the scope doc.</td>
<td>Price</td>
<td>Long-Term Relationship, Delivery Lead Time</td>
<td>High</td>
<td>High</td>
<td>Influence</td>
<td>• Produce Service Reports and assess Technical Team Performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>A21</td>
<td>Service Management</td>
<td>Process and Tool</td>
<td>MKTO, MKTP</td>
<td>improve the service, decrease incidents and evolve a solution in terms of features or characteristics.</td>
<td>No Formal Procedure for IDEA GATHERING. Lack of Communication with OB and End Customers.</td>
<td>Long Term Relationship</td>
<td>Product and Service Features, Repair Times, Price</td>
<td>High</td>
<td>High</td>
<td>Control</td>
<td>• Operational Feedback Systems</td>
<td>Customer Satisfaction Surveys at two points: Entry and Monitoring Survet</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.4 Opportunities Table (Made by the Author)
Analyze and Improve

**PROCESS**

**Measure Performance (KPIs);** It is critical to start developing indicators so as to track performance in TW processes, not for judgment but to understand how to improve, and measurements should be easy to understand to all levels of the organization (T. Pzydek and P. Keller 2009 p.46). Service Level Agreements (MSA in TW) are identified as a high critical task when Formalizing the contract (A.15) because it involves gathering all the service documentation (General Terms & Conditions, Object, Scope, Rights & Obligations, service scope, service conditions structure, service modification, suspension and discontinuation, pricing condition, etc.) needed to support the upcoming stages.

The activity requires monitoring tasks, and improvements can be shaped around Key Performance Indicators (KPI) so as to better manage new service development. Some useful KPI are:

- **Service Viability Index:**
  
  \[ \text{Service Viability Index} = \frac{\text{Revenue from new services (over 12 months)}}{\text{Total Service Revenue (over 12 months)}} \]

  Incident Response time; are useful to have a statistical control on response time to resolve incidents. This average time can be later incorporated into MSA in order to have a more accurate and real timing.

  J. Van Bon and M. Piper explain that not meeting established deadlines and due dates may result in loss of confidence and affect future relations with the customers, either internal as the OBs and externals (2008, p.69). Some useful measures are:

  - **Mean Time between Failure (MTBF):**
    
    \[ \text{MTBF} = \frac{\text{Total Operating Time}}{\text{Number of Failures (same interval)}} \]

  - **Mean Time between Outages (MTBO):**
    
    \[ \text{MTBO} = \frac{\text{Total Operating Time}}{\text{Number of Outages (same interval)}} \]

  - **Mean Time to Repair (MTTR):**
    
    \[ \text{MTTR} = \frac{\text{Total Corrective Maintenance Time}}{\text{Number of Corrective Actions (in given time)}} \]

**Produce Service Reports,** especially in activities related with service deployment in activities (Sc.1 Activities 21-A24). The reporting should contain:
• Develop business targets to report performance where IT strategic objectives are aligned with TW strategic objectives.
• Create a responsibility Structure for reporting when provisioning and deploying a service though a RACI Matrix (Responsible, Accountable, Consulted and Informed)
• Reporting KPIs published in the internal platform, visible to Operating Businesses and DPS Team.

**Improve Process’s Documentation for Sc.1** The process for creating standard services in TW (Sc.1) is documented internally and published in the internal platform where relevant documentation as process flows, IT process, RACI Matrix are displayed, but the whole value chain is not described in any document, meaning that the end-user is not visible impacting negatively in the process description and deployment (Sc1. A21-A24) since the service is been developed for the OB and not thinking on the end user, who is ultimately who triggers purchases.

**Improve Process’s Documentation for Sc.2** given that special projects were always treated as irregular and specific requirements in TW, the processes are not precisely documented. Activities in Sc.2 as A11 High level Viability study are affected by poor documentation and by lack of knowledge about contact persons and end user. By having clear documentation for supporting processes, activities will be less impacted in terms of distortion and delivery time enabling a better communication flow for the technical team to understand.

One improvement area identified is the development of documentation and manuals for special projects were the following information is included: Process Map for Special Projects (as contained in this research) starting from the End User, showing OBs

• Develop a RACI Matrix
• OBs Contact Listing; it is useful to create a list where the presales contact of the OB’s worldwide are included so as to ensure communication flow between all members of the demand chain.
• Inclusion of KPI in the service agreement as:

  o Mean Time to Service Development (MTTSD); for Special Projects

  \[
  MTTSD = \frac{\text{Requested Date (onced the bid is won)}}{\text{Delivery Date (provision)}}
  \]

  o Mean Time to Service Change (MTTSC); for standardizing Special Projects

  \[
  MTTSC = \frac{\text{Start Date of standirization activities}}{\text{Day of Incorporation in the Catalogue}}
  \]

  o Service Reuse; Number of Special Projects that have been introduced in TW catalogue

  \[
  \text{Service Reuse} = \frac{\text{Special Projects (per year)}}{\text{Qty. of standarized services (per year)}}
  \]
Idea Gathering process: the idea generation process in TW does not involve validating existing ideas within the company, allowing anyone to document new services idea. The task of fulfilling the “PdP- PdS file” does not promote the use of the internal knowledge portal, or the contact with end user and OBs.

Some criteria can be incorporated in the PdP- PdS file, so as to encourage employees to have a customer-oriented view. It is important to for the person who is generating the idea to think in the future customer of the proposal (OB’s and End User). In this line of thought, the author considers three aspects that should be included in the PdP- PdS file.

1. What customer need is covered with this new service?

2. Where is the idea coming from?
   a. OB’s and Customer Requirements:
      i. Use Customer Satisfaction Surveys (Entry or Monitor)
   b. Competitors (though Internet, previous employees…)
   c. Own- Idea
   d. Internal Knowledge Network Portal

Ideas coming from the OBs and End-User should represent the most valuable ideas, and given a certain priority when scrutinizing the document.

3. What driver will be impacted with this new service/feature, and why?
   a. Price, Discount structures, billing, payment terms.
   b. Service-Level Factors, Service Availability, QoS and SLA
   c. Repair Times
   d. Long Term Relationship, Trust and Reliability; Influence on Roadmaps, negotiation of better discounts, faster turnaround quotations.
   e. Organizational Flexibility, Adapt processes to demand and specific requirements
   f. Financial Stability Profitability, Debt Levels, Investment New Technologies
   g. Service Packaging; Automated Quotation Tools, Web-based portals, B2B Interfaces
   h. Delivery Lead Time
   i. Geographic Coverage, extent of the service and supplier coverage to reach a specific difficult locations
   j. Price Vs. Quality Flexibility, Different quality levels at different price points
   k. Supplier Brand, Market Perception of TW and reputation
   l. Product & Service Features, Variants of each service; connections speed, class of service, contention ratios, flexible bandwidth options
   m. Breadth of product Range, Variety of wholesale products & Services offered by TW

These three questions are valuable for several reasons as, it helps to filter the ideas and priorities of new service proposals, serves to better target customers and once the author thinks on the customer, some ideas might be discarded.
PEOPLE

T. Pzydek and P. Keller (2009 p.46) define some elements of customer-focused companies that can be applied and translated to TW:

**Flattened Hierarchies:** It is mandatory to approach to the end user of wholesale services, reducing the “bureaucratic layers” in the company structure. The authors reflect this point through an “upside-down” perspective where the customer comes first, in this case the End User.

**Promote Effective Communication:** one significant gap present in most of the NSD activities within the company is the lack of communication within all members of the supply chain, especially in two sides; TW with the End User in general and the second is the disconnection of IT and Technical Staff with customer requirements. It is important that technical teams in TW as Network, MKTO, Integration; Processes understand how significant their role in delivering a customer-oriented process is.

**Reward Employees:** it does not imply rewarding the employee for doing its own job; the message is to provide a proper and fair compensation for doing the job, recognizing employees who exceed performance not with monetary rewards but with activities that promote cooperation and team spirit as public rewards, parties, etc. (Pzydek and Keller 2009 p.46)

**Team for Data Intelligence:** some valuable information was gathered through interviewing TW’s employees, which might be useful in identifying improvement areas recognition (A27 in Sc1). Some of them were also employees at one of TW’s major competitors and when they were asked about knowledge network portals as the one TW have, they inform that the competitor have an Intelligence Team who is only devoted to perform customer analysis, market search, filter the opportunities found by the industry analysts, CRM activities, etc.

The task of searching significant information through TW’s knowledge portal is a time-consuming and requires constant review. It is advisable to create a team within the DPS team to:

- Exploit market opportunities
- Develop insights about specific customers
- Create tools to track performance of projects in scenario 1 and 2.
- Talent Management within TW to develop employees performance evaluations
- Set measurable targets to the team.
- Client Development (internal and external) and promote relationship management with OB’s and End User.
- Team Building to promote cultural alignment specially involving the most significant OB’s members.

TOOLS

Customer satisfaction in TW is not currently monitored. Although communication barriers exist with the end customer, certain tools as Operational Support Systems
must be used to translate the VOC to all members in the supply chain. Some strategies frequently used to communicate q

Implement a system to appropriately monitor satisfaction with the Operating Businesses and End User is required.

**Operational Feedback Systems;** are presented as one strategy for promoting communication with the End User and Employees. Systems developed for making complaints or suggests might not provide accurate statistical information, but instead they encourage customer and employees to have their own say, since they are perceived as a “census” rather than a “sample”. The anecdotes and feedback information provided though these systems might create a source for ideas and improvement areas. (T. Pzydek and P. Keller 2009 p.48)

Researches in the Telecommunication Industry shows that companies in this field employ web-based portals as Operational Support Systems (OSSs) to promote the interaction between suppliers and end User. Although in TW barriers exist with the end users and even with the OBs, there is a need to create an automated tool so as to understand needs and find improvement areas. In cases where the End User is in need of a new service, they can document all the information in the system and be visible to the OB who can translate the need to the developers. Making it easy to deploy A27. Improvement Areas Recognition. Some services as Telepresence has a portal for reporting and usage purposes, but the portal does not allow the user to document ideas, improvements or even as a help desk.

**Customer Satisfaction Index & Survey:** a worthy way of tracking improvement areas and monitoring customer satisfaction is to design a Customer Satisfaction Index to keep track on the company’s performance as perceived by OB’s and End Users.

It has been observed that TW measures customer satisfaction though a survey delivered on paper (Annex 1) when implementing A26 Customer Satisfaction Survey in Sc.1 and A21 Service Management in Sc.2. In the current survey, it is noted how significantly difficult is to track the answers due to lack of measurements, and because of the barriers with the End User.

Customer surveys can be used as current, but it is strongly advisable to add some parameters and fields to create a continuum in the process.

Aspects to be included in the survey are divided in two points of the NSD lifecycle, creating the “Entry Survey” and the “Monitor Survey”

An interaction between OB’s and Customers with TW is critical at two points of the service lifecycle:

**ENTRY-SURVEY:** At the beginning of the service development particularly before deploying A1 (Sc1. A1 DPS Search for new service proposals), an entry survey must be carried out in order to understand requirement and customer priorities and proceed with the idea generation phase.

Currently the only documentation available in the Idea Phase is the PdP-PdS file that serves to document employees’ ideas. Nevertheless, a research task should be
performed to conceptualize the idea. For this purpose, the author proposes a survey as an input of the process, and will be known as Entry Survey. Aspects to be included in the survey are:

- **New Service or features proposals**
  - What need will this service covers?
  - How will your business benefit with this service?
- **Upgrade or Retire Service**
  - Reasons for retirement

Ideally, if an Operational Feedback System is in place it will be worthy to document customer feedback so it can be downloaded and serve as a starting point for a new service, or feature service.

**MONITORING SURVEY** a satisfaction survey is performed by TW in current processes, specifically in Scenario 1 - A26 and in Scenario 2 – A21. The aim of the current survey is to monitor service performance, but a more detailed survey will provide insights on the supplier’s performance helping to shape new service proposals or to recognize opportunities for future improvements in the service management and performance. Some aspects that might be included are:

- **Performance of the Service**: is already included in TW current survey.
- **Performance of the Supplier (OB’s and TW)** in terms of:
  - Price, Discount structures, billing, payment terms.
  - Service-Level Factors, Service Availability, QoS and SLA
  - Repair Times
  - Long Term Relationship, Trust and Reliability; Influence on Roadmaps, negotiation of better discounts, faster turnaround quotations.
  - Organizational Flexibility, Adapt processes to demand and specific requirements
  - Financial Stability Profitability, Debt Levels, Investment New Technologies
  - Service Packaging; Automated Quotation Tools, Web-based portals, B2B Interfaces
  - Delivery Lead Time
  - Geographic Coverage, extent of the service and supplier coverage to reach a specific difficult locations
  - Price Vs. Quality Flexibility, Different quality levels at different price points
  - Supplier Brand, Market Perception of TW and reputation
  - Product & Service Features, Variants of each service; connections speed, class of service, contention ratios, flexible bandwidth options
  - Breadth of product Range, Variety of wholesale products & Services offered by TW

**SUGGESTED SCALE**: Excellent, Good, Adequate, Poor and Inadequate. The idea of using the same scale is to translate the information into the CTQ model, and merge it with the industry assessment made by OVUM every two years so as to generate a competitive advantage with the industry.
• Create the survey in an excel file so it can be added-up constantly, so as to keep KPI metrics regarding customer’s purchasing drivers and suppliers performance.
• Request the OBs to send the survey to end users so as to better channel new service development. Allow OB’s to participate in the idea gathering and monitoring process, allowing them to have influence in TW’s roadmaps, since they represent a good source on go-to-market strategies and a source of inside knowledge to TW and TG.

**Calculate Value of Customer Retention**: One valuable method for calculating the lifetime value of a loyal customer, is based on the work by Frederick Reichheld of Bain and Co. and the University of Michigan’s Claes Fornell, as follows (Stewart, 1995):

• Define a significant period of time for the calculation. In TW case, the calculation can be made for the end users to understand which wholesale customer represent a source of profit. Also it serves to determine TW flexibility when a wholesale customer demands a Special project.
• Calculate the Net Cash Flow (profit) of various customers in different years in order to understand how much business was assigned to TW from their overall margin. It is also possible to segment the customer by OB, sales channel, age and so on.
• Understand how much TW customer's base erodes each year by drawing each customer “life expectancy”. For example old customers are likely to leave “10% a year” than new customers (T. Pzydek and P. Keller 2009 p.59). The authors suggest that in retail banking 26% of account holder desert in the first year while in the ninth year, the rate falls to 95.
• Compute the NPV (Net present Value) with the customer profit per year and the customer retention. The discount rate chosen is upon TW's to choose; a 15% rate indicates this % in annual return of assets.
  o Yr1 = NPV = profit ÷ 1.15.
  o Next year, NPV = (year-two profit × retention rate) ÷ (1.15) 2.
  o Year “n”, the last year in your figures, NPV = n year’s adjusted profit ÷ (1.15)n.

The sum of the years one through n is how much the customer is worth—the net present value of all the profits you can expect from his tenure. (Pzydek and Keller 2009 p.59).

6.2.2 Targeted Processes Analysis

At the same time combining CTQ performance drivers with value activities makes mapping activities effective and efficient in terms of the amount of detail that can be gathered, leading to uncovering root causes (Reidenbach and Goeke 2006 p.30).

The purpose of mapping the critical activities in Figure 6.11 and 6.12 is to have a visual tool of the NSD activities that have the greatest impact on value, revealing improvement areas that are associated to an increase of customer satisfaction.
Figure 6.11 Scenario 1 - Targeted Activities (Made by the Author)
Figure 6.12 Scenario 2 - Targeted Activities
CONTROL AND VALIDATION

In the previous phases the research generated certain critical to quality activities and drivers that are essential to customers for purchasing wholesale services in both scenarios. The current CONTROL phase serves to validate the CTQ framework proposed against one standard service of TW's portfolio.

Additionally this phase attempts to frame the CTQ approach so it can serve to position TW's services according to customer’s purchasing priorities, at the design phase and also when monitoring performance.

7.1 CONTROL Phase

The control phase serves to investigate whether the approach taken regarding shaping TW process through driver’s importance would support to better channel the development of new services in the future. For this reason, and to validate the CTQ framework, a service that is listed as standard (Scenario 1) is chosen. This service is currently in the monitoring phase of the lifecycle and is a peculiar service because since the moment of launch it has not reached the expected sales.

The main objective of this control phase is centered in two main outcomes:

- Validate the framework proposed so it point improvement initiatives within the CTQ activities identified, with any of the services in TW catalogue.
- Position TW services against customer purchasing priorities, in order to highlight drivers that has not been taken into account in the service design and to provide an understanding on the performance gaps between customer desires and TW services performance

The methodology to validate the results will be the same used to evaluate TW performance, through the CTQ matrix analysis, measured against the 13 drivers proposed by customer for standard services.

The service chosen is Telepresence, a service that allows companies to hold virtual meetings with remote offices, using rooms fitted out to simulate an on-site environment. Participants can see the other participants in life size, with true skin tones, localized sound and maintain eye contact with them. The sensation of being present in the same room provided through this system allows wholesale customers to replace their on-site
meetings with TLPS sessions. The TLPS infrastructure consists of the physical environment of the room, which includes the conference table and the technological components of the solution. The general characteristics of a TLPS room are:

- Capacity for up to 18 people per room, in an immersive environment: “sensation of being there”. The technological components do not interfere with the users (microphones, speakers, communications equipment, etc.).
- Minimum echo and background noise (room design, location of microphones, wall insulation, etc.).
- The layout of the furniture encourages participants to sit in the areas with optimum lighting and sound, making the image seems real.
- Each room ‘mirrors’ the others that the client has (they are decorated in the same way) to give the sensation that they are in the same room.
- The conference table is joined to the screen, giving the sensation of continuity with the remote site or sites.

### 7.1.1 CTQ Matrix Analysis - Telepresence

CTQ analysis has been developed along with the product manager of the service inside the company, and supported by a compilation of market analysis made by the TW and by professional analysts, and finally with the service documentation uploaded in the internal platform of TW, especially considering the Marketing Manual of the Service.

The CTQ Matrix produced a list of critical activities KPOV and drivers KPIV identified along the telepresence lifecycle. Table 7.1 presents CTQ assessment aims to recognize the main targeting errors and discrepancies when the service was designed and launched either by activity or by driver.
### CTQ PROCESS MATRIX

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<th>PHASES</th>
<th>Process Scenario 1 - INPUT</th>
<th>PRICE</th>
<th>Service-Level Factors</th>
<th>Long Term Relationship</th>
<th>Repair Times</th>
<th>Financial Stability</th>
<th>Org. Flexibility</th>
<th>Delivery Lead Time</th>
<th>Service Packaging</th>
<th>Price Vs Quality / Flexibility</th>
<th>Geographic Coverage</th>
<th>Product &amp; Service Features</th>
<th>Supplier Brand</th>
<th>Breadth of product Range</th>
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**Impact by Driver**

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Table 7.1 Telepresence Service – CTQ Matrix
In Figure 7.1 CTQ activities obtained in scenario 1 are compared against critical activities for TLPS produced in the matrix (grey bars). The outcome serves to validate the framework proposed showing that high impact activities are the same for both, been TLPS a standard service.

Figure 7.1 Pareto TLPS CTQ activities vs. Scenario 1 CTQ activities (Made by the Author).

Since the service’s assessment has produced a very similar list of critical activities, it is useful to understand where are the performance gaps between customer requirements and the service developed by TW though an analysis of the CTQ matrix of the service. The focus of this research is not the telepresence service, but provides a validation framework for TW services vs. customer desires.

Figure 7.2 Customer Requirements Vs. TLPS Performance (Made by the Author)
It is notorious that several criteria considered “priority” for the customer were not the central priority for TW when designing TLPS service. As mentioned before, the TLPS service is not the focus of this research; nevertheless improvement activities can be explored so as to gain visibility for this service. Certain drivers are highlighted to point significant information gathered through market research and TW’s service information that can lead to improvement activities.

**Price**, the market to which the Telepresence service belongs is known as Video Collaboration Market. This market is divided into three main groups: Telepresence Group, the Executive Group and the Desktop and Mobile group as shown in Figure 7.3. The difference among the three groups is given by the environment where the service is deployed. **DESKTOP AND MOBILE SYSTEM**, refers to the typical videoconferencing hardware where only power and a network are required, as for example Sykpe. Instead **EXECUTIVE GROUP** is a room-based system with one screen while the **TELEPRESENCE SERVICE** consist of any given video collaboration system with 3 or more screens. This information is useful to understand the pricing structure followed when pricing the service. As Figure 7.3 reflects, the three-conferencing levels are a trade-off between experience and functionality over price. The option chosen by TW was the most expensive one.

![Figure 7.3 Video Collaboration Market (J. Montiel, 2012)]

**Service-Level Factors**: SLA in TW are defined by the following parameters, Service Availability and Quality of Service. Table 7.2 reflects the industry SERVICE AVAILABILITY for this specific service, either Purchase or Rent where TW has a very low performance just for the fact of not providing a Rent option to customers.

<table>
<thead>
<tr>
<th></th>
<th>Purchase</th>
<th>Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG and TW</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>Competitor 1</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Competitor 2</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Competitor 3</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Competitor 4</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Competitor 5</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

Table 7.2 TLPS Service Availability TW and Competitors (Adapted from company’ documents)
Special attention is given to **Quality of Service** according to market information, various aspects must be included in the Telepresence service so as to provide a good quality of service (QoS). The first one is Bandwidth; the reason why best efforts networks cannot be used for high-end videoconferencing endpoints is because today’s most used video compression protocols require resource reservation to assure a certain level of QoS. Secondly, in pure voice telephony there is a common known numbering dial plan, while for videoconferencing no scheme exists yet making difficult the communications between companies.

**Long Term Relationship**, the business model identified with TW reflects that first customer, although internal, are the OB’s followed by the End User. The issue with this relationship and the telepresence service is that some OBs are planning to have their own video collaboration service, which they are allowed to have within the group. This represents a substantial conflict of interests between TW and the OBs, impacting significantly in the commercialization of the service. There are not formal agreements with OBs so as to create a robust relationship. Additionally, as stated in previous chapters, the OB’s are not taken into account in the phases for idea generation and service development. Not involving them creates this gap in the relationship.

Maybe if the OB were involved in the initial phases, the service would have been shaped differently in terms of what are the customers (internal) desires.

**Repair Times** for the TLPS service is defined as the availability of the rooms to provide the service in a period of 24 hours, 7 days a week. For the sake of simplicity, availability is calculated taking into account an average of 30.4 days per month.

The response times will vary depending on the equipment maintenance module contracted by the client. Availability will be measured and calculated on an individual basis for each meeting room. An office is considered available when it is possible to hold a Telepresence session, which implies that the communications layer complies with the minimum quality parameters necessary for a session to take place and the equipment required for the session being in perfect working order.

The length of time that any given meeting room is deemed to have been unavailable is calculated by adding together the lengths of time that a specific Meeting Room was not able to hold any previously scheduled meetings. With the incident data delivered by the Telepresence Client Service Centre, monthly availability of a client’s room is measured in the following way:

\[
\text{Room Availability (Monthly)} = \left( \frac{T_{tot} - T_{nonAvailability}}{T_{tot}} \right) \times 100\%
\]

Where:

- \( T_{tot} \) = total time in the period considered expressed in minutes/month, considering an average of 30.4 days per month, results in: 43776 total minutes per month.

- \( T_{nonAvailability} \) = non-availability time in minutes/month, measured from the time the incident is registered to the time the service is restored. The non-availability time will be
the total non-availability time of all the breakdowns in a certain client room, under the conditions described in the conditions section.

**Organizational Flexibility** Adaption of processes to demand and specific requirements is considered by TW. The Telepresence service is available within TW as Standard, but can adapt to user specific requirements, in this case is considered a Special Project and will require an independent feasibility study.

**Delivery Lead Time** The delivery time of each room will be defined in agreements between the Reseller and its Clients and must be validated by TW, as they could vary depending on the location of each room, due to aspects like availability of communications services, regulations for bringing in equipment, etc.

TW measures the Room Provision deadline from the moment of the order registration in the TIWS Sales System. Provision is complete when the Client signs a Room Approval form. The calculation of the Room delivery Deadline is as follows:

**Room Delivery Deadline**

\[
\text{Room Delivery Deadline} = \text{Meeting Room RFS Date} - \text{Date Registration Order in TW System} - \text{Posponement requested by client} - \text{Delay for which TG has no fault.}
\]

Maximum of 120 days to deliver the service, from the date the OB registers the order in the TIWS Sales System.

**Service Packaging** The Service has packaging features as Customer Self Service, Usage reports, Service Performance Reporting and the performance metrics of the network. Incidents and help desk in TW are managed though telephone or email. The current portal for the service has not a help desk section.

**Price Vs. Quality Flexibility** The service is priced according to different quality levels:

<table>
<thead>
<tr>
<th>MAINTENANCE CONTRACT</th>
<th>BASIC</th>
<th>WITH ACCESS REDUNDANCY AND CUSTOMER PREMISES EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>24×7×4</td>
<td>99.1%</td>
<td>99.5%</td>
</tr>
<tr>
<td>8×5×NBD</td>
<td>98.1%</td>
<td>98.4%</td>
</tr>
</tbody>
</table>

**24 x 7 x 4:** Response in four hours to resolve problems related to the equipment under maintenance, 24 hours a day, 7 days a week, including applicable public holidays.

**8 x 5 x NEXTBUSINESSDAY:** Response on the next business day to resolve problems related to equipment under maintenance along with the reports, materials and technical service, during working hours in the location of the equipment until 5:00 p.m. (17:00). Response within the next business day applies to service requests received before 3:00 p.m. (15:00) the previous day. Requests sent after this time will be dealt with on the second business day. If replacements are not available on-site, they will be sent with same day shipping priority. Cisco will provide on-site support when the replacements are received.
Geographic Coverage: TG has 80 endpoints in 6 different organizations. As a comparison with competitors, the highest number installed by one provider is 2400 endpoints in more than 120 organizations (Fig. 7.4).

![Telepresence Installed Base](image)

Supplier Brand: measures the market perception of TW for this specific service. Although TW has a strong supplier brand, with respect to the telepresence service it lacks the same degree of consumer knowledge. According to industry analysts TW is not considered as a major competitor for this service, and a simple Google search for “Managed Telepresence Service” show the telecom group (TG) in page 16. (Montiel, J. 2012 p.17)

Additionally a webpage who is leader in providing news about the service does not mention TW among the directory of service providers. Other channels that competitors are using to promote the service awareness is Twitter, at least 3 major competitors use social networks so as to promote online brand visibility (Montiel, J. 2012 p.17)

Breadth of product Range: TW currently provides a Telepresence service while its main competitors provide the complete package, Telepresence and Videoconferencing. This represents a disadvantage for TW since the number of Videoconferencing endpoints forecasted to be installed is far superior to those of Telepresence, and it is very probable that end customers prefer to have Telepresence and Videoconferencing services under the same umbrella. However a Videoconferencing service for TW is under development and expected in the third quarter of 2012.

Considering the analysis of the information and results obtained through the CTQ matrix, the Performance of the service demonstrates lack of customer-oriented processes in TW.

The control performed in this phase serves as a framework to measure the performance in the other services provided by TW, regardless of their lifecycle stage. More value will be obtained if the assessment is conducted at the initial stages of the development so as to position the services within customer priorities.
8 CONCLUSIONS

This ending chapter is intended to summarize the significance and contribution of the research study.

The chapter is divided in three sections; the first one seeks to cover the results obtained throughout the case-study research in TW. The second section provides answer to the research questions used to conduct the study, mainly by comparing the results with the research questions described in the first chapter.

The last section recognize the implications of the study, in terms of limitations in this research and proposes further studies to be conducted in the field, finalizing with the significance of the whole research.

8.1 Results

In today’s technology-based business environment, service providers face significant challenges to remain competitive in terms of improving the service quality and secondly, retaining the customer.

The methodological approach used in this research, DMAIC of Six Sigma, provided a systematical process and a business orientation to ensure that the service improvement activities are centered on the customer. This research sought to gain an understanding on the lifecycle of New Service Development (NSD) being channeled through customer priorities by comparing the purchasing criteria of wholesale services against the TW’s processes when developing new services.

An initial contribution of this research is the application of DMAIC approach used to guide this research, providing a methodical and systematical framework that can be used by Telecom service providers, OBs within the group and service firms in general seeking to have more customer-focused processes.

Main results of this study are originated from the “As-Is” process maps. The development of these diagrams provide an important contribution to this study, not only because process flows were drawn from the end user service´s request, but in because drawing the layout and combining it with CTQ matrix allowed to stress the most critical to quality (CTQ) activities within the service cycle in TW.

Later in the research, the assessment of the CTQ matrix was constructed so as to measure the correlation of the activities described in the process maps, with respect to the VOC prioritized criteria. The result of the correlation allowed locating the most CTQ activities in both scenarios for developing new telecom services aiming to reach an improvement business processes.
A significant contribution for the company is presented through the “Opportunities Table” built in Chapter 6 by summarizing CTQ activities along with a description of the impacted drivers and finally a solution proposal to mitigate the situation encountered. The proposals and initiatives were classified according to the implementation period in short and long term, and cover improvements proposal for Processes as KPIs to track performance; Tools as improvements in the current surveys and People so as to build and improve current relations with employees and internal and external customers.

The performance indicators proposed strive to track and manage NSD in TW, which as service provider must establish quality parameters to use as performance standards. As the saying goes, “If You Don’t Measure It, You Can’t Manage”, some KPI’s have been proposed to monitor performance of the company, employees, services, measure time of NSD and to understand customer profitability.

“Marketing has the main responsibility for achieving profitable revenue growth for the company”. - P. Kotler (1999 p.18).” By this Kotler expressed the necessity of building profitable relations with customer so as to achieve revenue growth. Creating synergies with TW’s internal customer which are the OB’s, and building loyal and long term relationships with them and end users, facilitates significantly the transfer of inside market knowledge and know-how. Although “partnership” has been an over-used word, wholesale customers mainly OB’s and TW must start to establish a productive communication channel to create trusting and mutually beneficial relations.

The research can be extrapolated to other departments and with other services in the portfolio within TW so as to measure how customer-oriented are current business processes. Similarly the OB’s of the group can benefit for the research in terms of acknowledging their own performance by assessing customer priorities.

8.2 Answer to research Questions

The following research questions were used to guide this study,

- How is New Service Development (NSD) managed in TW?
- Which are the critical to quality (CTQ) variables that drive customer satisfaction in the telecommunications wholesale industry?
- Which are the most CTQ activities in the lifecycle of both scenarios?
- Where are the gaps between the services developed by TW and the Voice of the customer (VOC)?

The first question was aimed to explore and differentiate NSD processes in TW so as to identify the two scenarios in which TW develops service. The differentiation was possible through the collection of information based on empirical evidence and the outcome of the interviews. The first scenario describes the development of “Standard Services” proposed each year by the company’s human capital, and the second one involves a specific customer request to develop a custom solution denominated internally as “Special Project”.

The distinction of two different NSD lifecycles allowed developing specific documentation for each scenario, such as process diagrams, which are not described
in TW’s for scenario 2. At the same time solutions were identified based on each scenario, highlighting the criticality of each scenario separately and channeling improvement initiatives as two different processes.

The solution initiatives were obtained by answering to the addressed subtopics; CTQ variables prioritized by the customers and CTQ activities within TW’s processes. Despite the unusual application of six sigma methodologies in telecom service providers, the employment of these tools and techniques, as CTQ tools and value performance gap framework, allowed to the researcher to gather significant measurable data that served to point performance gaps and monitor the positioning of products and services.

One of the major contributions of the study is the usage of the CTQ Matrix so as to position services at any stage of the service lifecycle. Best results are achieved when the matrix is deployed at the initial stages of the service lifecycle because it obliges TW to think on customer priorities.

Concerning the second question, performance gaps were identified as an outcome of the CTQ matrix, by comparing how customer priorities are linked to TW’s internal process. The “value performance” approach allowed deepening into the occurrence and impact of certain drivers, such as price, within the service development lifecycle activities, both standard and special. The impact of each driver and activity served to explore and how customer-oriented are the internal processes and at the same time to create competitive advantage opportunities by comparing TW’s performance against the performance of different business providers.

8.3 Implications for Research

The current research explores service improvement opportunities by using DMAIC’s methodology by analyzing current process. For future research DMADV of Six Sigma (Define, Measure, Analyze, Design, Verify) can serve to create a new process in the company, following the customer-oriented framework described in this research.

Additionally, the CTQ matrix that rated TW’s performance was rated by the author along with MKTP team, focusing only in the vision of oneself. To extend this research and gain a more customer-oriented view, interviews to the OB’s and different stakeholders should be made. Other limitations of the research are centered in the difficulty of gathering and quantifying service process information (Bhargava et al. 2010 p.7658). An important portion of the VOC captured in this research is gathered through a professional analysts specialized in the telecommunications area, so it is considered to cover a significant sample of the wholesale market.

In the second scenario, a limitation is considered regarding the importance weights of the VOC to indicate customer purchasing priorities, because they were assessed within the company TW, using as a standard the outcome of the wholesale customer survey. Although customers are the same in the first and in the second scenario, purchasing priorities might change depending on the type of purchase, whether it is a standard service, or a special project.
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